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ABSTRACT

Developed during the 1976-77 school year to assist Washington grade 7-8 teachers in small school districts with the improvement of curriculum and instruction, this learning-objective-based curriculum suggests activities, monitoring procedures and resources for mathematics. Introductory materials describe the organization of Small School materials, relationship to Washington's Student Learning Objectives (SLO) Law, format of the curriculum guide, definitions of format terms, goals for the Washington Common Schools, mathematics program goals and the K-8 mathematics curriculum scope. The scope of the grade 7-8 curriculum includes whole numbers (addition, subtraction, multiplication, division and story problems): integers: rational numbers (common fractions, ratios, percentage, proportion and decimals): real numbers: algebraic expression: numeration (number theory, scientific notation and exponents): geometry (two- and three-dimensional shapes, points, lines, line segments, angles, triangles, circles, perimeter, area and volume): graphs: probability and statistics: and measurements (time, linear, capacity, weight, temperature and maintenance of English measurement). (NEC)

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SMALL SCHOOLS
MATHEMATICS CURRICULUM

GRADES 7-8

Reading · Language Arts · Mathematics · Science · Social Studies

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Dr. Frank B. Brouillet, State Superintendent of Public Instruction, Olympia,
Washington

SMALL SCHOOLS

MATHEMATICS CURRICULUM

7-8

Scope

Objectives

Activities

Resources

Monitoring Procedures

This is a publication of the Instructional and Professional
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Olympia, Washington.

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APPRECIATION

Many educators have been involved in the development of the Small Schools curriculum materials. Of these, Robert Groeschell, now retired from the office of the State Superintendent of Public Instruction, deserves special recognition of his insight, leadership and support in initiating the Small Schools Curriculum Project.

In order to provide assistance to small school districts, a curriculum assessment was conducted by Mr. Groeschell in the spring of 1975. The findings of this assessment pointed out the need for the development of curriculum guidelines to assist small districts in identifying learning objectives and in planning for program implementation. These findings were used to provide the basis for originally funding the Small Schools Curriculum Project.

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INTRODUCTION

The Small Schools materials were developed through the cooperative efforts of three levels of educational organizations: local, regional and state. Forty primary teachers and ten elementary principals from small districts in Snohomish and Island Counties (Arlington, Darrington, Granite Falls, Lake Stevens, Lakewood, Monroe, Snohomish, Stanwood, Sultan, South Whidbey and Monroe Christian School), developed and sequenced student learning objectives for grades kindergarten through third in five curriculum areas: reading, language arts, mathematics, science and social studies and for grades four through six in three curriculum areas: reading, mathematics and language arts. Suggested activities, monitoring procedures and resources used in teaching the objectives were identified and each student learning objective was correlated to the State Goals for Washington Common Schools and to broad program goals. Educational Service District 109 and the office of the Superintendent of Public Instruction provided technical assistance, organizational leadership and editorial and publication services to the districts. Curriculum specialists from Washington colleges, universities and local school districts also assisted with the development of materials.

On the following pages you will find a portion of the Small Schools Curriculum. Included are student learning objectives, suggested activities, monitoring procedures and resources for Mathematics. These materials were developed during the 1976-77 school year.

ORGANIZATION OF THE SMALL SCHOOLS MATERIALS

Book covers and objective pages for all Small Schools materials have been color-coded for each subject: Reading--green, Language Arts--yellow, Mathematics--blue, Social Studies--buff and Science--pink. Following each colored objective page there are several pages which identify activities, resources and monitoring procedures which may be used when teaching to the objectives. See pages viii and ix of this book for more detailed explanation of the format. On those objective pages all objectives for an area of the scope are identified. Within each curriculum book the objectives have been correlated to the Goals for the Washington Common Schools and to the Small Schools Program Goals for that subject area.

RELATIONSHIP TO THE SLO LAW

The purpose of this book and all other Small Schools materials is to assist teachers with the improvement of curriculum and instruction. In addition, it is expected that many smaller districts lacking curriculum personnel will find this book helpful in complying with the SLO Law. (This Law requires districts to identify student learning objectives and to evaluate each student's performance

related to the attainment of the objectives.) Contained within this book are many more objectives than any district would choose to identify as their SLO objectives. In order to provide districts with assistance in identifying objectives which might compose their SLO list, selected objectives are marked with an asterisk (*). These objectives have been selected with the understanding that they serve only as a model when using the Small Schools materials in helping districts to meet the requirements of the SLO Law.

For more information concerning the SLO Law, see the Handbook for School District Implementation of the Student Learning Objectives Law available from the office of the State Superintendent of Public Instruction.

FORMAT

One unique feature of the Small Schools Curriculum is the format arrangement of information on the page. The format was developed in order to facilitate the transportability of the product by allowing districts to personalize the curriculum materials to meet their own educational programs. The Small Schools Format provides a simple arrangement for listing objectives and identifying activities, monitoring procedures and resources used in teaching.

Page One

The first format page lists the sequence of student learning objectives related to a specific area of the curriculum for either reading, language arts, mathematics, science or social studies. For each objective a grade placement has been recommended indicating where each objective should be taught and mastered. The grade recommendation is made with the understanding that it applies to most students and that there will always be some students who require either a longer or shorter time than recommended to master the knowledges, skills and values indicated by the objectives.

Columns at the right of the page have been provided so district personnel can indicate the grade placement of objectives to coincide with the curriculum materials available in their schools. District personnel may also choose to delete an objective by striking it from the list or add another objective by writing it directly on the sequenced objective page.

SMALL SCHOOLS CURRICULUM PROJECT - Working Copy

Subject: Mathematics

Specific Area: Integers

	4	5	6	7	8
The student knows:					
the set of integers is the set of whole numbers, their opposites and zero. i.e., ...-2, -1, 0, 1, 2, ...	7-9				X X
any integer is either positive, negative or zero.	7-9				X X
The student can do this:					
order integers. Example: $-1 < 4, 6 > -5, -7 < -1, -2 > -8$.	7-8				X X
find the opposite of an integer. Example: $-6, -3 > -6$.	7-8				X
find the position of an integer on the number line.	7-8				X
read and write equations with positive and negative integers.	7-8				X X
add integers. Example: $(-5) + (-3) = -8$.	7-8				X X
subtract integers. Example: $(-7) - (-2) = -5$.	7-8				X X
multiply integers. Example: $(-3) (-2) = 6$.	7-8				X X
divide integers. Example: $20 \div (-2) = -10$.	7-8				X X
solve word problems requiring integers.	7-8				X
solve one step (M1-1) and two step (M2-1) open sentences involving integers.	7-8				X

Page Two

On the second format page, one or more objectives from the first format page are rewritten and suggested activities, monitoring procedures and possible resources used in teaching to the objective(s) are identified. The objectives are correlated to the State Goals for Washington Common Schools and to broad K-12 program goals. The suggested grade placement of the objectives and the activities is indicated and, wherever applicable, the relatedness of an objective to other curriculum areas have been shown.

Below is an example of a completed second format page. Teachers and principals in local districts may personalize this page by listing their own resources and by correlating their district goals to the student learning objectives.

SMALL SCHOOLS PROJECT - Working Copy

Suggested Objective Placement 7-8

Student Learning Objective(s) A. The student knows any integer is either positive, negative or zero. B. The student is able to multiply integers. Example: $(-2)(-3) = 6$. C. The student is able to divide integers. Example: $20 \div (-2) = -10$.

State Goal	1, 10
District Goal	
Program Goal	2, 3, 8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Multiplication/Division Bingo
Group Size: entire class
Materials: bingo game board as shown below, marker, multiplication and division problems with positive and negative integers

Give students a worksheet with multiplication and division problems involving integers. Correct and group students needing additional assistance.

District adopted text.

Procedure(s):

- The caller reads the multiplication and division problems with positive and negative integers.
- For example, one card might read "N - negative 5 times negative 6." Cell N 2 has + 30 or $-5 \cdot -6$ on it. A marker is placed on that cell.
- A second card might read "G - negative 12 divided by negative 3." Cell G 5 has + 4 or $-12 \div 3$ on it.
- The first player who covers a horizontal, vertical, or diagonal straight line wins.

Sample card:

1	-4	+1	-5	+2	+12
2	-9	0	+30	+22	-7
3	+8	+19	FREE	-3	-16
4	+36	-10	-21	-14	-1
5	+6	+11	-25	+4	-27
	B	I	N	G	O

District Resources

DEFINITION OF FORMAT TERMS
Small Schools Curriculum Project

Subject indicates a broad course of study. The subject classified the learning into one of the general areas of the curriculum, i.e., reading, mathematics, social studies.

Specific Area indicates a particular learning category contained within the subject. Within the subject of reading there exist several specific areas, i.e., comprehension, study skills, word attack skills.

State Goal indicates a broad term policy statement relating to the education of all students within the State of Washington. In 1972, the State Board of Education adopted 10 State Goals for the Washington Common Schools.

District Goal generally reflects the expectations of the community regarding the kinds of learning that should result from school experience. These goals are employed mainly to inform the citizenry of the broad aims of the school. When district goals are correlated to student learning objectives, community members are able to see how their expectations for schools are translated daily into the teaching/learning process of the classroom.

Program Goals are K-12 goals which do not specify grade placement. These goals provide the basis for generating subgoals or objectives for courses or units of study within a subject area. Program goals are used as a basis for defining the outcomes of an entire area of instruction such as mathematics, language arts or social studies.

Student Learning Objective

Three major types of learning objectives which have been identified are knowledge, process and value objectives.

Knowledge Student Learning Objectives identify something that is to be known and begins with the words, "The student knows..." Knowledge objectives specify the knowledge a student is expected to learn. These objectives include categories of learning such as specific facts, principles and laws, simple generalizations, similarities and differences, etc.

An example of a Knowledge Student Learning Objective is: "The student knows guide words in a dictionary indicate the first and last words on the page."

Process Student Learning Objectives identify something the student is able to do, and begins with the words, "The student is able to..." These objectives are associated with the rational thinking processes of communication, inquiry, problem solving, production, service and human relationships.

An example of a Process Student Learning Objective is: "The student is able to associate a consonant sound with the letter name."

Definition of Format Terms
continued

Value Student Learning Objectives identify only the type of values which foster the context of the discipline. These objectives are thought to be most uniformly and consistently approved by society as supporting the major aims of the discipline.

An example of a Value Student Learning Objective is: "The student values reading as a worthwhile leisure time activity."

Suggested Learning Activities describe the behavior of both the teacher and students. The instructional strategies employed by the teacher, as well as the activities undertaken by the students, are included in this section. Each activity includes materials, group size and procedures.

Suggested Monitoring Procedures indicate informal methods for determining the progress a student is making towards the attainment of the objective. These methods include techniques such as teacher observation, student interest and attitude surveys and recording results of classroom instruction.

Possible Learning Resources indicate materials, teacher made or commercially produced, which are needed by both the teacher and students in order to accomplish the learning activities.

* * * * *

Appreciation is extended to Dr. Charles Murray, Superintendent, and the staff of ESD 189 for providing meeting space, equipment and resources which facilitated the development of the Small Schools Curriculum materials.

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* * * * *

SMALL SCHOOLS PROJECT

GOALS FOR THE WASHINGTON COMMON SCHOOLS

1. As a result of the process of education, all students should have the basic skills and knowledge necessary to seek information, to present ideas, to listen to and interact with others, and to use judgment and imagination in perceiving and resolving problems.
2. As a result of the process of education, all students should understand the elements of their physical and emotional well-being.
3. As a result of the process of education, all students should know the basic principles of the American democratic heritage.
4. As a result of the process of education, all students should appreciate the wonders of the natural world, human achievements and failures, dreams and capabilities.
5. As a result of the process of education, all students should clarify their basic values and develop a commitment to act upon these values within the framework of their rights and responsibilities as participants in the democratic process.
6. As a result of the process of education, all students should interact with people of different cultures, races, generations, and life styles with significant rapport.
7. As a result of the process of education, all students should participate in social, political, economic and family activities with the confidence that their actions make a difference.
8. As a result of the process of education, all students should be prepared for their next career steps.
9. As a result of the process of education, all students should use leisure time in positive and satisfying ways.
10. As a result of the process of education, all students should be committed to life-long learning and personal growth.

MATHEMATICS PROGRAM GOALS
(K-12)

1. The student values the study of mathematics for its usefulness and application to everyday life.
2. The student develops the ability to communicate with precision and confidence using the vocabulary and symbols unique to mathematics.
3. The student develops the concept of number and numeration including counting, place value, reading and writing numbers, various numbering systems, number theory and scientific notation.
4. The student develops general mathematical concepts of time-space relationships; equality-inequality; measurement; function; graphs, charts and tables; probability and statistics; and geometry.
5. The student develops accuracy in using the computational skills of adding, subtracting, multiplying and dividing.
6. The student develops the ability to use problem-solving techniques.
7. The student develops the knowledge and use of the structure of mathematical systems and real numbers.
8. The student knows and is able to use the symbols, elements, operations and structure of the following number systems: whole numbers, integers, rational numbers, real numbers and complex numbers.

MATHEMATICS
SCOPE (K-8)

I.	WHOLE NUMBERS	
	A. Counting (Serial, Objects, Order) -- K-3	
	B. Equality and Inequality -- K-6	
	C. Reading and Writing Numerals -- K-6	
	D. Place Value -- K-6	
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	F. Subtraction -- 1-8	9
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	B. Money -- 1-6	313
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	D. Capacity -- 4-8	319
	E. Weight -- 4-8	323
	F. Temperature -- 3-8	331
	G. Maintenance of English Measurement -- 4-8	337

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SUBJECT: Mathematics
 SPECIFIC AREA: Whole Numbers: Addition

Page

Suggested
Grade Placement

District
Placement

4 5 6 7 8

The student knows:

- . addition is the combining of numbers.
- . an addend is one of a set of numbers to be added. $(4) + (2) + (3) = 9$
- . a sum is the total of all addends.
- . that adding zero to a number does not affect the sum.
- . the addition facts with sums to nine (mastery)
- *. the addition facts with sums to 18. (mastery)
- . that the order in which two numbers are added does not change their sum (commutative property), i.e., $3+5 = 8$ or $5+3 = 8$.
- . when adding three or more numbers the way addends are grouped does not affect the sum (associative property), i.e., $(1+2) + 4 = 1 + (2+4)$.
- . and maintains skills and basic facts of addition taught in primary grades (see Mathematics, Addition K-3).

K-1
1-3
1-3
1-2
1-2
2-3
2-3
1-3
3 4-8

The student is able to:

- *. add two two-digit numbers without renaming (carrying), i.e., $21 + 32 = 53$.
- . add three or more one-digit numbers.
- . add two three-digit numbers without renaming (carrying), i.e., $123 + 234 = 357$.
- . add three or more two-digit numbers with a sum of less than 100 without renaming (carrying), i.e., $21+23+14 = 58$.
- *. add any numbers with two or more digits that require renaming (carrying), i.e., $26+48 = 74$.
- . add any three or more two-digit numbers, i.e., $39+65+87+88 = 279$.
- . add any two or more three-digit numbers with renaming.
- *. add any two or more four-digit numbers with renaming.
- *. complete any addition problems in either horizontal or vertical form.
- . estimate sums using the concepts of "greater than" and "less than" ($140 + 90 > 200$ or < 250).

1-2
1-2
2
2-3
2-3
3-4
3-4
3-4
3 5-6
7 5-6

The student values:

- . the quick and accurate recall of basic facts.

3 4-8

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OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

18

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Student Learning Objective(s) A. The student knows and maintains skills and basic facts of addition taught in primary grades (see Mathematics, Addition K-3), B. The student is able to complete any addition problems in either horizontal or vertical form. C. The student values the quick and accurate recall of basic facts.

State Goal	1,8
District Goal	
Program Goal	2,3,5

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Football</p> <p><u>Group Size:</u> entire class</p> <p><u>Materials:</u> overhead projector, transparency with outline of football field (including yard marks, 5 yard intervals), tagboard cut into shape of football, kitchen timer, two construction paper or tagboard cards (one red, one green), stack of cards with number combinations to be summed</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Split class into two groups, line up along walls. . One group has red card, and the other green. . Red begins first half, green second. Place "ball" on 20-yard line toward red's goal. . Set timer for six minutes (or any other number). . Read number combinations (i.e., three plus four). . Student who has red card must respond quickly and accurately (2-3 seconds). Pass card to the next player in line when he/she answers correctly or incorrectly. . Advance the "ball" toward red's goal if correct and no penalty (see below). . When ball crosses goal, six points are scored for their team. Keep score on board or overhead. . Penalties: <ul style="list-style-type: none"> . "Delay of game" - ball moves 5 yards backward. Call next pair of numbers for same student. . "Fumble" - wrong answer given. Ball goes over to other team at the place it was fumbled. . "Interference" - talking out of turn - 15 yards in favor of non-offending team. 	<p>Pair students having difficulty with specific combinations with more able student for review and drill.</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>



Student Learning Objective(s) A. The student knows and maintains skills and basic facts of State Goal
addition taught in primary grades (see Mathematics, Addition K-3). B. The student is able to complete District Goal
any addition problems in either horizontal or vertical form. C. The student values the quick and accurate recall of basic facts. Program Goal

1,8
2,3,5

Related Area(s) _____

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Six Digit Relay
Group Size: teams of six
Materials: cards with 6 digits in each number for addends, chalk, chalkboard

Worksheet of basic addition facts. Group students who have problems with certain combinations and reteach.

District adopted text.

Procedure(s):

- . The first person on the team writes the problem on the chalkboard then adds the one place digit and records the answer carrying any number necessary to the tens column.
- . The second student adds the tens column and records it, carrying if necessary.
- . The game proceeds until the problem is solved.
- . The first team with the correct answer wins.

Title: Addition Tic-Tac-Toe
Group Size: pairs
Materials: large cardboard, tic-tac-toe board, two boxes of cards (marked: x - problems on back of card, 0 - problems on back of card)

District Resources

Procedure(s):

- . Two students play Tic-Tac-Toe by choosing "X" or "0," picking cards from appropriate boxes and working exercises.
- . If answer is correct (the other student checks), the student places his/her card on a square.
- . If not, student must wait until next turn.



Suggested Activities: Grade(s) _____

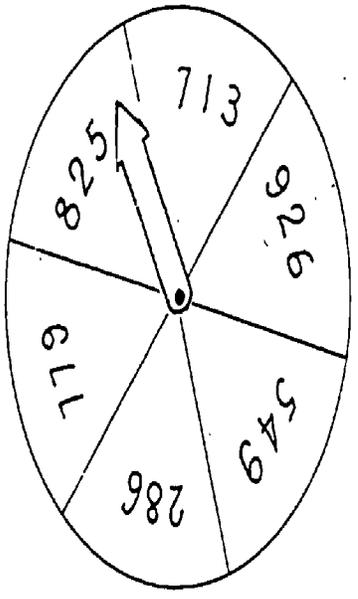
Suggested Monitoring Procedures

Possible Resources

Title: Spin Addend
Group Size: pairs, small group
Materials: 1 die marked 2-7, spinner cards (see illustration), spinner, paper and pencil

Procedure(s):

- . Players, in turn, roll the die to see how many addends they must spin.
- . The spinner is spun the number of times the die indicates, and the players write down the addends.
- . The resulting problem is then solved.
- . Players check each other's work.
- . One point if correct; thirteen wins.



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District Resources

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Student Learning Objective(s) <u>A. The student knows and maintains skills and basic facts</u>	State Goal	1,8
<u>of addition taught in primary grades (see Mathematics, Addition K-3).</u>	District Goal	
<u>B. The student is able to estimate sums using the concepts of "greater than" or "less than" ($140 + 90 > 200$ or < 250).</u>	Program Goal	2,3,5

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Estimating Sums</p> <p><u>Group Size:</u> small group</p> <p><u>Materials:</u> chalkboard, worksheet</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Ask the group if there are situations in life when it might be important to estimate an answer in adding. Help students to elicit responses such as shopping, telling time, estimating distance, mileage, etc. Put several examples on the board, and have students work the problems as a group using the terms "greater than" and "less than." Give students additional examples on a worksheet. Have the students circle their estimated answer, then work the problem as a check. <p><u>Example(s):</u></p> <p>$4821 + 190 > 5000$ or < 5100</p> <p>$284 + 990 > 1100$ or < 1300</p>	<p>Worksheet of addition problems to check combinations that pose problems. Group students for reteaching.</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>

Suggested Activities: Grade(s)	Suggested Monitoring Procedures	Possible Resources
--------------------------------	---------------------------------	--------------------

District Resources

30

31



PROJECT: Mathematics
 SPECIFIC AREA: Whole Numbers: Subtraction

Page
 Suggested
 Grade Placement
 District
 Placement

The student knows:

- . that subtraction is the inverse of addition.
- . that subtracting zero from a number does not affect the sum.
- . the difference is the result of subtracting one quantity from another, i.e., $5 - 3 = 2$
- . the minuend is the quantity from which another quantity is to be subtracted, i.e., $6 - 3 = 3$.
- . the subtrahend is the quantity to be subtracted from another, i.e., $4 - 1 = 3$.
- . the subtraction facts with a minuend of five or less (mastery).
- . the subtraction facts with a minuend of nine or less (mastery).
- *. the subtraction facts with a minuend of 18 or less (mastery).
- . and maintains skills and basic facts of subtraction in primary grades (see Mathematics, Subtraction K-3).

	4	5	6	7	8
1-3					
1					
1-2					
1-2					
1-2					
1-2					
2					
2-3					
11 4-8					

The student is able to:

- . subtract a one-digit number from a one- or two-digit number without remaining (borrowing), i.e., $8 - 2 = 6$, $25 - 2 = 23$.
- *. subtract a two-digit number from a two-digit number without renaming (borrowing), i.e., $48 - 26 = 22$.
- *. subtract a one-digit number from a two-digit number requiring renaming (borrowing), i.e., $17 - 8 = 9$.
- *. subtract a two-digit number from a two-digit number requiring renaming (borrowing), i.e., $37 - 28 = 9$.
- . subtract a one-, two- or three-digit number from a three-digit number requiring renaming (borrowing), i.e., $463 - 7 = 456$; $463 - 27 = 436$; and $463 - 187 = 276$.
- *. complete any subtraction problem in either horizontal or vertical form.
- . check subtraction problems by addition.

1-2					
1-2					
2-3					
3					
3					
11 4-6					
11 4-6					

The student values:

- . the quick and accurate recall of basic subtraction facts.

11 4-6					
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OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

33

34

Student Learning Objective(s) A. The student knows and maintains skills and basic facts State Goal
of subtraction in primary grades (see Mathematics, Subtraction K-3). District Goal
plete any subtraction problem in either horizontal or vertical form. Program Goal
subtraction problems by addition. D. The student values the quick and accurate recall of basic subtraction facts.
 Related Area(s) _____

1
1,2, 5,6

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Football
Group Size: entire class (2 teams)
Materials: overhead projector, transparency with outline of football field (including yard marks, 5-yard intervals), tagboard cut into shape of football; kitchen timer, two construction paper or tagboard cards (one red, one green), stack of cards with number combinations to be subtracted.

Give students a worksheet with incomplete subtraction problems and addition problems using like combinations. Circle the errors and reteach students with common combination difficulty.

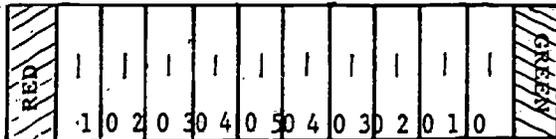
District adopted text.

District Resources

Procedure(s):

- Draw outline of football field on transparency.

Example:



- Divide class into two groups, and have students line up along wall.
- One group has the red card and the other the green card.
- The red team begins one first half, the green team one second. Place "ball" on 50-yard line toward red's goal.
- Set timer for six minutes (or any other number).
- Read number combination, i.e., seven minus four.
- Student who has red card must respond quickly and accurately (2-3 seconds).
- Advance the "ball" five yards toward red's goal if correct and no penalties.

Suggested Monitoring Procedures

Possible Resources

Penalties:

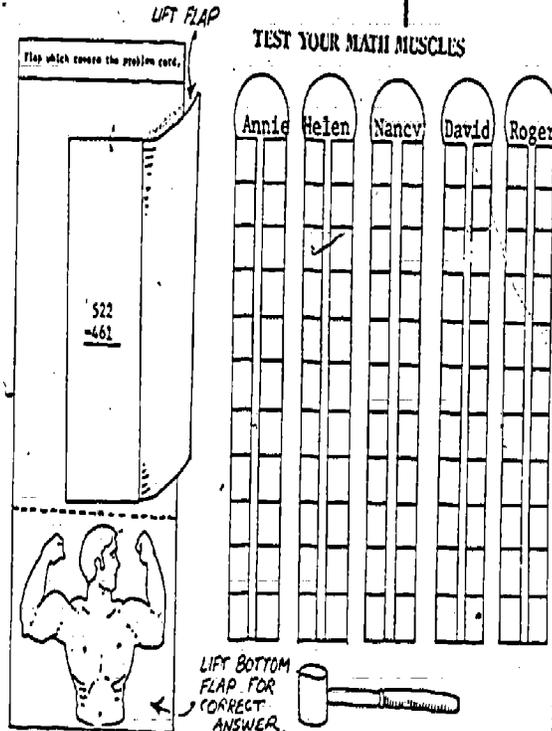
1. "Delay of game" -- ball moves 5 yards backward.
 2. Call next pair of numbers for same student.
 2. "Fumble" -- wrong answer given. Ball goes over to other team at the place it was fumbled.
 3. "Interference" -- talking out of turn--15 yards in favor of non-offending team.
- Student passes the card to the next student in line if he/she answers correctly. If student answers incorrectly, the ball goes to the other team and is placed on their corresponding yard line.
 - When ball crosses goal, 6 points are scored for that team. Keep score on chalkboard or overhead.

Title: Test Your Math Muscles
Group Size: small groups
Materials: gameboard, markers, worksheet, paper, pencil

Worksheet with subtraction problems. Ask students to check by using addition. Re-group students having difficulty.

Procedure(s):

- One student in the small group does not compete with the others. Instead, he/she chooses the problem to be worked and inserts the card with that problem written on it under the problem holder (see illustration). The answer is written at the bottom of the problem card so that it is visible when the flap with the Muscle Man picture is lifted.
- The problem is concealed from the others until the selector says go.
- The other students solve the problem. They may or may not copy the problem.
- As the students finish, they put their pencils down and place their writing hand on top of their heads.
- The player who is the selector checks the answers.
- The first player to finish correctly advances one space toward ringing the bell.



Page
Suggested
Grade Placement
District
Placement

JECT: Mathematics
SPECIFIC AREA: Whole Numbers: Multiplication

4 5 6 7 8

The student knows:

- . that multiplication can be pictured as the combination of equal sets.
- . a factor is one of two or more quantities having a designated product.
- . a product results when two numbers are multiplied.
- . the product of any number multiplied by the factor of zero is zero ($6 \times 0 = 0$).
- . the product of any number multiplied by the factor of one is that number ($3 \times 1 = 3$).
- *. the multiplication facts with products through 81 (mastery).

3
3
3
3
3
3-5

The student is able to:

- *. multiply one, two and three-digit numbers by a one-digit number:
 $4 \times 5 = 20$ 22 222
 $\begin{array}{r} x 5 \\ 110 \end{array}$ $\begin{array}{r} x 5 \\ 1110 \end{array}$
- *. multiply any number by a two-digit number: 126 14
 $\begin{array}{r} x 15 \\ 630 \\ \underline{126} \\ 1890 \end{array}$ $\begin{array}{r} x 12 \\ 28 \\ \underline{14} \\ 168 \end{array}$
- *. multiply any number by any three-digit number: 626
 $\begin{array}{r} x 120 \\ 12520 \\ 626 \\ \underline{75120} \end{array}$
- . estimate products using concepts of "greater than" and "less than."
- *. multiply by products of 10 (10's, 100's, 1,000's.)

3-5
4-5
5-6
4-6
4-6

The student values:

- . the quick and accurate recall of facts.

15 3-8



OPTIONAL GOALS AND ACTIVITIES

<p>PHYSICAL EDUCATION</p>	<p>MUSIC</p>	<p>SOCIAL STUDIES</p>
<p>ART</p>	<p>LANGUAGE ARTS</p>	<p>MATH</p>
<p>SCIENCE</p>	<p>HEALTH</p>	<p>READING</p>
<p>CAREER EDUCATION</p>	<p>ENVIRONMENTAL EDUCATION</p>	<p>OTHER _____</p>

40

41



Student Learning Objective(s) The student values the quick and accurate recall of facts.

State Goal

1
5, 8

District Goal

Program Goal

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Basic Facts Solitaire
 Group Size: individuals
 Materials: deck of cards consisting of multiplication facts

Procedure(s):

- . Each deck consists of matching pairs of phrase and answer cards. For example, 7 x 8 and 56 make a multiplication fact pair. The difficulty of the game depends on (1) the difficulty of the facts and (2) the number of pairs of phrase and answer cards in the deck. This may vary from ten to 25 pairs.
- . Phrase cards are printed in red and answer cards are printed in black.
- . A matching pair consists of a phrase card (red), and answer card (black).
- . Player shuffles cards and turns the first two cards face up. If these cards are a matching pair, player then covers them by placing the next two cards face up on top of the first two cards.
- . If no pair is showing, the player turns up two more cards so that he/she has four face-up cards showing. Once again, he/she examines them for matching pairs, covering any pairs that are showing as before.
- . The play continues with the player turning up two cards at a time whenever no more pairs are showing on the cards that were already turned up.
- . When all cards have been played, the player picks up stacks of cards by pairs: she/he picks up each pair of stacks whose top cards form a matching

District Resources

Student Learning Objective(s) The student values the quick and accurate recall of facts.

State Goal

1

District Goal

Program Goal

5, 8

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Spin-a-Fact
Group Size: pairs, small groups
Materials: one gameboard and two markers per student, two spinners per group

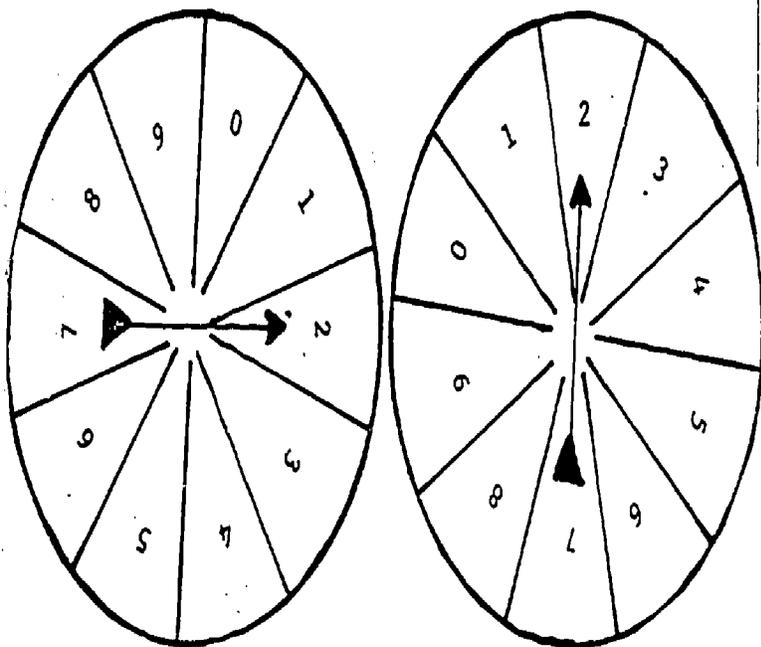
Timed fact test.

Math Laboratory at the Pacific Science Center, Seattle, Washington

Procedure(s):

- . The students spin, in turn, both spinners and multiply the two indicated numbers.
 - . The student then finds the product on the point award chart (found on back of page) to learn points earned.
 - . The students keep track of score on tally sheet.
 - . The winner is the first student to earn 100 points.
- Example of spinners: (Game needs two spinners).

District Resources



Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

SPIN-A-FACT / MULTIPLICATION

Point Award Chart

You get this number of points	1	5	7	20	10
for these products	0	6, 8, 12, 18, 24	4, 9, 16, 36	1, 25, 49, 64, 81	2, 3, 5, 7, 10, 14, 15, 20, 21, 17, 28, 30, 32, 35, 40, 42, 45, 48, 54, 56, 63, 72

District Resources

48

49

Student Learning Objective(s) The student values the quick and accurate recall of facts.

State Goal	1
District Goal	
Program Goal	5, 8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Multo
Group Size: small group, entire class
Materials: card for each player, markers, master card for teacher (with all possible combinations). Note: 1" graph paper works well for the cards.

Procedure(s):

- Pass out cards to each student and enough markers to play a game.
 - The rules are those of Bingo. The student card has five rows of five squares. The center square is a free square. Each square has the product of two numbers.
- Example: 42, product of 6 x 7
- The tables are divided up with the 0's and 1's under M, 2's and 3's under U, 4's and 5's under L, 6's and 7's under T, and 8's and 9's under O.
 - The teacher calls out, "Under L, 6x7," and so on.

Note the consistent winners.
Award prizes to winners.

District Resources

M	U	L	T	O
1	6	20	42	64
8	9	10	36	81
0	3	<u>Free</u>	49	32
7	4	15	18	9
6	16	12	14	18



Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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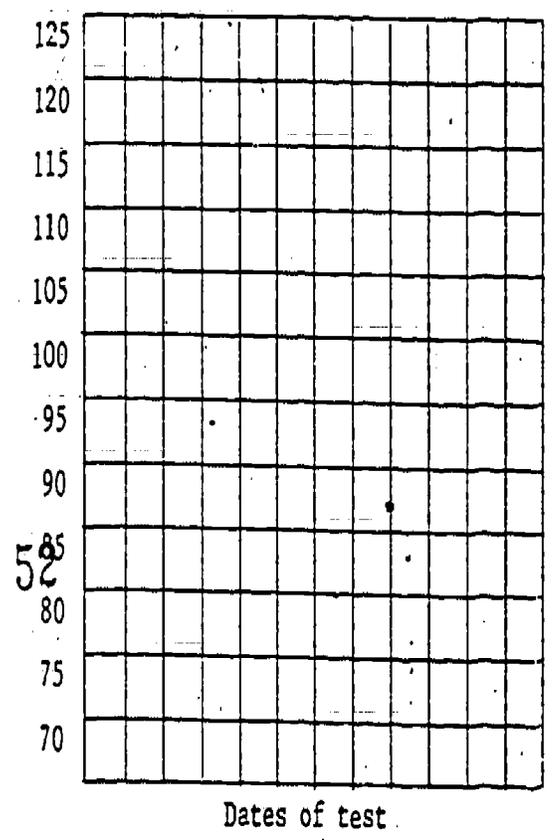
Title: Speed Test
Group Size: entire class
Materials: worksheet of 125 problems

Procedure(s):

- . Each student receives a sheet with the fact problems.
- . The class is started together and timed for a three minute test. Set a goal to be reached (90 to 100).
- . The student plots his/her progress from test to test on a graph kept at her/his desk. This activity continues daily or at least often to increase skill and speed.
- . When the goal is achieved regularly by a student he/she may sit out the activity.

Example of problems: 10 12 45 36 94
x11 x23 x13 x45 x48

Graph:



Check individual papers, record progress.

District Resources

53

SUBJECT: Mathematics

SPECIFIC AREA: Whole Numbers: Division

Page
Suggested
Grade Placement
District
Placement

The student knows:

- . that division is the inverse of multiplication.
- . division is repeated subtraction.
- . a dividend is a quantity to be divided.
- . a divisor is the quantity by which the dividend is to be divided.
- . the quotient is the quantity resulting from division of one quantity by another.
- . the remainder is the dividend minus the product of the divisor and the quotient.
- * . the basic division facts (mastery).

	4	5	6	7	8
23					

The student is able to:

- . divide a one- or two-digit number by a one-digit number without remainders. $\frac{3}{2/6}$
- . divide a one or two-digit number by a one-digit number with remainder expressed as whole numbers. $\frac{2 R1}{2/5}$
- * . divide two, three and four-digit numbers by one or two-digit numbers with remainders expressed as whole numbers. $\frac{23}{18/419}$
- * . divide two, three and four-digit numbers by one or two-digit numbers with remainders expressed as a fraction. $\frac{23}{5/8}$
- . divide five digits or less by two or three-digit numbers with or without remainders (expressed in whole numbers, fractions or decimals). $\frac{49.2}{5/246}$
- * . solve any given division problem.
- . check a division problem by using multiplication.
- . estimate the quotient in a given division problem.

23	3-4				
25	7-8				
27	4-6				
27	4-8				

The student values:



OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

55

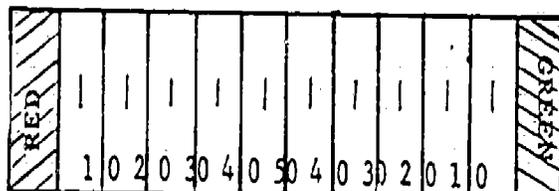
56

Student Learning Objective(s) <u>A. The student knows the basic division facts (mastery). B. The student is able to divide a one or two-digit number by a one-digit number without remainders.</u>	State Goal	1
	District Goal	
	Program Goal	4,5

Related Area(s) _____

Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Football
Group Size: entire class
Materials: overhead projector, transparency with outline of football field, including yard markers, 5 yard intervals, tagboard cut into shape of football, kitchen timer, two, construction paper or tagboard, cards (one red, one green), stack of cards with number combinations to be divided



Observation of activity.
 Give the students a worksheet with division facts. Correct the worksheet to note division facts that present the most problems. Pair students having difficulty with more able students for additional drill.

District adopted text.

District Resources

- Procedure(s):
- . Split class into two groups, line up along walls.
 - . One group has red cards and other, green.
 - . Red begins first half, green second. Place "ball" on 20-yard line, toward goal.
 - . Set timer for six minutes, or any other number.
 - . Read number combination (i.e., 12 divided by 4).
 - . Student who has red card must respond quickly (two or three seconds) and accurately. Pass card to next in line when he/she answers correctly or incorrectly.
 - . Advance the "ball" toward red's goal if correct and no penalties (see below).
 - . When ball crossed goal, six points are scored for that team. Keep score on board or overhead.
 - . Penalties:
 - of game" - ball moves 5 yards backwards.

Suggested Activities: Grade(s) 7

Suggested Monitoring Procedures

Possible Resources

Call next pair of numbers for the same student.
 "Fumble" - wrong answer given. Ball goes over to other team at the place it was fumbled.
 "Interference" - talking out of turn - 15 yards in favor of non-offending team.

Title: Find the Rule
Group Size: entire class or small group
Materials: worksheet

Procedure(s):

- . Have a student give you a number between 1 and 10. Apply a rule such as $n \times 6$ or $n \div 2$ and give the students the result. Do this several times until the students guess the rule you are applying.
- . Give the students a worksheet with tables with a sample of numbers only and the rule missing. Have the students complete the tables and fill in the rule.

Example:

n	
42	7
18	3
12	
	4
36	
	10
72	
	1

n	
72	8
	1
108	
	15
36	
18	

Answer: $n \div 9$

Answer: $n \times 6$

District Resources

59

60

Student Learning Objective(s) The student is able to solve any given division problem.

State Goal	1
District Goal	
Program Goal	2,5,6

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Division Challenge
Group Size: small group, entire class
Materials: chalkboard and chalk

Procedure(s):

- . Prepare a variety of division problems with answers, i.e., multiple digit problems with and without remainders.
- . Pick a student to begin and have him call or someone to challenge him/her.
- . Teacher gives a problem, first one finished with the correct answer wins and continues to challenge.
- . Three challenges without a loss retires the champ until later.
- . When all students have had a chance (give losers another chance against each other), have the champions go against each other until a final winner is found.

Students with little success can be given supplemental activities after the game is completed.

District adopted text.

District Resources

Title: Secret Code
Group Size: entire class
Materials: paper, pencil

Procedure(s):

- . Teacher makes up a division problem that corresponds with each letter of the alphabet.
- . The students have to solve all the problems and match their answers (letter of the alphabet) to the coded message. The coded message could be a sentence or a long paragraph depending on the ability of the group.

As students are working, the teacher can pass among students, helping when necessary.

District adopted text.

Student Learning Objective(s) <u>A. The student is able to check a division problem by using</u>	State Goal	1
<u>multiplication. B. The student is able to estimate the quotient in a given division problem.</u>	District Goal	
	Program Goal	2,5,6

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Division Bingo
Group Size: entire class
Materials: simple bingo cards with three rows of four squares (twelve squares in all), 1 inch square graph paper.

Pair students having difficulty with division with students who are more able for additional drill.

District adopted text.

Procedure(s):

- . Pass out Bingo cards to each student with division problems written in each of the squares.
- . Each card has different division problems and in different order.
- . The teacher has the master sheet.
- . Each student also has blank answer cards. When the teacher gives a division problem that the student has on his/her Bingo card, he/she places answer square over division problem and writes on answer card the division problem as a multiplication problem.
- . When a row is all covered he/she is the winner provided that he/she has written his/her division problems as multiplication problems correctly.

Variations:

- . Same cards as above but this time teacher calls out multiplication inverse operation and student has to cover appropriate division problem.

District Resources



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources _____

68

67



SUBJECT: Mathematics

SPECIFIC AREA: Whole Numbers: Story Problems

Page
Suggested
Grade Placement
District
Placement

The student knows:

- . characteristics of a number sentence are operational sign(s) and an equal sign.
- . basic facts.
- . that - and + are inverse operations.
- . that X and $\frac{\square}{\square}$ are inverse operations.
- . that not all information given in a story problem may be relevant to the solution of the problem.
- . clue words (total, sum, more, product, remainder, average, quotient).

31 2-8
35 3-5
3-4
4-5
37 2-8
3-5

The student is able to:

- . project a mental image (draw a picture) of the problem from an appropriate story problem.
- . identify relevant information necessary for solution.
- . identify operation to achieve solution (+, -, X, \div).
- . estimate size of problem solution (> <).
- . solve story problems with one operation.
- . solve story problems with multiple operations.
- . develop (write) a story problem from a given number sentence and solve the problem.
- . translate word sentences into "number" sentences.
- . translate equations to solvable form: $\boxed{10} - 3 = 7$ to $\boxed{10} = 7 + 3$.

39 2-8
37 2-8
4-6
4-8
35 2-3
4-8
31 4-8
33 4-6
23 5-8

The student values:

- . analysis and solution of story problems as the ultimate goal of mathematics.

35 2-8

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

70

71

State Learning Objective(s) A. The student knows characteristics of a number sentence are operational signs(s) and an equal sign. B. The student is able to develop (write) a story problem from a given number sentence and solve the problem.

State Goal

District Goal

Program Goal

1
2,6,8

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: A Picture is Worth a Thousand Numbers
Group Size: pairs, entire class
Materials: picture(s) from magazine or drawing on board or overhead projector (picture of runners finishing race), number sentence on board or overhead (3 minutes 59.4 seconds - 3 minutes 56.2 seconds = A), pencil and paper for each student

Teacher observation.

District adopted text

Kit - Base Games Media Research Associates 1976

Procedure(s):

- . Direct the students to write a story problem related to the picture using the number sentence for the solution.
- . Exchange story problems and solve. Read to class.

Variation(s):

- . Do not furnish number sentence. Students make up their own.

District Resources



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

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74

75

Student Learning Objective(s) A. The student knows characteristics of a number sentence are operational sign(s) and an equal sign. B. The student is able to translate word sentences into "number" sentences. C. The student is able to translate equations to solvable form: $10-3 = 7$ $10 = 7+3$.

State Goal	1
District Goal	
Program Goal	2,6,8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Story Problem Competition
Group Size: entire class
Materials:
Procedure(s):
 . Divide class into groups or teams of four students each. Each team should be assigned the task of developing one story problem for each of the four operations (+, -, X, ÷). In addition they provide a number sentence and solution for the teacher. Groups then exchange problems only. Have a timed contest for finding a number sentence and a solution.

Give students a worksheet with word sentences and have them translate to number sentences with correct operational signs.

District adopted text

Title: Number Sentence Completion
Group Size: small group, entire class
Materials: worksheet, chalkboard
Procedure(s):
 . Give students several problems verbally and have them suggest number sentences to solve problems.
 . Put these on the board and solve.
 . Give students a worksheet with similar problems to solve.

District Resources

Example:
 Study each word sentence, then write a number sentence and solve.
 Six less than a number when the number is sixty-four $64-6 =$
 Six more than a number when the number is eighty-one $6+81 =$
 Four times a number when the number is one hundred four $104 \times 4 =$
 Five minus a number when the number is two hundred eighty three $283-5 =$



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
--------------------------------------	---------------------------------	--------------------

Three more than twice a number
 when the number is twelve $2 \times 12 + 3 =$
 Six less than three times a num-
 ber when the number is sixty-four $3 \times 64 - 6 =$

District Resources

78

79



Student Learning Objective(s) A. The student knows basic facts. B. The student is able to solve story problems with one operation. C. The student is able to solve story problems with multiple operations. D. The student values analysis and solution of story problems as the ultimate goal of mathematics. State Goal
 District Goal
 Program Goal
 Related Area(s) _____

1
3,6,8

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Shopping Spree
Group Size: individual, entire class
Materials: newspaper, pencil and paper, calculator (optional)
Procedure(s):
 . Teacher sets a maximum amount to be spent on shopping spree (\$10 or \$20, or other reasonable maximum).
 . Using the supermarket advertisements, students "shop" at one market only, selecting food items from each of the basic food groups (dairy, meat, cereal grains, fruit and vegetables).
 . Students record item(s) selected and price.
 . Students total purchases, and must return some items if they exceed pre-set amount to be spent.
 . Student or teacher checks total on calculator.

Teacher observation and individual assistance.

District Resources

Title: Mail Order Math
Group Size: entire class
Materials: catalogues or supplements, facsimiles of order form (see example), calculator (optional)
Procedure(s):
 . Have each student select a topic (shop, kitchen, bedroom, clothing, etc.) or draw lots from prepared slips of paper with one topic on each.
 . Each student completes order sheet, ordering three or more items (clothing: 1 shirt, 1 pair pants, 1 pair shoes).
 . Student totals amount of order.
 . Student (or teacher) checks total on calculator.



Suggested Activities: Grad. (s) _____

Suggested Monitoring Procedures

Possible Resou

Variation(s):

- . Multiple items (3 sheets @ \$2.65, etc.) may be selected to utilize multiplication.
- . Include sales tax (calculated or use tax table).
- . Include shipping charges or parcel post charges.

Example:

FERNDOC MAIL ORDER, INC.
 1234 1st Street.
 Ferndoc, Ohio 54321

Ship to: Name _____
 Address _____
 City _____ State _____ Zip _____

Catalogue Number	Description of Item	Number of Items	Cost per Item	Total Cost

District Resources

Sub Total _____
 Sales Tax _____
 Shipping Fee _____
 GRAND TOTAL _____

83

82

Student Learning Objective(s) A. The student knows that not all information given in a story problem may be relevant to the solution of the problem. B. The student is able to identify relevant information necessary for solution.

State Goal	1
District Goal	
Program Goal	6,7

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> What's Important</p> <p><u>Group Size:</u> small group, entire class</p> <p><u>Materials:</u> set of cards with a story problem on each containing items of irrelevant information (Five boats with seven people went fishing. Three of the boats sank; however, each person caught two fish. How many fish were caught?), a second set of cards with identical details but question requires formerly irrelevant information to solve (How many boats made it back to dock?)</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Call on any student to describe the irrelevant information in his/her problem. Others check theirs to see if they hold the card where that information is relevant. Students with matching cards get together and solve problems. 		<p>District Resource _____</p>

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

96

97

Student Learning Objective(s) A. The student knows that not all information given in a story problem may be relevant to the solution of the problem. B. The student is able to project a mental image (draw a picture) of the problem from an appropriate story problem. State Goal
 District Goal
 Program Goal

1
1,2,6

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Math Art</p> <p><u>Group Size:</u> Individual, entire class</p> <p><u>Materials:</u> drawing paper, crayons or colored pencils, paint or chalk, felt pens</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Teacher writes a descriptive story problem or problems on the chalkboard. <p><u>Example:</u></p> <p>Three greebletoffs came tumbling and swinging down the hall. One fell in the laundry chute and didn't get out at all. Who made it where?</p> <ul style="list-style-type: none"> Student uses the art materials to illustrate the problem he/she selects. Finished illustrations may then be put up on the bulletin board. 		<p>District Resources</p>



Suggested Activities: Grade(s) _____ Suggested Monitoring Procedures Possible Resources

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources

District Resources

91

.90

SUBJECT: Mathematics

SPECIFIC AREA: Integers

Page
Suggested
Grade Placement
District
Placement

4 5 6 7 8

The student knows:

- . the set of integers is the set of whole numbers, their opposites and zero, i.e., ...-2, -1, 0, 1, 2...
- . any integer is either positive, negative or zero.

43 7-8
43 7-8

The student is able to:

- . order integers. Example: $-3 < 4, 0 > -5, -7 < -3, -4 > -8$.
- . find the opposite of an integer. Example: $6 -6, -3 +3$.
- find the position of an integer on the number line.
- read and write equations with positive and negative integers.
- . add integers. Example: $(-6) + (-3) = -9$.
- . subtract integers. Example: $(-7) - (-2) = -5$.
- . multiply integers. Example: $(-2) (-3) = 6$.
- . divide integers. Example: $20 \div (-2) = -10$.
- . solve word problems requiring integers.
- . solve one step ($X+3=2$) and two step ($3X+1=2$) open sentences involving integers.

43 7-8
47 7-8
49 7-8
51 7-8
53 7-8
53 7-8
57 7-8
57 7-8
63 7-8
61 7-8

The student values:

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

94

93

Student Learning Objective(s) A. The student knows the set of integers is the set of whole numbers, their opposites and zero, i.e., ...-2, -1, 0, 1, 2... State Goal 1
B. The student knows any integer is either positive, negative or zero. C. The student is able to order integers. Example: $-3 < 4, 0 > -5$, District Goal
Related Area(s) $-7 < -3, -4 > -8$. Program Goal 2,7,8

Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Ordering Integers
Group Size: entire class
Materials: index cards

Procedure(s):

- . Divide class into groups of eight to ten.
- . Each student is assigned an integer, and assigned to a group.
- . Groups can be as simple as a row, or the teacher can select groups of 8 - 10 students.
- . Each student writes his/her integer on a card.

Example: 3 -7 0

- . At a signal from the teacher, the groups arrange themselves in order from smallest to largest.
- . The first group to get the correct order wins that round.
- . The group to win a number of rounds wins the game.

Observation of activity with assistance given to students who have difficulty with the integers concept.

District adopted text.

Title: Line Up!
Group Size: ten plus
Materials: chalk, index cards with different unique integers on them (including 0) and ">" and "<."

Procedure(s):

- . Draw a long chalk line on the floor.
- . Pass out cards.

District Resources



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

- . Student who is 0 takes his/her place on the line.
- . Then each student is chosen at random to take a position along the line.
- . The distance between students is not critical.
- . Establish that the integers are correctly ordered.
- . Then give a student the ">" and "<" signs.
- . Have two students step out and have student place the correct sign between them.
- . Continue until a correct pattern of responses develops.

Title: "Integers"
Group Size: entire class
Materials: worksheets

Observation. Test

Procedure(s):

- . Students shade boxes where integers are ordered correctly.

-5=5	-3 < -2	7 > 9
-7 > 0	0 < 7	0 > 1
-1 < -2	5 > -6	7 > 10
2 > 7	-2 > 7	-12 < -20
-3 > 2	-1 < 0	9 < 4

District Resources

98

Student Learning Objective(s) A. The student knows the set of integers is the set of whole numbers, their opposites and zero, i.e., ...-2, -1, 0, 1, 2.... State Goal
B. The student knows any integer is either positive, negative or zero. District Goal
C. The student is able to order integers. Example: $-3 < 4, 0$, $-5, -7 < -3$, Program Goal

1
3
2,7,8

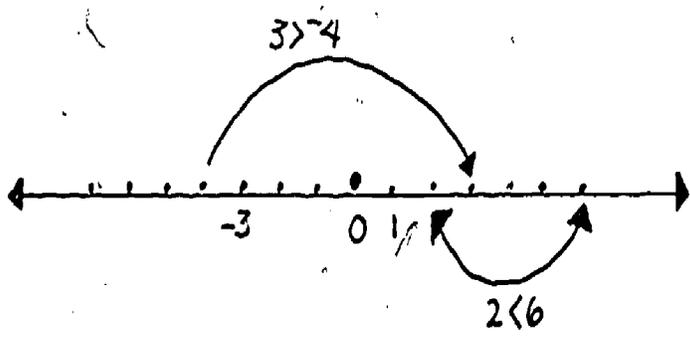
Related Area(s) -4 > -8.

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: "Comparing Integers"
Group Size: entire class
Materials: 4 incomplete number lines
Procedure(s):
 . Copy the number lines and write the integers that are missing.
 . Use arrows and labels, as in example, to compare the pairs of integers. Make one comparison below each number line and one above.
Example:
 ① 0, 5 ② -2, -5 ③ -7, 2 ④ 1, 3 ⑤ 7, 2
 ⑥ -1, 1 ⑦ -4, 0 ⑧ -7, 7

Give the students a worksheet with incomplete number lines and similar problems as a follow-up.

District adopted text.



District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

QR

District Resources

101

102

Student Learning Objective(s) A. The student knows the set of integers is the set of whole numbers, their opposites and zero, i.e., ...-2, -1, 0, 1, 2.... State Goal 1
B. The student knows any integer is either positive; negative or zero. District Goal
C. The student is able to find the opposite of an integer. Example: Program Goal 2,7,8

Related Area(s) 6 -6, -3 +3.

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Integer Rummy
Group Size: small group
Materials: 64 cards (30 negative integers, 1-10; 30 positive integers, 1-10; 4 zero cards), score card.

Observation of the activity.

District adopted text

Procedure(s):

- . Dealer shuffles cards and gives each player seven cards, remaining cards stacked face down in center of the table. Turn top card face up on the table to form "draw" pile.
 - . Player on the left of dealer starts play by picking up card that is face up or drawing top card from stack.
 - . When player has a "run" (at least three consecutive negative or positive integers) he/she puts them on the table and marks 1 point on score card for each card in run. (Three points for a run of three).
 - . Player can receive double points for run if his/her run can cancel one of the other players.
- Example:
 Player A has a run consisting of -3, -4, -5 on the table. Player B gets double or 6 points if he puts down a run of 3, 4, 5.
- . Game ends when player has played all his/her cards and has only one card to discard; however, the last card discarded must be a "zero" card.
 - . Player to go out first receives five points.
 - . Shuffle cards and repeat, first player with 50 points is the winner.

District Resources

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

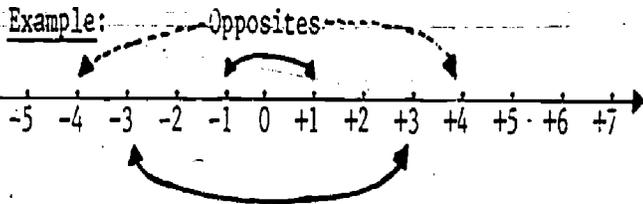
Title: Integers and Their Opposites

Group Size: entire class

Materials: pencil and paper

Procedure(s):

. Draw a number line from -7 to +7.



- . Label all 15 integers.
- . Above zero write the word "Opposites"
- . With arrows link three integers with their opposites
- . What number must each letter be replaced with to make each sentence true?

- . $5 + n = 0$ Answer _____
- . $y + ^{-}3 = 0$ Answer _____
- . $-6 + k = 0$ Answer _____
- . $4 + ^{-}4 = m$ Answer _____
- . $-1 + x = 0$ Answer _____

Have students do a short quiz with a worksheet comparable to the activity.

District adopted text.

District Resources

Student Learning Objective(s) A. The student knows the set of integers is the set of whole numbers State Goal
their opposites and zero, i.e., ...-2, -1, 0, 1, 2.... District Goal
positive, negative or zero. C. The student is able to find the position of an integer on the Program Goal
number line.

1
2,7,8

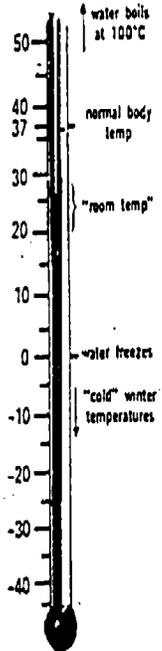
Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Celsius
Group Size: entire class
Materials: worksheet of temperature chart and thermometer

Procedure(s):
 . Have students put a mark on Celsius thermometer and label for each day's maximum and minimum temperatures.

District adopted text.

CELSIUS



	Max	Min
Sunday	45	+6
Monday	+10	-8
Tuesday	+5	-5
Wednesday	+12	-20
Thursday	+40	+10
Friday	+50	+25
Saturday	+37	+20

District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

Title: Integers on a Number Line
Group Size: three
Materials: number line across entire chalkboard from -15 to +15, 20 shuffled cards marked from -10 to +20.

Observe the activity, noting students who have difficulty with the concept.

District adopted text.

Procedure(s):

- . One student acts as caller.
- . The two players start at "0" on the number line.
- . The players move in turn on the number line as the caller turns over one integer card at a time and names the integer.
- . The object of the activity is to be the first player off the number line or to be nearer one end than the other player after all cards are drawn.

District Resources

110

139

Student Learning Objective(s) <u>A. The student knows any integer is either positive, negative or zero.</u>	State Goal	1,8
<u>B. The student is able to read and write equations with positive and negative integers.</u>	District Goal	
	Program Goal	1,2,8

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Writing Integers and Equations</p> <p><u>Group Size:</u> small group, entire class</p> <p><u>Materials:</u> worksheet</p> <p><u>Procedure(s):</u></p> <p>. Express a series of common experiences as an integer.</p> <p><u>Example:</u> (Make equations of 4, 5, 6, 7). Draw a picture to illustrate #2.</p> <p>1. The quarterback was sacked for 15. <u>-15</u></p> <p>2. A Chinook raised the thermometer from -5 to +40 in two hours. ($40 - -5 = 45$) <u>+45</u></p> <p>3. At the track the man lost his "across the board" bet on the 4th race. <u>-6</u></p> <p>4. The most tense time of liftoff is from -1 minute to +1 minute. ($1 - -1 = 2$) <u>+2</u></p> <p>5. The team gained 150 yards passing but lost 50 yards rushing. ($150 - 50 = 100$) <u>+100</u></p> <p>6. The temperature rose 10° from 0°, then fell 4°. ($10 + -4 = 6$) <u>+6</u></p> <p>7. A householder spent \$15 on groceries in the morning and \$5 more in the afternoon. ($15 + -5 = -20$) <u>-20</u></p>	<p>Pair more able students with students having difficulty with integers for additional assistance.</p>	<p>District adopted text</p> <hr/> <p>District Resources</p>



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

113

114



Student Learning Objective(s) <u>A. The student knows any integer is either positive, negative or zero.</u>	State Goal	1
<u>B. The student is able to add integers. Example: $(-6) + (-3) = -9$.</u> <u>C. The student is able to</u>	District Goal	
<u>subtract integers. Example: $(-7) - (-2) = 5$.</u>	Program Goal	2,7,8

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Adding and Subtracting Integers with Living Models</p> <p><u>Group Size:</u> entire class or small group</p> <p><u>Materials:</u> chalk or buy an adhesive number line for the floor</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Draw a number line on the floor. . Begin by having a student locate an integer on the number line. . Add another integer of the same sign to it by having a student walk off the correct number of units in the correct direction. . Then add integers of different signs by reversing direction of travel. . To illustrate subtraction have two students stand on the integers that are given and find the difference by counting the units they are apart. Does the order of subtraction make a difference? 	<p>Observation of the activity.</p>	<p>District adopted text.</p>
<p><u>Title:</u> Integer Relay</p> <p><u>Group Size:</u> entire class (two teams)</p> <p><u>Materials:</u> index cards with positive and negative integers on them.</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Form two teams and give each a stack of integer cards. . The first player picks two cards and adds them together on the board. . He/she then tags the next member who picks a card, adds it to the previous sum, etc. . Give the 1st team to finish, 3 points. 	<p>Observation of the activity.</p>	<p>District Resources</p>

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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- . Give 5 points for each time a sum was correctly added.

Variation: The game can also be played by subtracting the smaller number from the larger on the first draw and then subtracting each subsequent number.

Title: Zero Wins
Group Size: pairs, small group
Materials: index cards (with the positive and negative integers up to 50--100 cards--for a large group, up to 25 for a small group--50 cards)

Observation of the activity.

Procedure(s):

- . Shuffle cards and deal out all cards.
- . Dealer starts by laying down any cards which "cancel out" that is, cards whose total value is zero.

Example:

5 -5

- . The dealer then picks a card from the hand of the player on his/her right whose turn is next.
- . Start first by limiting cards to pairs.
- . Then require three cards, four cards, etc., in order to "cancel out."

Example:

5 -3 -2

- 117 First player out of cards wins and is new dealer.
- Variation: Require all pairs have a difference of a set number such as -5.

District Resources

118

Student Learning Objective(s) <u>A. The student knows any integer is either positive, negative or zero.</u>	State Goal	1
<u>B. The student is able to add integers. Example: $(-6) + (-3) = -9$. C. The student is able to subtract integers. Example: $(-7) - (-2) = 5$.</u>	District Goal	
	Program Goal	2,7,8

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Magic Squares Involving Integers
Group Size: entire class
Materials: magic squares

- Procedure(s):
- . Remind students that in a magic square each row, each column, and each diagonal have the same sum.
 - . Circle the magic squares in the following.

-3 10 1	-6 -7 -2	11 -10 5	-1 9 -2
7 3 -1	-1 -5 9	4 2 8	1 2 3
5 -5 9	-8 -3 -4	-1 14 -7	6 -5 7

District Resources

. Complete the magic squares below by writing the correct integer in each box.

-6	0	-8
-7	-5	
-2	-9	

	-8	7
-2		10
1		-5

Suggested Activities: Grade(s) _____ Suggested Monitoring Procedures Possible Resources

Table with 3 columns: Suggested Activities: Grade(s), Suggested Monitoring Procedures, and Possible Resources. The table is currently empty.

District Resources

121

122



Student Learning Objective(s) A. The student knows any integer is either positive, negative or zero. B. The student is able to multiply integers. Example: $(-2)(-3) = 6$. C. The student is able to divide integers. Example: $20 \div (-2) = -10$. State Goal
District Goal
Program Goal

1, 10
2, 3, 8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Multiplication/Division Bingo
Group Size: entire class
Materials: bingo game board as shown below, marker, multiplication and division problems with positive and negative integers

Give students a worksheet with multiplication and division problems involving integers. Correct and group students needing additional assistance.

District adopted text.

Procedure(s):

- . The caller reads the multiplication and division problems with positive and negative integers.
- . For example, one card might read "N — negative 5 times negative 6." Cell N 2 has + 30 or $-5 \cdot -6$ on it. A marker is placed on that cell.
- . A second card might read "G — negative 12 divided by negative 3." Cell G 5 has + 4 or $-12 \div 3$ on it.
- . The first player who covers a horizontal, vertical, or diagonal straight line wins.

Sample card:

1	-4	+1	-5	+2	+12
2	-9	0	+30	+22	-7
3	+8	+19	FREE	-3	-16
4	+36	-10	-21	-14	-1
5	+6	+11	-25	+4	-27
	B	I	N	G	O

District Resources



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

125

126

Student Learning Objective(s) <u>A. The student knows any integer is either positive, negative or zero.</u>	State Goal	1
<u>B. The student is able to multiply integers. Example: $(-2)(-3) = 6$.</u> <u>C. The student is able to</u>	District Goal	
<u>divide integers. Example: $20 \div (-2) = (-10)$.</u>	Program Goal	2,7,8

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Integer Relay</p> <p><u>Group Size:</u> entire class</p> <p><u>Materials:</u> index cards with positive and negative integers on them</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Form two teams and give each team a pile of cards. The first player picks two cards and multiplies them on the board. He/she then tags the next team member who picks a card, multiplies it to the previous product, etc. Give the first team to finish, 3 points. Give 5 points for each time a product was correct. <p><u>Variation:</u></p> <ul style="list-style-type: none"> the division process may be used instead of multiplication. in division draw 2 cards each time and do <u>not</u> use the previous quotient. <p><u>Title:</u> Multiplication Bingo with Integers</p> <p><u>Group Size:</u> entire class</p> <p><u>Materials:</u> spinner, dice</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Each student makes a 5x5 Bingo card on paper. In the boxes write any integers from -81 to 81 omitting 0, 1 and all prime numbers. The teacher either picks two single-digit integers or uses a spinner or special dice. The student multiplies those two numbers together and x's out the answer if it appears on his/her card. 	<p>Teacher observation. Note students having difficulty, diagnose problem and reteach if necessary.</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>



Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

- . The first to get a "Bingo" wins.
- Variation:
- . Can use 3 integers.
- . Multiply any two of the integers and divide by the remaining integer.

Title: Operations Puzzle
Group Size: entire class
Materials: operations puzzle

- Procedure(s):
- . Copy and complete the operations puzzle by placing the missing operational signs or integers in the empty boxes.

Observation of the activity.
 Group students having difficulty with the concept for re-teaching.

District adopted text

-4

-24	X	.	=	96
÷		÷		÷
-3	x	-2	=	6
=		=		=
8		2	+	16

District Resources

129

130



Student Learning Objective(s) <u>The student is able to solve one step ($x + 3 = 2$) and two step ($3x + 1 = 2$) open sentences involving integers.</u>	State Goal	1,8
	District Goal	
	Program Goal	1,2,8

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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<p><u>Title:</u> One-Step Open Sentences <u>Group Size:</u> entire class <u>Materials:</u> one-step open sentences</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . The purpose of this activity is to help students use additive inverses to find equivalent sentences involving integers. . What is so special about a number and its additive inverse? (<u>Their sum is 0.</u>) . Examine the open sentence: $x + 3 = 8$ What is the additive inverse of 3? (-3) Show what happens when we add -3 to both sides. $x + 3 + -3 = 8 + -3$ Then $x + 0 = 5$ and $x = 5$. Are the four sentences above all equivalent (over) sentences? Why? . Can the following open sentences be solved by using additive inverses? 1. $x + -5 = 7$ 2. $y - 7 = 13$. If your answer is yes, what do we add to both sides? 	<p>Give students a worksheet with one-step open sentences and ask them to use the additive inverse to work the problems.</p>	<p>District adopted text</p> <hr/> <p>District Resources</p>
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Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Two-Step Open Sentences</p> <p><u>Group Size:</u> entire class</p> <p><u>Materials:</u> two-step open sentences</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> The purpose of this activity is to stress that addition is used first to create an equivalent sentence having the variable alone on one side, and then multiplication follows. Copy and complete this open sentence using two approaches: <p>Addition, then multiplication approach</p> $3x + 2 = 8$ $3x + 2 + -2 = 8 + -2$ $3x + 0 = 6$ $3x = 6$ $x = 2$ <p>Multiplication, then addition approach</p> $3x + 2 = 8$ $\frac{1}{3}(3x) + \frac{1}{3}(2) = \frac{1}{3}(8)$ $x + \frac{2}{3} = \frac{8}{3}$ $x + \frac{2}{3} + \frac{-2}{3} = \frac{8}{3} + \frac{-2}{3}$ $x = \frac{6}{3}$ $x = 2$ <ul style="list-style-type: none"> Did you discover that performing the addition step first resulted in a simpler method of solving? 	<p>Observe students during the activity. Group students having difficulty with the concept and reteach.</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>



Student Learning Objective(s) The student is able to solve word problems requiring integers.

State Goal 1,8

District Goal

Program Goal 1,2,8

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Problem Solving with Integers
Group Size: pairs, small group
Materials: problem sheets and solution sheet written by each student
 number cards equal to the number of problem sheets.

Teacher observation

District-adopted text

Procedure(s):

- . Have students make up five word problems on one sheet of paper and their solutions on another sheet.
- . Assign each problem sheet a number.
- . Have each student draw a number card. If a student draws his/her own set of problems, that student must draw another number card.
- . The student must do the five problems on the sheet that was drawn.

District Resources

Title: Competition for Problem Solvers
Group Size: two small groups
Materials: word problems involving integers
 2 answer keys for the word problems

Procedure(s):

- . Teacher gives, either orally or in written form, a word problem to the students.
- . As soon as a student finishes the problem, he/she folds the paper and passes it forward to the group's checker.
- . The checker does not solve any of the problems. The checker corrects the papers for his/her group and returns incorrect papers to the owners for correcting.

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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- . When all the papers in a group are correct, the checker writes the answer on the chalkboard.
- . The first group to do five problems correctly is the winner.

Title: Solving Word Problems Using Number Sentences
Group Size: entire class
Materials: word problems to solve

Procedure(s):

- . The purpose of this activity is to give students a method to help solve word problems.
- . Write a number sentence that illustrates the problem.
- . Solve the number sentence.
- . State the answer.

Example:

The elevator went down 2 floors, up 3, up 5, and down 9. What was the net change?

Number sentence: $-2 + 3 + 5 - 9 = n$

Solve: $-2 + 3 + 5 - 9 = -3$

Answer: The net change is floors was down 3.

- . Two problems to solve:
 1. During a 4 week period a stock price went up \$6 one week, down \$2 the second week, down \$7 the third, and up \$13 the fourth week. What was the net change?
 2. I opened a bank account with a \$48 deposit, added another \$53, and then withdrew \$37. How much have I left?

Give student a worksheet with word problems involving the use of integers. Have them solve the problems using the same format as the activity.

District adopted text

District Resources

Student Learning Objective(s) The student is able to solve one step ($x + 3 = 2$) and two step

State Goal 1,8

($3x + 1 = 2$) open sentences involving integers.

District Goal

Program Goal 1,2,8

Related Area(s) _____

Suggested Activities: Grade(s) 8

Suggested Monitoring Procedures

Possible Resources

Title: Integer Eights
Group Size: small group
Materials: deck of 50-60 cards, divided evenly into four suits (colors) and each with different simple equations written on it.

Teacher observation. Test on same equations as on cards.

District adopted text

Procedure(s):

- . Shuffle and deal seven cards.
- . Place remaining deck in center of table with discard pile next to deck.
- . Turn over top card to form discard pile.
- . First person to the left of dealer either lays down a card of the same color, or a card having the same value for its unknown as the card on the top of the discard pile.
- . Second to the left does the same, only using the new top card.
- . Play continues around the table, each player playing on the previous players discard.
- . If a player can't play, he/she must draw from the deck until he/she can play.
- . A card with a value of 8 for its unknowns is wild and can be played at any time.
- . When an 8 is played, that person can change the suit (color) to better match the rest of his/her hand, or if possible to keep the next person from playing.
- . If the deck is exhausted, the discard pile is shuffled and turned over.
- . The first person to get rid of his/her cards is the winner.

District Resources

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

141

142

Student Learning Objective(s) The student is able to solve one step ($x + 3 = 2$) and two step ($3x + 1 = 2$) open sentences involving integers.

State Goal	1,8
District Goal	
Program Goal	1,2,8

Related Area(s) _____

Suggested Activities: Grade(s) 7

Suggested Monitoring Procedures

Possible Resources

Title: Number Code
Group Size: individual, entire class
Materials: number code sheet, direction sheet

Teacher observation.

District adopted text.

Procedure(s):

- Have students solve two step equations and use answer to answer "number code questions."

Example:

Direction Sheets

Solve the following step equations. Circle the answers in the right spot on the number code sheet and connect each circle with a straight line in order to make a letter. In this case, three letters will make a word.

District Resources

Letter One:	Letter Two	Letter Three
$\frac{x}{13} + 2 = 3$	$\frac{w}{2} + 3 = 3\frac{1}{2}$	$3a - 4 = 14$
$2x + 3 = 5$	$4w - 3 = 21$	$2a - 14 = 0$
$4x + 2 = 14$	$2w - 18 = 18$	$\frac{a}{3} + 2 = 6$
$\frac{x}{5} - 2 = 1$	$13/w - 1 = 0$	$3a - 26 = 13$
$\frac{x}{3} - 6 = 0$		$\frac{18}{a} + 5 = 6$
$2x - 4 = 8$		

NUMBER CODE SHEET

1	7	13	1	7	13	1	7	13
2	8	14	2	8	14	2	8	14
3	9	15	3	9	15	3	9	15
4	10	16	4	10	16	4	10	16
5	11	17	5	11	17	5	11	17
6	12	18	6	12	18	6	12	18
1st Letter			2nd Letter			3rd Letter		

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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145

District Resources

146

SUBJECT: Mathematics

SPECIFIC AREA: Rational Numbers: Fractions

Page

Suggested
Grade Placement

District
Placement

4 5 6 7 8

The student knows:

- . any integer can be expressed as a fraction.
- . a fraction consists of a numerator (which is on top) and a denominator (which is on the bottom) with the line between as a symbol which means divide.
- . proper fractions have numerators which are less than the denominator.
- . improper fractions have numerators greater than or equal to the denominator.
- . mixed numbers (forms) consist of a whole number added to a proper fraction.

71 5-7
71 5-7
81 5-7
87 5-7
83 5-7

The student is able to:

- . identify and write fractions to represent parts of a region.
- . write a fraction for part of a set.
- . identify and write fractions to represent an uncompleted division of two numbers.
- . find fractions that are equivalent to given fractions.
- . order fractions with like denominators.
- . order fractions with unlike denominators.
- . locate a fractional number on a number line.
- *. change fractions to simplest forms.
- . change mixed forms to improper fractions.
- *. add and subtract fractions with like denominators.
- *. add and subtract mixed forms with like denominators.
- *. add and subtract fractions with unlike denominators.
- *. add and subtract mixed forms with unlike denominators.
- . express addition and subtraction answers in simplest form.
- *. multiply fractions (proper and improper) by fractions and/or by whole numbers.
- . express fraction multiplication products in simplest forms.
- *. divide fractions.
- . divide mixed forms.
- . express fraction division quotients in simplest form.

75 4-5
75 5-6
75 5-7
73 5-7
79 5-7
87 5-7
89 5-6
5-7
83 5-7
79 4-7
85 5-7
87 5-8
87 6-8
5-8
81 5-6
91 5-8
93 5-7
95 5-7
91 5-8

The student values:

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

149

149

Student Learning Objective(s) A. The student knows any integer can be expressed as a fraction. B. The student knows a fraction consists of a numerator (which is on top) and a denominator (which is on the bottom) with the line between as a symbol which means divide. State Goal District Goal Program Goal

1
2,7

Related Area(s) _____

Suggested Activities: Grade(s) 7 Suggested Monitoring Procedures Possible Resources

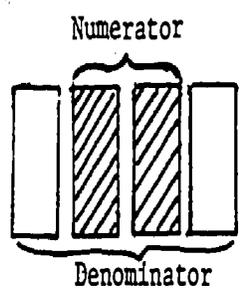
Title: Shady Fractions
Group Size: small group, entire class
Materials: worksheet

Have students label the numerator and denominator in the sets on the worksheet, i.e.,

TR, Topic 55, Representing Common Fractions, Wisconsin Research and Development, Center for Cognitive Learning, Rand McNally and Company, 1975

Procedure(s):

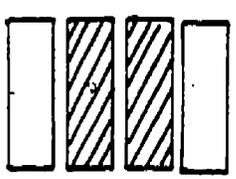
- Use a transparency or the chalkboard to illustrate an integer expressed as a fraction with numerator/denominator ($5/6$, $1/2$, $1/4$, etc.).
- Give the students a worksheet with sets with parts of the sets shaded or marked.
- Students are to indicate in a fraction form the part of the set that is shaded or marked.



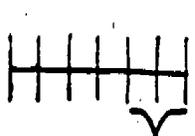
Example(s): 1.



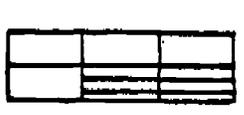
2.



3.



4.



Variation:

- Indicate an incorrect fraction on the line below the sets and ask the students why it is incorrect.

Example:



$3/4$ Why? _____

150

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

Title: Bingo
Group Size: entire class
Materials: Bingo cards (6 lines by 6 lines) to be made by students, markers

Teacher observation of the activity.

District adopted text.

Procedure(s):

- . Teacher puts 25 or more fractions on the board.
- . Each student places the fractions on his/her own Bingo form in no particular order (at random).
- . Teacher calls out one number to be used as a numerator and one number to be used as a denominator.
- . Student having a fraction consisting of those numbers on his/her card, puts a marker on that space.
- . Winner is first to "BINGO" in whatever pattern agreed upon or designated at the start of the game.

B	I	N	G	O
1/2	7/1	1/3	4/8	2/4
8/1	6/1	4/6	1/6	3/1
3/4	2/1	4/1	1/8	10/1
1/10	1/7	1/9	5/10	1/5
1/4	3/6	5/1	2/3	9/1

District Resources



Student Learning Objective(s) <u>A. The student knows any integer can be expressed as a fraction.</u>	State Goal	1
<u>B. The student is able to find fractions that are equivalent to given fractions.</u>	District Goal	
	Program Goal	3,5,8

Related Area(s) _____

Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Equivalence Relay
Group Size: entire class
Materials: paper, pencil

Procedure(s):

- . The teacher divides the room into teams of any size larger than five.
- . The teacher gives to the first member of each team, the same fraction.
- . At a given signal, the first person on each team writes down an equivalent fraction on a blank sheet of paper and passes it to the next person on his/her team. That person writes down another equivalent fraction and passes it to the next person.
- . The process is repeated until the final team member is finished.
- . The first team to have its final member obtain a fraction equivalent to the first fraction wins that round.
- . The first team to win a given number of rounds wins the game.

Example:

"A" Team 1st person $1/2 = 2/4$
 2nd person $2/4 = 4/8$
 3rd person $4/8 = 8/16$
 4th person $8/16 = 12/24$
 etc.

Observation of activity.

District adopted text

District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

Title: Fraction Bingo
Group Size: entire class
Materials: Bingo cards from tagboard or 1" graph paper

Note students having problems during game.

District adopted text

Procedure(s):

- . Have students make Bingo cards by randomly copying fractions from the chalkboard.
- . Teacher reads aloud various fractions (reduced, not-reduced, proper, improper) from those listed on the chalkboard.
- . Students match the given fraction with those on their card.
- . Winner is first to "BINGO" in whatever pattern agreed on or designated at the start.
- . Students may exchange cards or make more than one fraction Bingo card.

Example:

B	I	N	G	O
6	1/2	4/5	7/9	3
3/10	8/20	2	6/9	8/12
3/4	5/10	4/12	5	2/3
4	3/8	7/8	2/8	10/30
5/6	3/12	1	8/10	7

District Resources

156

157



Student Learning Objective(s) A. The student knows a fraction consists of a numerator (which is on top) and a denominator (which is on the bottom) with the line between as a symbol which means divide. State Goal 1
 District Goal
B. The student is able to identify and write fractions to represent an uncompleted division of two numbers. Program Goal 2,7
 Related Area(s)

Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> <u>Group Size:</u> small group, entire class <u>Materials:</u> worksheet</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Study the example below. Fill in the missing information. <p><u>Example(s):</u> $\bullet\bullet = 1 \text{ out of } 2 = 1/2 = 1\div 2 = 2\overline{)1}$</p> <p>1. $\bullet\bullet\bullet = 2 \text{ out of } 3 = \underline{\quad} = 2\div 3 = 3\overline{)2}$</p> <p>2. $\bullet\bullet\bullet\bullet = \underline{\quad} = 3/4 = 3\div 4 = 4\overline{)3}$</p> <p>3. $\bullet\bullet\bullet\bullet\bullet = \underline{\quad} = \underline{\quad} = \underline{\quad} = \underline{\quad}$</p> <p>4. $\bullet\bullet\bullet\bullet\bullet\bullet = 5 \text{ out of } 6 = \underline{\quad} = \underline{\quad} = \underline{\quad}$</p> <p>5. $00000000 = \underline{\quad} = \underline{\quad} = \underline{\quad} = 8\overline{)3}$</p> <p>6. One of your own: $\underline{\quad} = \underline{\quad} = \underline{\quad} = \underline{\quad} = \underline{\quad}$</p> <p><u>Variation:</u></p> <ul style="list-style-type: none"> Have students begin with a division problem and reverse the procedure. <p><u>Example:</u> $4\overline{)3} = 3\div 4 = 3/4 = \text{three of four } \bullet\bullet\bullet\bullet$</p>	<p>Peruse worksheets. Group students having difficulty with the concept and re-teach.</p>	<p><u>Fundamentals of Mathematics</u>, Stein, Edwin I., Allyn and Bacon, Publishers, 1976</p> <p><u>Holt School Mathematics</u>, Nichols, et al, Holt, Rinehart & Winston, 1974</p> <hr/> <p>District Resources</p>



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

101

160

Student Learning Objective(s) A. The student knows a fraction consists of a numerator (which is on top) and a denominator (which is on the bottom) with the line between as a symbol which means divide. State Goal 1
 District Goal
B. The student is able to write a fraction for part of a set. Program Goal 2,7

1
2,7

Related Area(s) _____

Suggested Activities: Grade(s) 7 Suggested Monitoring Procedures Possible Resources

Title: Fraction Sets
Group Size: small group, entire class
Materials: large calendar, classroom objects

Procedure(s):

- Display a large calendar and compare a school week with a calendar week. Express this as a fraction and label the fraction, i.e.,

$$\frac{5}{7}$$
 school week - Numerator
 calendar week - Denominator
- Repeat this process using other examples from the calendar, i.e., Mondays as compared to all the weeks all the days in the month, etc..
- Give students a worksheet and ask the following questions to be expressed as a fraction.
 What fraction of the days of the week begins with: W, T, M, S
- Give students a series of fractions on the worksheet such as 1/2, 3/4, 5/6, etc.. Have them circle the fractions that have a numerator of 3; cross out the fractions with a denominator of 6. (Vary with different combinations.)

Peruse worksheets.

District adopted text

District Resources

Title: Fraction the Fractions
Group Size: small group, entire class
Materials: worksheet

Procedure(s):

- Fill in the missing portions of each equivalent.



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources



Title: Spot the Sets
Group Size: small group, entire class
Materials: worksheet

Procedure(s):

Make a fraction that compares the shaded circle to the total number of circles in the set, or shade in the set to make it equivalent to the fraction.

Example:

(● 0 0 0) = 1/4

(0 0 0 0) =

(0 0 0 0 0) =

(● 0 0 0 ● 0) =

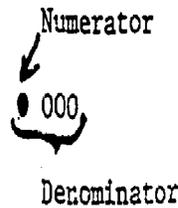
(● ● ● ● ● ●) =

(0 0 0 0 0 0) = 2/6

(0 0 0 0 0 0 0) = 0/7

134

Give students a worksheet with sets similar to the activity and have them work the problems. In addition, have them label the numerator and the denominator in the set, i.e.,



District Resources

135

Student Learning Objective(s) A. The student knows a fraction consists of a numerator (which is on top) and a denominator (which is on the bottom) with the line between as a symbol which means divide. State Goal 1
 District Goal

B. The student is able to order fractions with like denominators. C. The student is able to add and subtract fractions with like denominators. Program Goal 2,5,6

Related Area(s) _____

Suggested Activities: Grade(s) 7 Suggested Monitoring Procedures Possible Resources

Title: Adding and Subtracting Fractions
Group Size: entire class
Materials: worksheet

Procedure(s):
 . Have students do the problems on the worksheet.
 . Have them follow the dots from small to large which correspond to the numbers of correct problems.

Example:

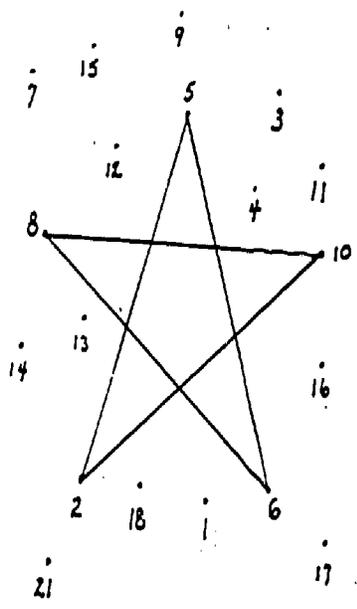
True - False

- 1. $1/3 + 1/3 = 1/6$
- 2. $3/5 + 1/5 = 4/5$
- 3. $2/5 + 1/5 = 3/10$
- 4. $8/9 - 2/9 = 5/9$
- 5. $6/7 - 3/7 - 3/7$
- 6. $2/9 + 5/9 = 7/9$
- 7. $3/7 + 2/7 = 6/7$
- 8. $4/7 + 2/7 = 6/7$
- 9. $8/10 = 6/10 = 2/20$
- 10. $10/13 - 8/13 = 2/13$

District adopted text

Observation of students.

District Resources



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

198

199

Student Learning Objective(s) A. The student knows proper fractions have numerators which are less than the denominator. B. The student knows improper fractions have numerators greater than or equal to the denominator. C. The students is able to multiply fractions (proper and improper) by fractions and/or by whole numbers. State Goal 1
 District Goal
 Program Goal 5,7,8

Related Area(s) _____

Suggested Activities: Grade(s) 7

Suggested Monitoring Procedures

Possible Resources

Title: Fraction Dots
Group Size: entire class
Materials: worksheet (dot paper) or graph paper

District adopted text.

Procedure(s):

- . Have students reproduce models of problems on dot or graph paper for multiplication of fractions.
- . Later, students can make up and solve their own problems.
- . This activity should be done with more difficult fractions as well as improper fractions.

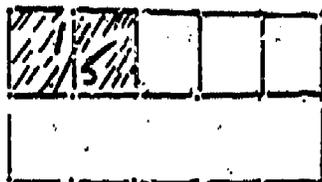
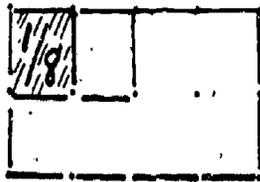
Example:

$1/2 \times 1/4 =$

$2/5 \times 1/2 =$

$1/2 \text{ of } 1/4 = 1/8$

$2/5 \text{ of } 1/2 = 2/10 = 1/5$



$3/4 \times 1-1/2 = 3/4 \times 3/2 =$

$3/4 \text{ of } 3/2 = 9/8 = 1-1/8$



District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring
Procedures

Possible Resources

District Resources

173

173

Student Learning Objective(s) <u>A. The student knows improper fractions have numerators greater than or equal to the denominator.</u>	State Goal	1
<u>B. The student knows mixed numbers (forms) consist of a whole number added to a proper fraction.</u>	District Goal	
<u>C. The student is able to change mixed forms to improper fractions.</u>	Program Goal	2,5,6
Related Area(s) _____		

Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Improper Fractions--Mixed Numbers
Group Size: entire class
Materials: worksheet

Procedure(s):
 . Have students study the examples.
 . Have students fill in missing information.

Example(s): Improper --- Mixed Numbers


 $\frac{9}{4} = 2\frac{1}{4}$
 $4 \overline{) 9} \begin{array}{r} 2 \\ 8 \\ \hline 1 \end{array}$

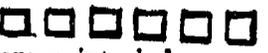
group into fourths


 $\frac{7}{3} = \underline{\hspace{2cm}}$

group into thirds


 $\frac{6}{3} = \underline{\hspace{2cm}}$

group into thirds


 $\frac{6}{2} = \underline{\hspace{2cm}}$

group into halves

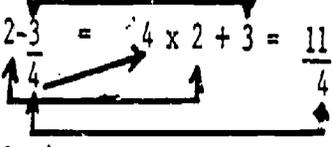
Mixed Numbers --- Improper fractions

$2\frac{3}{4} = \frac{11}{4}$

 $\frac{11}{4}$

group into fourths

OR

$2\frac{3}{4} = 4 \times 2 + 3 = \frac{11}{4}$


$2\frac{1}{3} = \underline{\hspace{2cm}}$
 group into thirds, OR


 $\frac{\hspace{1cm}}{\hspace{1cm}} \times \frac{\hspace{1cm}}{\hspace{1cm}} + \frac{\hspace{1cm}}{\hspace{1cm}} = \frac{\hspace{1cm}}{\hspace{1cm}}$

Peruse completed worksheets-- group students having difficulty.

District adopted text.

District Resources

Suggested Activities: Grade(s) _____ Suggested Monitoring Procedures Possible Resources

Table with 3 columns: Suggested Activities: Grade(s), Suggested Monitoring Procedures, Possible Resources. The table is currently empty.

District Resources

176

177



Student Learning Objective(s) <u>A. The student knows mixed numbers (forms) consist of a whole number</u>	State Goal	1
<u>added to a proper fraction. B. The student is able to add and subtract mixed forms with like</u>	District Goal	
<u>denominators.</u>	Program Goal	2,5

Related Area(s) _____

Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Adding and Subtracting Like Fractions
Group Size: individual, entire class
Materials: worksheet

If some students have difficulty pair them with more capable students and do additional nomographs.

SEAMATH: Seattle Mathematics Program: K-6, Seattle School District, 815 Fourth North, Seattle, WA, 98109, 1975.

Procedure(s):

- Give students worksheet with fraction nomograph.
- Have them follow the directions and answer the problems.
- Similar worksheets can be developed for other denominators.

FRACTION NOMOGRAPH
Addition
 Use the nomograph at the right.
 The dotted line shows:
 $\frac{1}{12} + \frac{1}{12} = \frac{2}{12}$ and $\frac{1}{12} + \frac{3}{12} = \frac{4}{12}$
 Follow these steps:
 1. Find the marks for the fractional numbers that you want to add on number lines A and C.
 2. Put a ruler or other straightedge on these number line points.
 3. Read the numeral for the sum at the point where the straightedge crosses the middle number line. (B)
 4. Try these:
 $\frac{1}{12} + \frac{1}{12} = \frac{2}{12}$, $\frac{1}{12} + \frac{3}{12} = \frac{4}{12}$, $\frac{1}{12} + \frac{5}{12} = \frac{6}{12}$, $\frac{1}{12} + \frac{7}{12} = \frac{8}{12}$, $\frac{1}{12} + \frac{9}{12} = \frac{10}{12}$, $\frac{1}{12} + \frac{11}{12} = \frac{12}{12}$
Subtraction
 The dotted line also shows subtraction:
 $\frac{1}{12} - \frac{1}{12} = \frac{0}{12}$ and $\frac{1}{12} - \frac{5}{12} = -\frac{4}{12}$
 Follow these steps:
 1. Find the mark for the larger number on the middle number line. (B)
 Find the mark for the smaller number on one of the outside number lines. (A or C)
 2. Put a straightedge on these number line points.
 3. Read the numeral for the difference at the point where the straightedge crosses the other outside number line.
 4. Try these:
 $\frac{1}{12} - \frac{1}{12} = \frac{0}{12}$, $\frac{1}{12} - \frac{5}{12} = -\frac{4}{12}$, $\frac{3}{12} - \frac{1}{12} = \frac{2}{12}$, $\frac{5}{12} - \frac{1}{12} = \frac{4}{12}$
 This activity can work for A and B. It should include larger numbers for variety.

District Resources

BEST COPY AVAILABLE



Suggested Activities: Grade(s) _____ Suggested Monitoring Procedures Possible Resources

Empty table area for suggested activities, monitoring procedures, and possible resources.

District Resources

150

181



Student Learning Objective(s) <u>A. The student is able to order fractions with unlike denominators.</u>	State Goal	1
<u>B. The student is able to add and subtract fractions with unlike denominators.</u>	District Goal	
	Program Goal	4,5,7

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Ordering Fractions
Group Size: entire class
Materials: worksheet

Peruse completed message and problems.

District adopted text.

Procedure(s):

- . Students order the fractions from smallest to largest.
 - . Students then put the corresponding letters in same order on the blanks below to read the message.
- NOTE: Individualize by using simple fractions, same numbers, different denominators, for students having difficulty with fractions.

Example:

- L = 6/25 S = 3/10
- C = 1/12 L = 3/4
- H = 1/10 O = 1/2
- O = 2/15 O = 2/3
- S = 1/15 C = 1/3
- I = 1/4
- O = 1/5

District Resources

Suggested Activities: Grade(s) _____ Suggested Monitoring Procedures Possible Resources

Table with 3 columns: Suggested Activities: Grade(s), Suggested Monitoring Procedures, Possible Resources. The table is mostly empty.

District Resources

Table with 3 columns: Suggested Activities: Grade(s), Suggested Monitoring Procedures, District Resources. The table is mostly empty.

194

195



Student Learning Objective(s) <u>The student is able to locate a fractional number on a number line.</u>	State Goal	1
	District Goal	
	Program Goal	2,7

Related Area(s) _____

Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
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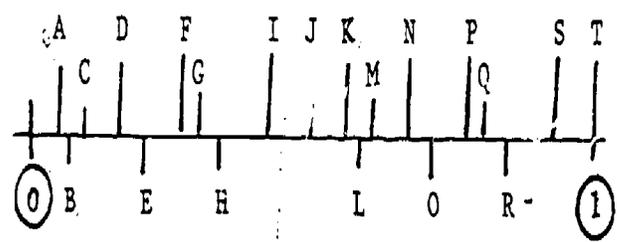
Title: By the Rule
Group Size: individual, entire class
Materials: worksheet

Check and reinforce with similar work on a ruler.

Fundamentals of Mathematics, Stein, Edwin I., Allyn and Bacon, Publishers, 1976

Procedure(s):

. Have students match the fractions with each point on the number line by filling in the blanks of the corresponding letter.



- | | | |
|-------------|-------------|-------------|
| <u> </u> A | <u> </u> H | <u> </u> O |
| <u> </u> B | <u> </u> I | <u> </u> P |
| <u> </u> C | <u> </u> J | <u> </u> Q |
| <u> </u> D | <u> </u> K | <u> </u> R |
| <u> </u> E | <u> </u> L | <u> </u> S |
| <u> </u> F | <u> </u> M | <u> </u> T |
| <u> </u> G | <u> </u> N | |

- 1/2, 1/3, 2/3, 1/4, 3/4, 1/5
 2/5, 3/5, 4/5, 1/6, 5/6, 1/8
 3/8, 5/8, 7/8, 1/10, 3/10, 7/10,
 9/10, 1

District Resources



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		District Resources

198

199

Student Learning Objective(s) A. The student is able to change fractions to simplest forms. B. The student is able to express fraction multiplication products in simplest forms. C. The student is able to express fraction division quotients in simplest form.

State Goal	1
District Goal	
Program Goal	2,7

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Dividing for Dollars
Group Size: entire class
Materials: worksheet
Procedure(s):
 . Students mark the squares that contain fractions equivalent to 1/2, 2/3, 3/4.
Example:

Give students a worksheet with fractions and have them match equal fractions, i.e.,

<u>c</u> 1/6	a. 1/2
<u>e</u> 6/10	b. 5/6
<u>f</u> 4/6	c. 2/12
<u>a</u> 6/12	d. 4/5
<u>d</u> 12/15	e. 3/5
<u>b</u> 15/18	f. 2/3

District adopted text.

3/15	7/32	5/7	8/9	2/4	2/5	2/3	8/21	6/15	19/40		
4/12	7/27	6/9	15/20	20/30	18/24	3/6	10/15	22/33			
	8/18	10/15	6/7	6/12	9/11	16/24	9/16	17/33			
9/19	8/18	12/16	17/21	11/22	13/15	24/36	6/15	4, 10	4/9		
7/21	9/20	10/20	21/28	60/90	24/32	12/18	4/8	5, 100	8/34		
	4/14	3/21	9/16	22/44	12/20	26/39	4/9	27/36		7/21	
4/9	6/32	18/23	7/21	4/8	6/22	14/21	6/14	30/40	6/15		
	5/25	15/30	25/50	44/88	36/48	5/10	33/44	20/40			
	7/10	8/14		8/12	9/16	9/12	7/16	7/15			

District Resources



Suggested Activities: Grade(s) _____

Suggested Monitoring
Procedures

Possible Resources

District Resources

192

193

Student Learning Objective(s) The student is able to divide fractions.

State Goal

1,8

District Goal

5,6

Program Goal

Related Area(s) _____

Suggested Activities: Grade(s) 7

Suggested Monitoring Procedures

Possible Resources

Title: Dividing Fractions

Group Size: entire class

Materials: paper, pencil, chalkboard

Procedure(s):

- . Assign a fraction to each student.
- . Call out the names of two students at random.
- . Those two people go to the board and divide one fraction by the other (girls fraction by the boys or shorter person by the taller, etc.)
- . The first person to get the correct answer gets to choose the next contestants.
- . Class also works problems on paper while contestants are at the board.

Example:

1. $3/4 \div 1/2 =$ _____ (1 1/2)
2. $3/8 \div 1/2 =$ _____ (3/4)
3. $1/2 \div 1/4 =$ _____ (2)
4. $5/6 \div 2/3 =$ _____ (1 1/2)
5. $4 \div 1/2 =$ _____ (8)

Short quiz on division of fractions. Group students having difficulty with the concept for additional help.

District adopted text.

District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

196

197



Student Learning Objective(s) The student is able to divide mixed forms.

State Goal

1,8

District Goal

Program Goal

5,6

Related Area(s)

Suggested Activities: Grade(s) 7

Suggested Monitoring Procedures

Possible Resources

Title: Fraction Relay
Group Size: entire class
Materials: paper, pencil

Teacher has correct answers to compare to those on the board.

District adopted text.

Teacher observes to make sure all students are doing problems.

Procedure(s):

- Each row will be a team with the first person in each designated to be the captain.
- The teacher will give five problems, one for the second person, third person, fourth person, etc. in each row.
- The captain does not receive a problem.
- The class works their problems. When they are completed, they pass their answers forward to the captain.
- The captain adds all the answers together and puts his/her answer on the board.
- The first team with the correct answer wins that round.
- The first team to win a designated number of rounds wins the game.

NOTE: The captain should be someone who has already mastered this type of problem being concentrated on that day.

Example:

$$1. 4 \div 1\frac{1}{2} = 2\frac{2}{3} \quad 6. 4\frac{1}{2} \div 5 = \frac{9}{10}$$

$$2. 8 \div 1\frac{3}{5} = 5 \quad 7. 4\frac{1}{2} \div 2\frac{1}{2} = 1\frac{4}{5}$$

$$3. 14 \div 2\frac{1}{2} = 5\frac{3}{5} \quad 8. 7\frac{1}{5} \div \frac{1}{5} = 36$$

$$4. 2\frac{1}{2} \div 8 = \frac{5}{16} \quad 9. 8\frac{1}{2} \div 2\frac{2}{3} = 3\frac{3}{32}$$

$$10. 6\frac{1}{3} \div 2\frac{1}{2} = 2\frac{8}{15}$$

District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring
Procedures

Possible Resources

District Resources

200

201

Student Learning Objective(s)	The student is able to express fraction division quotients in simplest form.	State Goal	1,8
		District Goal	
		Program Goal	5,6

Related Area(s) _____

Suggested Activities: Grade(s)	Suggested Monitoring Procedures	Possible Resources
--------------------------------	---------------------------------	--------------------

Title: Ratio Race
Group Size: small groups (up to eight each)
Materials: worksheet

Procedure(s):

- Each player chooses a letter from B - I.
- When one player says "GO", both players look for the path of equal ratios from the circled letter at the top to a circle at the bottom.
- The winner is the player who draws his/her path and puts the letter in the circle at the bottom first.
- Path A has been drawn for you. All of the ratios in path A are equal. You can tell that this is so by using the cross products test.

Example:

$\frac{6}{10} = \frac{9}{15}$ is a true proportion since $6 \times 15 = 9 \times 10$.

- Also, the simplest fraction form should be indicated by circling.

(See back of page for worksheet.)

Independent project or teacher can check results.

SEAMATH: Seattle Mathematics Program, Seattle Public Schools
 815 Fourth North, Seattle, Wa.
 98109, 1975

District Resources



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

A	B	C	D	E	F	G	H	I
$\frac{12}{18}$	$\frac{4}{8}$	$\frac{9}{36}$	$\frac{20}{8}$	$\frac{5}{15}$	$\frac{24}{9}$	$\frac{10}{12}$	$\frac{20}{25}$	$\frac{12}{16}$
$\frac{7}{14}$	$\frac{4}{6}$	$\frac{25}{10}$	$\frac{5}{20}$	$\frac{56}{21}$	$\frac{7}{21}$	$\frac{25}{30}$	$\frac{21}{28}$	$\frac{32}{40}$
$\frac{3}{6}$	$\frac{45}{18}$	$\frac{2}{3}$	$\frac{16}{6}$	$\frac{8}{32}$	$\frac{2}{6}$	$\frac{40}{48}$	$\frac{12}{15}$	$\frac{6}{8}$
$\frac{10}{4}$	$\frac{2}{4}$	$\frac{20}{30}$	$\frac{40}{15}$	$\frac{9}{27}$	$\frac{10}{40}$	$\frac{30}{36}$	$\frac{15}{20}$	$\frac{24}{30}$
$\frac{5}{2}$	$\frac{16}{24}$	$\frac{6}{12}$	$\frac{72}{27}$	$\frac{7}{28}$	$\frac{3}{9}$	$\frac{27}{36}$	$\frac{15}{18}$	$\frac{8}{10}$
$\frac{35}{14}$	$\frac{10}{20}$	$\frac{6}{9}$	$\frac{4}{16}$	$\frac{48}{18}$	$\frac{4}{12}$	$\frac{50}{60}$	$\frac{9}{12}$	$\frac{28}{35}$
$\frac{8}{16}$	$\frac{15}{6}$	$\frac{3}{12}$	$\frac{10}{15}$	$\frac{10}{30}$	$\frac{80}{30}$	$\frac{20}{24}$	$\frac{16}{20}$	$\frac{18}{24}$
$\frac{40}{16}$	$\frac{5}{10}$	$\frac{6}{24}$	$\frac{6}{18}$	$\frac{14}{21}$	$\frac{45}{54}$	$\frac{64}{24}$	$\frac{30}{40}$	$\frac{40}{50}$
$\frac{9}{18}$	$\frac{50}{20}$	$\frac{8}{24}$	$\frac{2}{8}$	$\frac{35}{42}$	$\frac{18}{27}$	$\frac{6}{8}$	$\frac{32}{12}$	$\frac{36}{45}$
				A				

District Resources

205

204

Page
Suggested
Grade Placement
District
Placement

SUBJECT: Mathematics

SPECIFIC AREA: Rational Numbers: Ratios, Percentage, Proportion

			4	5	6	7	8
The student knows:							
• a ratio is a way of comparing two numbers by division, i.e., the ratio of a to b is $\frac{a}{b}$.	101	6-8					
• a ratio can be expressed in the following forms: a to b or $\frac{a}{b}$.	101	6-8					
• a percent is defined as a ratio with denominator of one hundred and is denoted by the symbol %, i.e., 50% is $\frac{50}{100}$.	103	7-8					
• the meaning of the key terms associated with percent: base, rate, and percentage.	105	7-8					
• base x rate = percentage.	105	7-8					
• areas of application for percent: banking, commerce, statistics, communications.	107	7-8					
• a proportion is a statement of equality between two ratios, i.e., $\frac{2}{4} = \frac{6}{12}$.	111	7-8					
• in a proportion the cross-products are equal, i.e., for b and d $\neq 0$, $\frac{a}{b} = \frac{c}{d}$ implies $ad=bc$.	111	7-8					
The student is able to:							
• rename any rational number as a percent, i.e., .05=5%; .5=50%; $\frac{3}{4} = 75\%$; 2 = 200%; $1\frac{1}{2} = 150\%$.	103	7-8					
• rename a number in a percent form as either a fraction or decimal i.e., 100% = 1.00; 75% = .75 = $\frac{3}{4} = \frac{75}{100}$. $150\% = \frac{3}{2} = \frac{150}{100} = 1\frac{1}{2} = 1.5$							
• 33 $\frac{1}{3}\%$ = $\frac{1}{3} = .333\dots$	117	7-8					
• solve the three types of percentage problems: a% of b = c, i.e., a. given a and b, find c (find 25% of 60). b. given b and c, find a (what percent of 90 is 45?) c. given a and c, find b (25 is 50% of what number?)	121	7-8					
• solve for the missing value of a given proportion, i.e., $\frac{8}{x} = \frac{2}{7}$.	121	7-8					
• solve simple word problems involving percent: interest, commission, compound interest, % of change, discount, price.	121	7-8					
	115	7-8					
	107	7-8					

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____ 208

207

208

Student Learning Objective(s) A. The student knows a ratio is a way of comparing two numbers State Goal
by division, i.e. the ratio of a to b is $\frac{a}{b}$. B. The student knows a ratio can be expressed in District Goal
the following forms: a to b or $\frac{a}{b}$. Program Goal

i
2,7,8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Ratio Survey
Group Size: entire class
Materials:

Procedure(s):

- . Survey the class (either orally or on paper) as to such ratios as:
- .left-handed to right-handed.
- .odd-numbered birthdays to even-numbered birthdays.
- .those having at least one brother/sister to those having none.
- .blonds to brunets.
- .those able to swim for five minutes to those unable to swim.
- .those who have flown (or sailed, or ridden on a train, to those who have not.)
- .those who have broken bones to those who have not.
- .those born in Washington State to those born outside the state.
- .those who walk to school to those who ride the bus.
- .those who have travelled out-of-state to those who have not.
- .those who have been hospitalized (except for birth) to those who have not.
- .those who ride horses to those who do not.
- .foreign car families to domestic car families.
- .those who have visited Canada to those who have not.

District Resources

Suggested Activities: Grade(s)	Suggested Monitoring Procedures	Possible Resources
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District Resources



Student Learning Objective(s) A. The student knows a percent is defined as a ratio with denominator of one hundred and is denoted by the symbol %, i.e., 50% is $\frac{50}{100}$. B. The student is able to rename any rational number as a percent, i.e., .05=5%; .5=50%; $\frac{3}{4}$ = 75%; 2=200%; $1\frac{1}{2}$ = 150%.

State Goal	1
District Goal	
Program Goal	2,4 7,8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

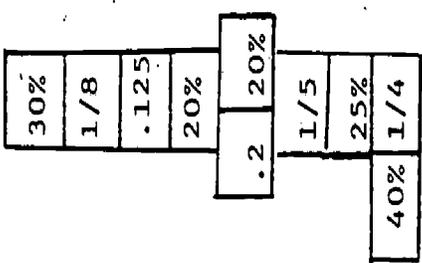
Suggested Monitoring Procedures	Possible Resources
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Title: Ratio Dominoes
Group Size: pairs
Materials: domino set made from tagboard (or paper pasted on regular domino set)

Procedure(s):

- . Cut tagboard into 2.5x5 cm rectangles.
- . Write a percent on one end, and on the other end, write a fraction or decimal fraction. Take care that the fraction of one domino will be equivalent to a percent or decimal of another.
- . Place dominoes face down on the table. Each
- . Each player chooses five dominoes.
- . Another domino is placed face up on the table and is the starting domino.
- . Player must draw one domino from the unplayed, unchosen dominoes if he/she cannot play from his/her own stack.
- . First player to play all his/her dominoes wins.

Example:



Give students a worksheet of ratios and have them rename them as a percent, i.e.,

$\frac{2}{5} = 40\%$; $\frac{1}{2} = 50\%$

$\frac{1}{4} = 25\%$; $\frac{3}{4} = 75\%$

TR
 Forbes, Jack, et al.
Macmillan Mathematics Skills Practice Book, Macmillan Publishing Co., p. 55.

District Resources

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Percent Concentration
Group Size: pairs
Materials: concentration board, 16 cards with 8 of one color and 8 of another.

District adopted text.

Procedure(s):

- Make up eight cards with rational numbers and eight cards of another color as percentages.
- Place the cards face down on the board. The first player draws a card of each color. If the rational number card and the percentage card match, the player gets one point and draws two more cards.
- If the cards do not match, they are placed face down and the other player gets a turn.
- The winner is the player with the highest total.

Example:

.05	.5	$\frac{3}{4}$	2	$1\frac{1}{2}$	3	.6	.25
50%	50%	75%	200%	150%	300%	60%	25%

CONCENTRATION

Game Board

District Resources

215

216

Student Learning Objective(s) A. The student knows the meaning of the key terms associated with percent: base, rate and percentage. B. The student knows base x rate = percentage. State Goal _____
 District Goal _____

1
2,7,8

Program Goal 2,7,8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Base x Rate = Percentage
Group Size: entire class
Materials: worksheet in chart form, overhead or chalkboard.

Evaluate the chart.

District adopted text.

Procedure(s):

. Review with students that percent means "per hundred." Demonstrate that in order to use percents in computation, it is necessary to change percents to decimals:

$$60\% = \frac{60}{100} = 60 \div 100 = .60$$

. Point out that in basic percent problems students can replace percents by decimals in order to multiply:

$$20\% \text{ of } 8 = .20 \times 8 = 1.6$$

. Use terms for the percent problem as follows:

20% = .20 is the ratio or rate.

8 is the base

1.6 is the percentage of the base. Thus, rate times base equal percentage ($r \times b = p$).

. Go over several examples with students and then have them fill in the chart:

30% of 50 is _____

$$.30 \times 50 = p$$

$$.3 \times 50 = p$$

$$.3 \times 50 = 15$$

PERCENT PROBLEM	PERCENTAGE	RATE	BASE
8% of 75 is <u>6</u>			
	6	.08	75
25% of 56 is _____			
_____ is 25% of 56			
80% of 90 is _____			
_____ of 50 is 40			

District Resources

218



Suggested Monitoring Procedures Possible Resources

Suggested Monitoring Procedures

Possible Resources

District Resources

210

220

Student Learning Objective(s) A. The student knows areas of application for percent: banking, commerce, statistics, communications. B. The student is able to solve simple word problems involving percent: interest, commission, compound interest, % of change, discount, price.

State Goal 1

District Goal

Program Goal 2,6,7

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Clearance Sale
Group Size: entire class
Materials: large pictures of items students might like, i.e., ski equipment, stereo equipment.

Paper and pencil check with similar items.

District adopted text.
 magazines
 newspapers

- Procedure(s):
- . Attach regular sales prices to each item.
 - . Teacher puts pictures with prices on the bulletin board along with a sign saying "Clearance Sale -- 20% Off!"
 - . Give students a fixed amount of money to spend.
 - . Students are to decide which items they could buy with their money.

Given \$150, which of these could you buy?

<u>Item</u>	<u>Regular Price</u>	<u>20% Off</u>
ski boots	\$95.00	_____
ski jacket	45.00	_____
ski mask	12.00	_____
ski gloves	8.00	_____
stereo	145.00	_____
stereo head-phones	35.00	_____
speakers	90.00 each	_____
turntable	130.00	_____

District Resources



Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title:

Group Size: entire class

Materials: copy of your school district's building fund or maintenance and operation budget showing moneys invested on a short term basis.*

Procedure(s):

- . Invite the school business manager or superintendent to class to discuss school investments and school finance.
- . Class can determine and chart the interest money to be gained.
- . Comparison of short term and long term investments could be made.

* Many school districts do invest building funds in short term government bonds or certificates of deposit (CD's).

Title: Compound It

Group Size: entire class

Materials: overhead or chalkboard

Procedure(s):

- . Point out to students that interest added to the principal at the end of an interest period is called compound interest. Tell them that most banks automatically deposit the interest in a savings account at the end of the interest period.
- . Use the formula $i = r \times p \times n$ to show how to find interest for a year when r is rate, p is principal, and n is the period of time.

Period	Principal on Deposit	Interest Earned
1	\$100	$.06 \times 100 \times 1 = 6.00$
2	$\$100 + \$6 = \$106.00$	$.06 \times 106 \times 1 = 6.36$
3	$\$106 + 6.36 = 112.36$	$.06 \times 112.32 \times 1 = 6.74$

- . Give students problems involving bank deposits and have them do compound interest.

District superintendent.

Have students compare simple interest over a five year period to compound interest using a base of \$1000.00.

District Resources

224

Student Learning Objective(s) A. The student knows areas of application for percent: banking, commerce, statistics, communications. B. The student is able to solve simple word problems involving percent: interest, commission, compound interest, % of change, discount, price.

State Goal	1
District Goal	
Program Goal	

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Real Data in Ratio and Percent <u>Group Size:</u> entire class <u>Materials:</u> magazines, newspapers</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Have students bring articles from newspapers and magazines that apply to data on ratio or percent. . Label different parts of the bulletin board "Sports," "Government," "Business," etc., and post articles in appropriate sections. . Use data from these articles to construct story problems for students to solve. <p>Examples: "Amount off" in ads that present "n% off regular price." Investment loss or gain in stock market changes. The percent of total budget (or amount if percent is given) of the nation, state, city, or school district spent for various purposes. Win/loss percentage of favorite professional sports team or school team.</p>	<p>Teacher observation</p>	<p>TR <u>Macmillan Mathematics,</u> Jack E. Forbes et al. Macmillan Publishing Company 1977, p. 279B.</p> <hr/> <p>District Resources</p>

225

226



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

227

228



Student Learning Objective(s) A. The student knows a proportion is a statement of equality between two ratios, i.e., $\frac{2}{4} = \frac{6}{12}$. B. The student knows in a proportion the cross-products are equal, i.e., for b and d $\neq 0$, $\frac{a}{b} = \frac{c}{d}$ implies $ad=bc$. State Goal
 District Goal
 Program Goal

1
2,7,8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Ratio Rummy
Group Size: small groups
Materials: deck of about 60-80 cards containing integers from 0 to 30 (one per card); skip some prime numbers, i.e., 19, 23, 29; have two or three of some composite numbers, i.e., 4, 5, 6, 8, 12, 16.

- Procedure(s):
- Shuffle and deal ten cards.
 - Place top card on the discard pile.
 - Play starts at the dealer's left.
 - First player draws from either pile and must discard.
 - The object is to make ratios.
 - When a player makes a ratio, i.e., $2/4=3/6$ (using four cards 2, 4, 3, 6), he/she lays them down.
 - All other ratios player makes must be equal to his/her original one ($5/10$).
 - A player may play on an opponent's ratio, also (the cards are placed in front of his/her own place).
 - When the deck is exhausted, shuffle the discard pile and turn it over.
 - When a player plays all his/her cards, the round is over.
 - Scoring is by face value. Thus, $2/4 = 3/6 = 5/10$ would equal 30 points ($2+4+3+6+5+10$).
 - Cards left in a player's hand are subtracted from his/her total.
 - The first player to reach a total of 100 points is the winner.

Teacher observation of game. Test.

District adopted text.

District Resources

Suggested Monitoring Procedures

Possible Resources

Title: Cross-Products Message

Group Size: entire class

Materials: worksheet

Procedure(s):

- Students complete cross products.
- Place letter from correct proportions in order from start to finish. Work down.
- Letters will form a message.

A. $\frac{2}{3} = \frac{6}{9}$

F. $\frac{1}{8} = \frac{3}{24}$

P. $\frac{3}{4} = \frac{6}{8}$

T. $\frac{5}{12} = \frac{2}{3}$

E. $\frac{4}{3} = \frac{5}{4}$

O. $\frac{8}{9} = \frac{24}{27}$

R. $\frac{1}{2} = \frac{6}{12}$

O. $\frac{3}{10} = \frac{18}{60}$

M. $\frac{4}{7} = \frac{5}{8}$

L. $\frac{2}{3} = \frac{8}{12}$

O. $\frac{3}{6} = \frac{13}{24}$

A. $\frac{10}{7} = \frac{30}{22}$

I. $\frac{9}{12} = \frac{15}{20}$

S. $\frac{6}{7} = \frac{24}{28}$

L. $\frac{3}{8} = \frac{15}{40}$

B. $\frac{5}{11} = \frac{6}{12}$

Have students change ratios so that they are a proportion in the examples where there is not equality, i.e.,

E $\frac{4}{3} = \frac{5}{4}$ change to $\frac{4}{3} = \frac{8}{6}$

District adopted text.

District Resources

A P R I L F O O L S

Title: Ratio Race

Group Size: pairs

Materials: see chart below

Procedure(s):

1. Each player chooses a letter from B to I.
- When one player says "GO!", both players look for a path of equal ratios from the circled letter at

Have students use cross products to check their ratios, i.e.,

$\frac{2}{3} = \frac{4}{6} = 3 \times 4, 6 \times 2$

Student Learning Objective(s) A. The student knows a proportion is a statement of equality

State Goal

1

between two ratios, i.e., $\frac{2}{4} = \frac{6}{12}$

B. The student knows in a proportion the cross-products are

District Goal

equal, i.e., for b and d \neq 0, $\frac{a}{b} = \frac{c}{d}$ implies $ad=bc$.

Program Goal

2,7,8

Related Area(s) Rational Numbers: Fractions, decimals.

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

- the top to a circle at the bottom.
 - the winner is the player who draws his/her path and puts the letter at the bottom first.
 - PATH A has been drawn. All of the ratios in Path A are equal. You can tell that this is so by using the cross-products test.
- Variation: Have some of the ratios replaced with decimals or percentages.

SEAMATH: Seattle Mathematics Program: K-6, 1975
Seattle Public Schools
815 Fourth North
Seattle, WA 98109

District Resources

A	B	C	D	E	F	G	H	I
$\frac{12}{18}$	$\frac{4}{8}$	$\frac{9}{36}$	$\frac{20}{8}$	$\frac{5}{15}$	$\frac{24}{9}$	$\frac{10}{12}$	$\frac{20}{25}$	$\frac{12}{16}$
$\frac{7}{14}$	$\frac{4}{6}$	$\frac{25}{10}$	$\frac{5}{20}$	$\frac{56}{21}$	$\frac{7}{21}$	$\frac{25}{30}$	$\frac{21}{28}$	$\frac{32}{40}$
$\frac{2}{6}$	$\frac{45}{18}$	$\frac{2}{3}$	$\frac{16}{6}$	$\frac{8}{32}$	$\frac{2}{6}$	$\frac{40}{48}$	$\frac{12}{15}$	$\frac{6}{8}$
$\frac{10}{4}$	$\frac{2}{4}$	$\frac{20}{30}$	$\frac{40}{15}$	$\frac{9}{27}$	$\frac{10}{40}$	$\frac{30}{36}$	$\frac{15}{20}$	$\frac{24}{30}$
$\frac{5}{2}$	$\frac{16}{24}$	$\frac{6}{12}$	$\frac{72}{27}$	$\frac{7}{28}$	$\frac{3}{9}$	$\frac{27}{36}$	$\frac{15}{18}$	$\frac{8}{10}$
$\frac{35}{14}$	$\frac{10}{20}$	$\frac{6}{9}$	$\frac{4}{16}$	$\frac{48}{18}$	$\frac{4}{12}$	$\frac{50}{60}$	$\frac{9}{12}$	$\frac{28}{35}$
$\frac{8}{16}$	$\frac{15}{6}$	$\frac{3}{12}$	$\frac{10}{15}$	$\frac{10}{30}$	$\frac{80}{30}$	$\frac{20}{24}$	$\frac{16}{20}$	$\frac{18}{24}$
$\frac{40}{16}$	$\frac{5}{10}$	$\frac{6}{24}$	$\frac{6}{18}$	$\frac{14}{21}$	$\frac{45}{54}$	$\frac{64}{24}$	$\frac{30}{40}$	$\frac{40}{50}$
$\frac{9}{18}$	$\frac{50}{20}$	$\frac{8}{24}$	$\frac{2}{3}$	$\frac{35}{42}$	$\frac{18}{27}$	$\frac{6}{8}$	$\frac{32}{12}$	$\frac{36}{45}$
					A			

Suggested Activities: Grade(s)

Suggested Monitoring
Procedures

Possible Resources

District Resources

235

236

Student Learning Objective(s) A. The student knows in a proportion the cross-products are equal, i.e., for b and d ≠ 0, $\frac{a}{b} = \frac{c}{d}$ implies ad = bc. B. The student is able to solve for the missing value of a given proportion, i.e., $\frac{8}{x} = \frac{2}{7}$. State Goal 1
 District Goal
 Program Goal 2,6,7

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

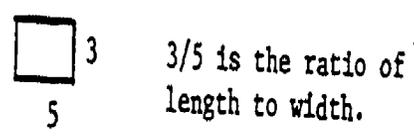
Suggested Monitoring Procedures

Possible Resources

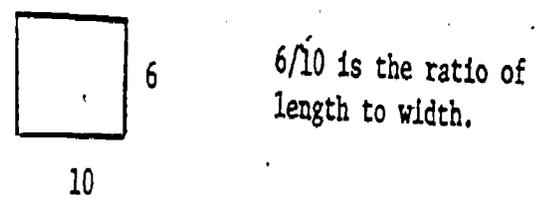
Title:
Group Size: small group
Materials: overhead projector, several rectangles and a square cut from construction paper, chalk, pencil, paper.

Give students a worksheet with cross-products to follow the activity:
 $\frac{3}{4}, \frac{5}{7}, \frac{3}{4}, \frac{6}{8}, \frac{4}{12}, \frac{1}{3}, \frac{3}{12}, \frac{1}{4}$

- Procedure(s):
- Place rectangle on overhead, projecting onto chalkboard.
 - Outline figure on board.
 - Measure length and width with meter stick. Write as fraction.



- Move projector back a few inches. Retrace and remeasure.



Show by cross-product that $\frac{3}{5} = \frac{6}{10}$
 i.e., $5 \times 6 = 30$
 $3 \times 10 = 30$

District Resources

207

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Secret Star
Group Size: individual
Materials: 3 x 5 cards

District adopted text.

Procedure(s):

Prepare decoder card:

A =1	H =9	O =24	V =36
B =2	I =10	P =25	W =40
C =3	J =12	Q =27	X =42
D =4	K =15	R =28	Y =45
E =5	L =16	S =30	Z =48
F =6	M =18	T =32	
G =8	N =20	U =35	

Other cards contain spaces for letters to be taken from decoder and series of equivalent ratios with one missing number. When determined, this missing number will correspond with the correct letter to be filed into the blanks in order:

<u>T</u> (32)	<u>H</u> (9)	<u>E</u> (5)	
<u>F</u> (6)	<u>O</u> (24)	<u>N</u> (20)	<u>Z</u> (48)
$\frac{3}{8} = \frac{12}{x}$	$\frac{1}{x} = \frac{7}{63}$	$\frac{3}{15} = \frac{1}{x}$	
$\frac{3}{x} = \frac{5}{10}$	$\frac{3}{8} = \frac{9}{x}$	$\frac{12}{x} = \frac{6}{10}$	

Determine the missing numbers and discover the star.

District Resources

240

200



Student Learning Objective(s) A. The student is able to rename a number in percent form as either a fraction or decimal, i.e., 100% = 1.00; 75% = .75 = $\frac{3}{4}$ = $\frac{75}{100}$; 150% = $\frac{3}{2}$ = $\frac{150}{100}$ = $1\frac{1}{2}$ = 1.5; $33\frac{1}{3}\%$ = $\frac{1}{3}$ = .333.

State Goal	
District Goal	1
Program Goal	2, 6, 7, 8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources												
<p><u>Title:</u> Matching</p> <p><u>Group Size:</u> entire class</p> <p><u>Materials:</u> worksheets</p> <p><u>Procedure(s):</u></p> <p>Students match equivalent forms and find the hidden message.</p> <p>1. 50% = _____ E = 2/3</p> <p>2. 67% = _____ P = .5</p> <p>3. 75% = _____ L = 7/8</p> <p>4. 150% = _____ R = 2.000</p> <p>5. 175% = _____ M = .42</p> <p>6. 38% = _____ C = $1\frac{1}{2}$</p> <p>7. 33% = _____ I = 3/11</p> <p>8. 80% = _____ N = .375</p> <p>9. 30% = _____ S = 4/5</p> <p>10. 200% = _____ R = 3/4</p> <p>11. 25% = _____ A = 3/10</p> <p>12. 22% = _____ T = .333</p> <p>13. 27% = _____ E = 1 3/4</p> <p>14. 42% = _____ S = 2/9</p> <p>15. 40% = _____ E = 1/4</p> <p>16. 88% = _____ P = .400</p> <p>17. 83% = _____ E = 5/6</p>	<p>Observation of the activities.</p> <p>Give students a worksheet on which they must rename a number as a fraction and a decimal.</p> <table border="0" style="margin-left: 40px;"> <tr> <td></td> <td style="text-align: center;">Fraction</td> <td style="text-align: center;">Decimal</td> </tr> <tr> <td>60%</td> <td style="text-align: center;">$\frac{60}{100}, \frac{3}{5}$</td> <td style="text-align: center;">.60</td> </tr> <tr> <td>75%</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>33 1/3%</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> </table>		Fraction	Decimal	60%	$\frac{60}{100}, \frac{3}{5}$.60	75%	_____	_____	33 1/3%	_____	_____	<p>District adopted text.</p>
	Fraction	Decimal												
60%	$\frac{60}{100}, \frac{3}{5}$.60												
75%	_____	_____												
33 1/3%	_____	_____												
<p><u>Title:</u> Matching II</p> <p><u>Group Size:</u> entire class</p> <p><u>Materials:</u> one index card for each student. (One half the cards should contain a percent, the</p>	<p>Observation of the activities.</p> <p>Give students a worksheet on which they must rename a number as a fraction and a decimal.</p>	<p>District Resources</p>												



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		District Resources

213

214

Student Learning Objective(s) A. The student is able to rename a number in percent form as either a fraction or decimal, i.e., 100% = 1.00; 75% = .75 = $\frac{3}{4} = \frac{75}{100}$; 150% = $\frac{3}{2} = 1\frac{1}{2} = 1.5$; State Goal

1

33 $1.\overline{3}\% = \frac{1}{3} = .333$. District Goal

--

Program Goal

2, 6 7, 8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

other half should contain an equivalent fraction or decimal.)
 Procedure(s):
 . At a signal, the students wander around the room trying to find the student whose card matches
 . When students find their match, they sit down next to each other.
 . Award 10 points for first, 9 points for second, 8 points for third.
Variation: Use Concentration game.

District Resources



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		District Resources

217

218

Student Learning Objective(s) A. The student is able to solve the three types of percentage

State Goal

1

problems: $a\%$ of $b = c$, i.e., a. given a and b , find c (find 25% of 50). b. given b and c ,

District Goal

find a (what percent of 90 is 45?). c. given a and c , find b (25 is 50% of what number?).

Program Goal

2, 6,
7, 8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Three Kinds of Percent
Group Size: entire class, small group
Materials: overhead, chalkboard

Give students as many real life examples as possible.

District adopted text.

Procedure(s):

- Write the following on the chalkboard or overhead:
10% of 60 is 6
10% of 60 is a
 $b\%$ of 60 is 6
10% of c is 6
- Point out that in each case a different number is being found. These are the three basic types of percent problems.
- In three separate lessons, work on the types of percent problems using as many real life problems as possible, i.e., percent of interest, taxes, baseball averages, etc.

District Resources

Examples of the three types of problems:		
5% of 120 = a	$b\%$ of 300 = 60	50% of c = 74
$.05\%$ of 120 = a	(think, 60 is what % of 300)	$.50 c = 74$
$.05\% \times 120 = 6$	$\frac{b\%}{100} = \frac{60}{300}$	$\frac{.50}{.50} c = \frac{74}{.50}$
	$300 b\% = 6000$	$c = \frac{74}{.50}$
	$b = 20\%$	$c = 148$



Suggested Monitoring Procedures

Possible Resources

Title: Hidden Message
Group Size: entire class
Materials: worksheet with percentage problems; worksheet with answers keyed to alphabet.

Read students' hidden message.

District adopted text.

Procedure(s):

- Students work the percentage problems, find the letter of the alphabet that corresponds to their answer, and write each letter as they complete the problems. The letters combine to form a Hidden Message.

$\frac{B}{1}$	$\frac{A}{2}$	$\frac{N}{3}$	$\frac{K}{4}$	$\frac{E}{5}$	$\frac{R}{6}$	$\frac{S}{7}$	$\frac{K}{8}$	$\frac{N}{9}$	$\frac{O}{-}$	$\frac{W}{-}$
$\frac{P}{12}$	$\frac{E}{13}$	$\frac{R}{14}$	$\frac{C}{15}$	$\frac{E}{16}$	$\frac{N}{17}$	$\frac{T}{18}$				

- | | |
|-----------------------------|------------------------------|
| 1. 10% of 60 is <u>6</u> | 10. 25% of 20 is 5 |
| 2. 15% of 80 is <u>12</u> | 11. 35% of 80 is 28 |
| 3. 70% of 120 is <u>84</u> | 12. 75% of 150 is 112.5 |
| 4. 95% of 40 is <u>38</u> | 13. 72% of 200 is 144 |
| 5. 60% of 120 is <u>72</u> | 14. 10% of 9.6 is .96 |
| 6. 12% of 80 is <u>9.6</u> | 15. 83% of 40 is 33.20 |
| 7. 18% of 60 is <u>10.8</u> | 16. 20% of 72 is 14.40 |
| 8. 38% of 100 is 38 | 17. 84% of 300 is 25.20 |
| 9. 20% of 84 is 16.8 | 18. 16% of 46 is <u>7.36</u> |

Answer Key:

- | | |
|----------|----------|
| B = 6 | T = 7.36 |
| K = 38 | C = 83 |
| N = 84 | O = 25 |
| S = 10.8 | W = 80 |
| E = 72 | P = 150 |
| R = 9.6 | A = 12 |

District Resources

2

252

SUBJECT: Mathematics

SPECIFIC AREA: Rational Numbers: Decimals

Page

Suggested
Grade Placement

District
Placement

4 5 6 7 8

The student knows:

The student is able to:

- *. read and write decimals to the thousandths.
- *. read and write decimals to hundred thousandths.
- . express a decimal in expanded form to thousandths, i.e.,
 $.438 = \frac{\quad}{10} + \frac{3}{100} + \frac{8}{1000}$
- . express a decimal in expanded form to hundred thousandths.
- . express the expanded form of a fraction in decimal form, i.e.,
 $\frac{\quad}{10} + \frac{3}{100} + \frac{8}{1000} = .438$
- *. order decimals on number line.
- *. round decimals to hundredths, i.e., $.763 \rightarrow .76$
- *. round decimals to tenths, i.e., $284 \rightarrow .3$
- *. round decimals to thousandths.
- . round decimals to ten thousandths.
- *. add and subtract decimals to thousandths.
- *. add and subtract decimals to hundred thousandths.
- *. multiply and divide decimals to thousandths.
- . multiply and divide decimals to hundred thousandths.

125 6-8
 129 7-8
 125 6
 129 7-8
 125 6-8
 131 6-8
 133 6-7
 133 6-7
 133 7-8
 133 7-8
 135 6
 135 7-8
 137 7-8
 139 7-8

The student values:

253

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

215

251



Student Learning Objective(s) <u>A. The student is able to read and write decimals to the thousandths.</u>	State Goal	1
B. The student is able to express a decimal in expanded form to thousandths, i.e., $.438 = \frac{4}{10} + \frac{3}{100} + \frac{8}{1000}$.	District Goal	
C. The student is able to express the expanded form of a fraction in decimal form, i.e., $\frac{4}{10} + \frac{3}{100} + \frac{8}{1000} = .438$	Program Goal	1,3

Suggested Activities: Grade(s) <u>6</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Decimal Expando
Group Size: small group, entire class
Materials: cards (3x5 or 3x3)
Procedure(s):

- Have students make a number of cards with basic numerals 1 - 9, a decimal point card, two plus sign cards and an equal sign card. In addition have students make cards with expanded fraction forms of each number, i.e., $\frac{1}{10}, \frac{1}{100}, \frac{1}{1000}, \frac{2}{10}, \frac{2}{100}, \frac{2}{1000}$, etc.
- Read a number and have students form the number with their cards, i.e.,

.
3
2
5

- Have students match the decimal number with the expanded form in fractions, i.e.,

$+$ $\frac{3}{10}$ $+$ $\frac{2}{100}$ $+$ $\frac{5}{1000}$

Variation: Reverse the procedure.

Walk among students (class) or observe (small group) to see if they have arranged cards correctly.

District adopted text.

District Resources

2:0

207



Suggested Activities: Grade(s) 6

Suggested Monitoring Procedures

Possible Resources

Title: Decimal Puzzle

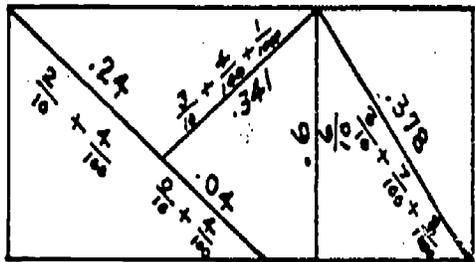
Group Size: pairs

Materials: paper, ruler, scissors

Procedure(s):

- Have each student make a design (see example). Each segment in the design should have a decimal (to the thousandth) on one side and its expanded form on the other side.

Example:



- Cut apart the design to make a puzzle.
- Have students trade puzzles and try to put them back together by matching the decimal and its expanded form.

Give students a worksheet with decimals and have them write the expanded notation, i.e.,

$$.6 = \frac{6}{10}; .25 = \frac{2}{10} + \frac{5}{100};$$

$$.75 = \frac{7}{10} + \frac{50}{100}; .251 = \frac{2}{10} + \frac{50}{100} +$$

$$\frac{1}{1000}$$

District adopted text.

District Resources

Student Learning Objective(s) A. The student is able to read and write decimals to the thousandths.
 B. The student is able to express a decimal in expanded form to thousandths, i.e.,
 $.438 = \frac{3}{10} + \frac{4}{100} + \frac{8}{1000}$. C. The student is able to express the expanded form of a fraction in decimal form, i.e.,
 $\frac{4}{10} + \frac{3}{100} + \frac{8}{1000} = .438$

State Goal

District Goal

Program Goal

1
1,3

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

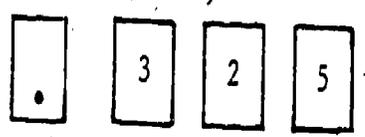
Title: Decimal Expando
Group Size: small group, entire class
Materials: cards (3" x 5" or 3" x 3")

Walk among students (class) or observe (small group) to see if they have arranged cards correctly.

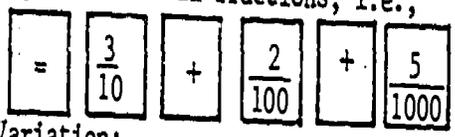
District adopted text.

Procedure(s):

- Have students make a number of cards with basic numerals 1 - 9, a decimal point card, two plus sign cards, and an equal sign card.
- In addition, have students make cards with expanded fraction forms of each number, i.e.,
 $\frac{1}{10}, \frac{1}{100}, \frac{1}{1000}, \frac{2}{10}, \frac{2}{100}, \frac{2}{1000}$, etc.
- Read a number and have students form the number with their cards, i.e.,



- Have students match the decimal number with the expanded form in fractions, i.e.,



Variation:

- Reverse the procedure.

District Resources

280

281



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

Title: Decimal Puzzle
Group Size: pairs
Materials: paper, ruler, scissors

Give students a worksheet with decimals and have them write the expanded notation, i.e.,

District adopted text.

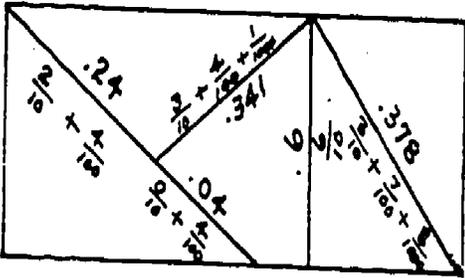
$$.6 = \frac{6}{10}, \quad .25 = \frac{2}{10} + \frac{5}{100}$$

$$.75 = \frac{7}{10} + \frac{5}{100}; \quad .251 = \frac{2}{10} + \frac{5}{100} + \frac{1}{1000}$$

Procedure(s):

- Have each student make a design like this one. Each segment in the design should have a decimal (to the thousandth) on one side and its expanded form on the other side.

Example:



- Cut apart the design to make a puzzle.
- Have students trade puzzles and try to put them back together by matching the decimal and its expanded form.

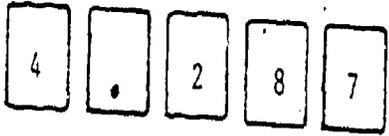
District Resources

Student Learning Objective(s) A. The student is able to read and write decimals to hundred thousandths. B. The student is able to express a decimal in expanded form to hundred thousandths.

State Goal	1
District Goal	
Program Goal	1, 3

Related Area(s): _____

Suggested Activities: Grade(s) 7-8

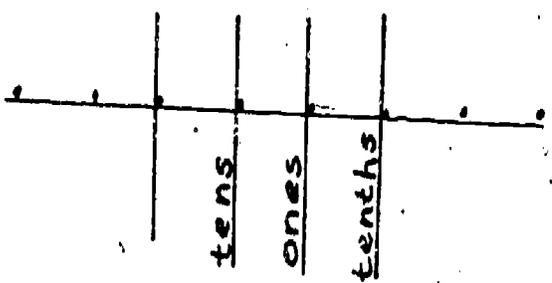
Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources																																			
<p><u>Title:</u> Placing the Decimal <u>Group Size:</u> small group, entire class <u>Materials:</u> cards (3x5 or 3x3) <u>Procedure(s):</u></p> <ul style="list-style-type: none"> Have students make one card for each digit one through nine and one card with a decimal point. Read a number containing a decimal and have students arrange their cards to form that number. <p>Note: Read the decimal as "and." Example:</p> <div style="text-align: center;">  </div> <p>Variation: Arrange cards before the group and call upon students to read the number, or have a student read a number and have other students form the same number with their cards.</p>	<p>Walk among students to see if they have arranged the decimal number correctly.</p> <p>Have students draw place value charts if they have difficulty with this concept, i.e.:</p> <div style="text-align: center;"> <table border="1" style="border-collapse: collapse;"> <tr> <td style="padding: 5px;">thousands</td> <td style="padding: 5px;">hundreds</td> <td style="padding: 5px;">tens</td> <td style="padding: 5px;">ones</td> <td style="padding: 5px;">tenths</td> <td style="padding: 5px;">hundredths</td> <td style="padding: 5px;">thousandths</td> </tr> <tr> <td style="padding: 5px;"> </td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> <td style="padding: 5px;">1</td> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">1</td> <td style="padding: 5px;"> </td> </tr> </table> <p style="margin-left: 100px;">← 10 1 ten ← .1 1 tenth ← .001 1 thousandth</p> </div>	thousands	hundreds	tens	ones	tenths	hundredths	thousandths											1	0							1						0	0	1		<p>District adopted text.</p> <hr/> <p>District Resources</p>
thousands	hundreds	tens	ones	tenths	hundredths	thousandths																															
			1	0																																	
				1																																	
			0	0	1																																



Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Decimal Place Value
Group Size: small group or entire class
Materials: chalkboard or worksheet

Procedure(s):
 . Begin a place value chart on the chalkboard or duplicate one for each student, i.e.,



- . Have students extend the chart in both directions (either orally with you at the chalkboard, or on their worksheets).
- . Have students write decimals through thousandths by telling them the place value of each digit. For example, 5 in the tenths place, 6 in the hundredths, and 8 in the thousandths place would be 568.

Give students a worksheet of decimal numbers and have them underline the correct numeral as you read them, i.e.,

A. .5432 B. .52 C. 1.68921

Underline 4 hundredths in problem A, 5 tenths in problem B, and 1 hundred thousandths in problem C.

District adopted text.

District Resources

256

257

Student Learning Objective(s) The student is able to order decimals on number line.

State Goal

1

District Goal

Program Goal

3,4,7

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Number Line Code
Group Size: individual, entire class
Materials: worksheets

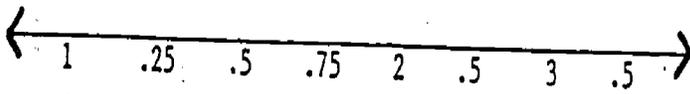
Give students a worksheet of number lines with some decimal numbers shown, and have them complete the number line.

District adopted text.

Procedure(s):
 . The teacher makes a worksheet with coded messages for the students to do.

Example:

WORKSHEET _____ DATE _____ NAME _____



Directions:
 . Write in each decimal number on the above number line in its place. Below each decimal number written in, write its corresponding letter to form a message.

- 3.2 = S
- 2.01 = L
- 1.25 = H
- 2.35 = P
- 1.33 = E
- 3.00 = U

District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures	Possible Resources
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District Resources

270

271

Student Learning Objective(s) A. The student is able to round decimals to hundredths, i.e., .763 - .76. B. The student is able to round decimals to tenths, i.e., .284 - .3.
The student is able to round decimals to thousandths. D. The student is able to round
Related Area(s) decimals to ten thousandths.

State Goal	1
District Goal	
Program Goal	1, 3

Suggested Activities: Grade(s) 7

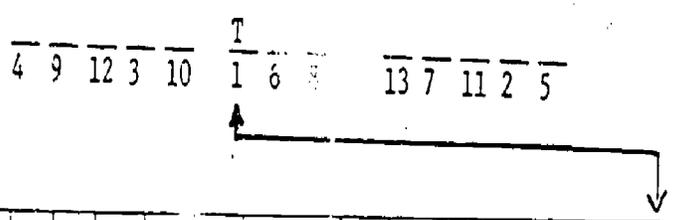
Suggested Monitoring Procedures

Possible Resources

Title: Unblank the Blank
Group Size: individual, entire class
Materials: worksheet (below)

Procedure(s):
 . Round each number below to the nearest hundredth.
 Find answer in code area. Place letter above problem number.

The purpose of a test is to:



R	L	D	N	O	A	A	R	N	B	E	I	Y	H	T
7.25	4.68	4.49	7.21	4.67	6.80	3.99	3.61	7.85	4.50	3.76	3.96	7.26	4.66	3.16

- 1) 3.1587 = 3.16
- 2) 4.6849
- 3) 3.9552
- 4) 4.4928
- 5) 7.8462
- 6) 4.66098
- 7) 7.2537
- 8) 3.75531
- 9) 3.6052
- 10) 7.21498
- 11) 3.9874
- 12) 6.79536
- 13) 4.4982

District Resources

272

273



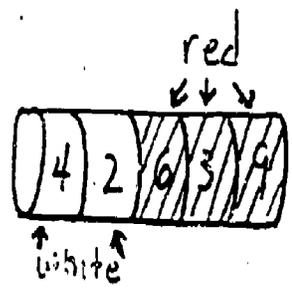
Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Rounded Decimals
Group Size: two or more
Materials: center from roll of paper towels, strips of paper (red and white)

Procedure(s):

- Write numerals 0 through 9 on each strip so that they appear as an odometer when wrapped around the tube.
- With red representing decimal fraction places, students round off to nearest tenth or hundredth.

Variation: Use thread spools and a pencil. Partition grid paper and put on the cylindrical surface of each spool. The spools can be rotated to expose the digits as on the face of an odometer.
 Example:



District Resources

271

275

Student Learning Objective(s) A. The student is able to add and subtract decimals to thousandths.
B. The student is able to add and subtract decimals to hundred thousandths.

State Goal
 District Goal
 Program Goal

1
5

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Roll and Add or Subtract
Group Size: small groups
Materials: key chart:

Dice	
Red	= Ones
Blue	= 1/10's
White	= 1/100's
Green	= 1/1000's

pencil, paper, cubes (make each cube a different color to represent each place value. The face of each cube must have a number from 0-9. Each cube will not have every number.)

Students may check each other. Perhaps a group leader could check or the teacher could play.

Procedure(s):

- . A student shakes and throws out the dice. Each student writes down the number thrown. After three tosses (numbers), everybody adds.
 - . After five addition problems have been solved, switch to subtraction. This will require two tosses.
 - . Students take turns throwing the dice.
- Variation: Teacher may vary the number of place value columns, i.e., whole numbers.
 In addition, the number of tosses may be increased.

District Resources

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Magic Squares
Group Size: entire class or small group
Materials: worksheet

Peruse magic squares. Ask students if they can make magic squares. (Numbers must have a pattern, i.e., all numbers are .10 greater than the previous number.)

District adopted text.

Procedure(s):

- . Have students work decimal magic squares.
- . Have students add decimals in a vertical, horizontal, and diagonal fashion.

Note: In an addition magic square, the sum of the numbers in each row, column, and diagonal are the same.

Example:

Add

2.80	.35	2.10
1.05	1.75	2.45
1.40	3.15	.70

.613	.471	.573
.515	.551	.598
.532	.632	.492

Subtract

.160	.130	.220
.190	.250	.310
.280	.370	.340

To subtract: In rows 1, 2, and 3, find the sum of the two end numbers, then subtract the middle number. In columns 1, 2, and 3, follow the same procedure. In diagonals, follow the same procedure.

District Resources

279

Student Learning Objective(s) A. the student is able to add and subtract decimals to thousandths. B. The student is able to add and subtract decimals to hundred thousandths.

State Goal	1
District Goal	
Program Goal	5

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Decimal Draw</p> <p><u>Group Size:</u> small groups (two to six students)</p> <p><u>Materials:</u> cards</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Make two cards for each of the following numbers: 0, .25, .5, .75, 1, 1.25, 1.5, 1.75, 2, 2.25, 2.5, 2.75, 3, 3.25, 3.5, 3.75, 4, 4.25, 4.5, 4.75, 5. Shuffle the cards and put them in a pile. The first player draws six cards and tries to make an addition or subtraction equation using <u>three</u> of the cards (if he/she drew the following cards 4, 2.5, 1, .25, .75, 1.5, the player could write $2.5 - 1.5 = 1$). The player scores one point for a correct equation. If he/she can make more than one equation, additional points can be earned. After each player has had a turn, the cards are returned and shuffled and play continues as described above. The first player to score ten points wins. 	<p>Observation of game and correct equations.</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>

201

201



Suggested Activities: Grade(s)

Suggested Monitoring Procedures

Possible Resources

292

District Resources

293

Student Learning Objective(s) A. The student is able to multiply and divide decimals to

State Goal

1

thousandths. B. The student is able to multiply and divide decimals to hundred thousandths.

District Goal

Program Goal

5

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

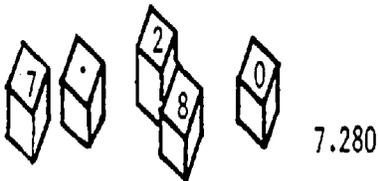
Possible Resources

Title: Decimal Dice
Group Size: small groups
Materials: paper, pencil, five cubes (four have a number from 0-9 on each face and one cube has a decimal point on each face)

Procedure(s):

- . To get a good spread of the dice, prepare an area about a foot square for the dice to land in.
- . A student shakes and tosses the dice.
- . Pull the dice into a line in the approximate order they landed in.

Example:



This allows the decimal point to be placed in various positions.

- . After each toss, the students write down the number. After two tosses, they multiply and cross-check the answers.

District Resources

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Multiplication Magic Squares

Group Size: small group or entire class

Materials: worksheet, chalkboard

Peruse the worksheets. Have students who grasp the concept easily make up magic multiplication squares.

Procedure(s):

- Show students a multiplication magic square. (In a magic square, the product of each row, column and diagonal is the same.)
- Work out the example with the students to show that the example is a magic square.
- Give students a worksheet of several squares and have them work the problems to see which squares are magic.

Example:

A			B		
8.1	.45	5.4	6.2	4.8	2.1
1.8	2.47	4.05	.6	3.1	2.13
1.35	16.2	.90	.30	1.9	.08

- A is a magic square as all rows, columns and diagonals equal 19.683. B is not a magic square.

District Resources

Title: Math Puzzle

Group Size: entire class

Materials: worksheet of puzzle

Worksheets of division and multiplication problems or textbook problems that can be corrected for correct procedure as well as accuracy.

Procedure(s):

- The puzzle should be solved using the designated numerals, logical thinking, and trial and error to find values for the letters.
- Each letter represents one number less than ten.
- No number is represented by more than one letter, and a letter represents the same number each time it appears.

297

Student Learning Objective(s) A. The student is able to multiply and divide decimals to thousandths. B. The student is able to multiply and divide decimals to hundred thousandths.

State Goal
District Goal
Program Goal

1
5

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

$$\begin{array}{r}
 \text{N.W4} \quad \text{W 4.F} \\
 \text{H R. H 8 R} \\
 \hline
 -\text{W 4 8} \\
 \hline
 \text{F F 8} \\
 -\text{4 N 6} \\
 \hline
 \text{6 W R} \\
 -\text{6 W R} \\
 \hline
 \text{R}
 \end{array}$$

Solution:

N=1, W=2, H=3, F=5, R=0

For extended activity, have students make up puzzles and exchange.

District Resources



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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200

District Resources

201



Page
Suggested
Grade Placement
District
Placement

SUBJECT: Mathematics
SPECIFIC AREA: Real Numbers

4 5 6 7 8

The student knows:

there are rational and irrational numbers. Examples of rational numbers:

$$\frac{3}{5}, \frac{2}{3}, 7, 1.36, .3333$$

145 7-8

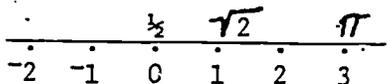
Examples of irrational numbers: π , $\sqrt{2}$, .2121121112...

The student is able to:

order real numbers using $< = >$ Example: $\sqrt{2} < 3$
.6 < .6812

145 7-8

order real numbers on the number line



147 7-8

express common fractions as repeating decimals:

$$\frac{2}{3} \rightarrow \frac{.66}{3/2.00} \rightarrow .6$$

153 8

express repeating decimals as common fractions. .150 = $\frac{15}{100} = \frac{3}{20}$

153 8

$$n = .3\bar{3}$$

$$n = .1\bar{8}$$

$$10n = 3.3\bar{3}$$

$$100n = 18.\bar{18}$$

$$-1n = .\bar{33}$$

$$-1n = 18.1\bar{8}1\bar{8}$$

$$9n = 3.0\bar{0}$$

$$99n = 18.000\bar{0}$$

$$n = \frac{3}{9} = \frac{1}{3}$$

$$n = \frac{18}{99} = \frac{2}{11}$$

distinguish between the representations of rational and irrational numbers. Example: rational: 3, -6, .6

irrational: $\sqrt{5} = 2.236068...$ $\sqrt{2} = 1.414214...$

151 8

The student values:



OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION

MUSIC

SOCIAL STUDIES

ART

LANGUAGE ARTS

MATH

SCIENCE

HEALTH

READING

CAREER EDUCATION

ENVIRONMENTAL EDUCATION

OTHER _____

293

294

Student Learning Objective(s) A. The student knows there are rational and irrational numbers. State Goal 1

Examples of rational numbers: $\frac{3}{5}$, $\frac{-2}{3}$, 7, 1.36, .3333. Examples of irrational numbers π $\sqrt{2}$ District Goal

.2121121112. B. The student is able to order real numbers using $<=>$ Examples: $\sqrt{2} < 3$ $.6 < .6812$ Program Goal 2,7,8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Rationals and Irrationals
Group Size: entire class
Materials: paper, pencil, worksheet with number line from 0-10 (with $\sqrt{\quad}$ modifications) See example below

Teacher observation.

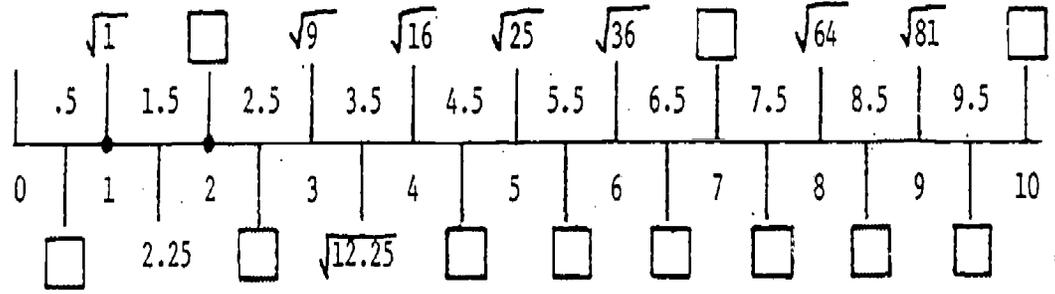
District adopted text.

Procedure(s):

. To help students readily identify placement of irrational and rational numbers, have them complete blank spaces on number line.

Example:

. Students are to fill boxes with the correct number on the number line.



District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring
Procedures

Possible Resources

Title: Tic Tac Toe
Group Size: pairs
Materials: 3" x 5" index cards with two
real numbers to order

Teacher observation

District adopted text.

Procedure(s):

- . Problem cards are placed face down to correspond to the spaces on a Tic Tac Toe game board.
- . The players play in turn and choose where they would like to place their "X" or "O."
- . Then they attempt to do so by turning over one card at a time, and placing the appropriate sign $>$, $=$, or $<$ between the two real numbers.
- . The player who is first to get three answers correct in a row, column, or diagonal is the winner.

. Sample Tic Tac Toe Game Board:

$\frac{4}{3}$ $\sqrt{2}$	π 3	$\frac{7}{8}$ $\frac{5}{6}$
$\sqrt{3}$ 2	$-\frac{5}{9}$ $-\frac{2}{3}$	$\frac{5}{3}$ $\sqrt{3}$
3 $\sqrt{5}$	$\frac{2}{3}$ $\frac{5}{8}$	$\frac{7}{4}$ $\sqrt{4}$

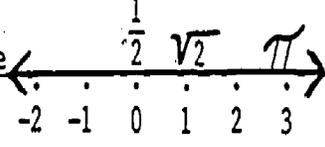
District Resources

297

299

Student Learning Objective(s) A. The student knows there are rational and irrational numbers. Exam-State Goal
Examples of rational numbers $5, \frac{3}{5}, 7, 1.36, .3333$. Examples of irrational numbers: $\pi, 2, .212112111$ District Goal

1
2,7,8

B. The student is able to order real numbers on the number line $\left\langle \frac{1}{2} \sqrt{2} \pi \right\rangle$ Program Goal


Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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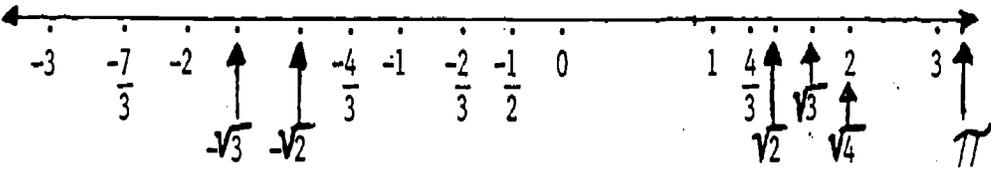
Title: Ordering Real Numbers On the Number Line
Group Size: entire class
Materials: ruler, pencil, paper

Procedure(s):

- . Draw a 10 inch number line.
- . Place all the integers from -3 to +3 on your number line so that each integer is $1\frac{1}{2}$ inches apart. The integers are spaced far apart so that the number line does not become distorted as the point for each real number is located.
- . In addition to the integers, locate points for the following real numbers symbols:

$$-\frac{1}{2}, \sqrt{2}, \sqrt{4}, -\sqrt{2}, \pi, \sqrt{3}, \frac{4}{3}, \frac{-7}{3}, -\sqrt{3}, \frac{-2}{3}, \frac{-4}{3}$$

- . List the irrational numbers.
- . The number line below has been included for teachers to indicate one way the assignment can be handled so that there is little distortion of the number line.



District Resources

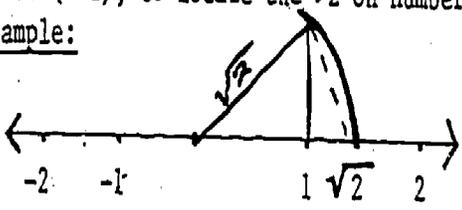
Suggested Activities: Grade(s) <u>8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Finding $\sqrt{2}$ On a Number Line
Group Size: entire class
Materials: ruler, compass, paper, pencil

Procedure(s):

- Draw a number line approximately four inches long on paper.
- Mark zero approximately in center of line.
- Measure one inch from the right of zero and mark that as 1 on number line. Complete by including the other possible integers.
- Construct a perpendicular line segment to the point at 1.
- Using compass, mark 1 unit vertically above number line on perpendicular.
- By connecting that point with zero, you have a right triangle with legs of 1 unit length, so hypotenuse equals $\sqrt{2}$.
- Using compass, swing an arc equal to length hypotenuse ($\sqrt{2}$), to locate the $\sqrt{2}$ on number line.

Example:



- Can $\sqrt{2}$ be expressed as $\frac{a}{b}$ where a and b are integers, and $b \neq 0$?
- Is 0 a rational or irrational number? Have student state reason.
- Are -2, -1, 1 and 2 both integers and rational numbers?

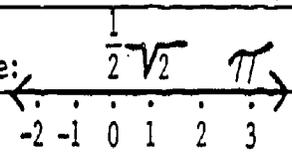
For Experts only

- Using the Pythagorean Rule, and using the figure above, tell how to find the point on the number line that corresponds to $(\sqrt{3})$.

District adopted text.

District Resources

Student Learning Objective(s) A. The student knows there are rational and irrational numbers.	State Goal	1
Examples of rational numbers: $\frac{3}{5}, \frac{-2}{3}, 7, 1.36, .3333$. Examples of irrational numbers: $\pi, \sqrt{2}$.	District Goal	
.2121121112. B. The student is able to order real numbers on the number line:	Program Goal	2,7,8

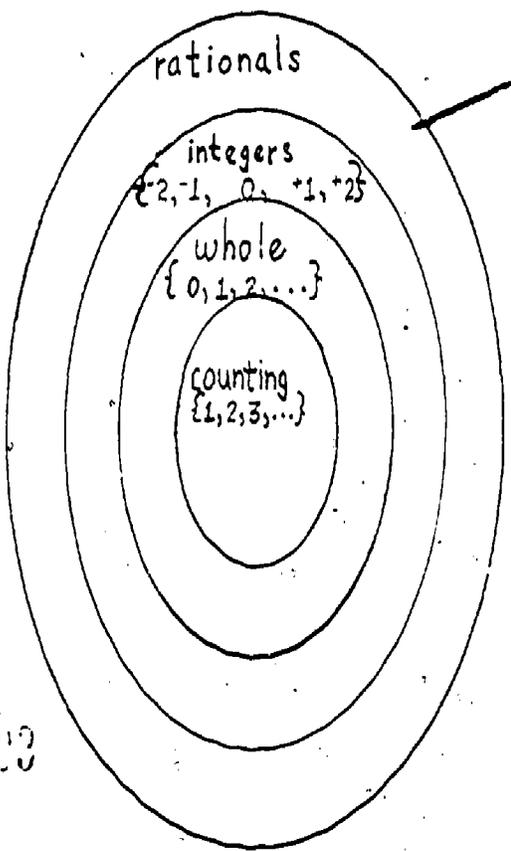


Suggested Activities: Grade(s) 7-8	Suggested Monitoring Procedures	Possible Resources
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Title: Venn Diagram Showing Number Sets
Group Size: entire class
Materials: incomplete Venn Diagram showing the various sets of numbers that have been studied

Give students a mixed group of rational and irrational numbers and have them place them under the correct headings in two columns.

- Procedure(s):
- Have students complete the Venn Diagram by illustrating the set of rational numbers much like the other sets were developed.
 - Under irrationals have students write irrational numbers that they have worked with, and make up two new irrational numbers of their own.



REAL

irrational

303

Venn Diagram Showing Sets of Numbers

304

Suggested Activities: Grade(s) _____ Suggested Monitoring Procedures € Possible Resources

305

District Resources

306



Student Learning Objective(s) A. The student knows there are rational and irrational numbers. Example State Goal
of rational numbers: $\frac{3}{5}$, $\frac{-2}{3}$, 7, 1.36, .3333 . Examples of irrational numbers: π , $\sqrt{2}$, .2121121112 . District Goal

B. The student is able to distinguish between the representations of rational and irrational numbers. Program Goal 2,7,8

Related Area(s) Example: rational 3, -6, .6 ; irrational: $\sqrt{5} = 2.236068$, $\sqrt{2} = 1.414214$

Suggested Activities: Grade(s) <u>8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Writing Irrational Numbers <u>Group Size:</u> entire class <u>Materials:</u> paper, pencil</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Have students write or make up four irrational numbers. . Numbers must be decimal numbers that neither repeat nor terminate. . Use a "pattern" method to help in your writing of irrational numbers. . Use three different digits for the second irrational number. . Use four different digits for the third and five different digits for the last. <p><u>Example:</u></p> <p>.<u>1311311131111311111...</u> <u>3838838883888838888...</u></p>		District adopted text.
<p>. Let one of the irrational numbers that they write (the first one) begin with .1. Then have the students write the digits 0 and 1 in order. (Thus .101) Then have students complete the construction of this irrational number by showing the pattern they developed. Students must use only two different digits.</p> <p><u>Example:</u></p> <p>.<u>101001000100001</u></p> <p>. Here are two interesting irrationals. Write the next 4 digits for both.</p> <p>3.13579113579... _____</p> <p>2.123124125126... _____</p>		District Resources



Suggested Activities: Grade(s)	Suggested Monitoring Procedures	Possible Resources
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District Resources

310

300

Student Learning Objective(s) A. The student is able to express common fractions as repeating decimals. State Goal 1

2 $\frac{2}{3} \rightarrow 3\overline{2.00} \rightarrow .6$ B. The student is able to express repeating decimals as common fractions. District Goal

15 $.150 = \frac{15}{100} = \frac{3}{20}$ $n = .33$ $10n = 3.33$ $n = \frac{3}{9} = \frac{1}{3}$ $100n = 18.18\overline{18}$ $n = \frac{18}{99} = \frac{2}{11}$ Program Goal 2,7,8

9 $-1n = .33$ $9n = 3.00$ $-1n = .18\overline{18}$ $99 = 18.0000$

Related Area(s) _____

Suggested Activities: Grade(s) <u>8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Concentration with Repeating Decimals

Group Size: pairs, small group

Materials: two sets of cards, (each card of set A has a fraction on its face which will generate a repeating decimal, each of set B has a repeating decimal equal to one of the fractions of set A).

Check for legitimate equivalents.

District adopted text.

Procedure(s):

- . Place both sets, shuffled together, face down on the table.
- . Each player draws a card and attempts to draw its equivalent.
- . Player with most pairs when all are gone is winner.

. Set A

- | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 1/3 | 5/9 | 2/3 | 7/9 | 1/6 | 2/9 | 5/6 | 1/9 |
|-----|-----|-----|-----|-----|-----|-----|-----|

. Set B

- | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| .33 | .55 | .66 | .77 | .16 | .22 | .83 | .11 |
|-----|-----|-----|-----|-----|-----|-----|-----|

District Resources



Suggested Activities: Grade(s) 8

Suggested Monitoring
Procedures

Possible Resources

Title: Bingo
Group Size: entire class
Materials: . game boards as pictured below
. markers
. cards for common fractions
. similar number of equivalent
cards for repeating decimals

Procedure(s):

- . The cards are shuffled and placed in a pile face down.
- . The caller turns over one card at a time and reads the common fraction or repeating decimal.
- . Student covers, with a marker, equivalent names for the numbers read.
- . For example, one card might read B two thirds. Cell B4 has .66 on it, so students would cover that cell with a marker. Another card might read G POINT ONE SIX. CELL G3 has .16 on it, so students would cover it with a marker.
- . Sample Bingo Board:

1	5/9	.8 $\bar{3}$	1/9	.1 $\bar{1}$	1/3
2	. $\bar{3}$.030 $\bar{3}$. $\bar{6}$	3/11	5/6
3	1/30	2/9	FREE	.1 $\bar{6}$.2727
4	2/3	.4 $\bar{4}$	7/9	.2 $\bar{2}$. $\bar{5}$
5	1/11	. $\bar{7}$	4/9	.0909	1/6

B I N G O

District Resources

313

314

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Algebraic Expressions

Page
Suggested
Grade Placement
District
Placement

4 5 6 7 8

The student knows:

- . the term "variable" means a symbol (usually a letter from the alphabet in lower case) that represents a number(s).
- . the expression $5y$ means five time the value of y .
- . the expression $\frac{y}{5}$ means y divided by five.

157 7-8
157 7-8
157 7-8

The student is able to:

- * . solve one step equations by using the addition principle.
- * . solve one step equations by using the multiplication principle.
- * . solve two step equations by using the addition and multiplication principles.
- . evaluate numerical expressions by using the order of operations.
 first: ()
 second: \times, \div , left to right
 third: $+, -$, left to right
 Example: $3 \cdot (4-2) + 8 = 3(2) + 8$
 $= 6 + 8$
 $= 14$

161 7-8
161 7-8
167 8
165 7-8

The student values:

OPTIONAL GOALS AND ACTIVITIES

<p>PHYSICAL EDUCATION</p>	<p>MUSIC</p>	<p>SOCIAL STUDIES</p>
<p>ART</p>	<p>LANGUAGE ARTS</p>	<p>MATH</p>
<p>SCIENCE</p>	<p>HEALTH</p>	<p>READING</p>
<p>316 CAREER EDUCATION</p>	<p>ENVIRONMENTAL EDUCATION</p>	<p>OTHER <u>317</u></p>

Student Learning Objective(s) A. The student knows the term "variable" means a symbol (usually a letter from the alphabet in lower case) that represents a number(s). State Goal 1

B. The student knows the expression $5y$ means five times the value of y . District Goal

C. The student knows the expression $\frac{y}{5}$ means y divided by five. Program Goal 2, 8

Related Area(s) _____

Suggested Activities: Grade(s) 7 - 8

Suggested Monitoring Procedures

Possible Resources

Title: Algebraic Expressions
Group Size: small group
Materials: 16 small index cards, each card containing a basic phrase
Examples:

- . p multiplied by five
- . one-fifth of p
- . the product of seven and m
- . m divided by five
- . eight multiplied by a
- . a divided by eight
- . twice an unknown quantity, n
- . an unknown quantity, n, divided by 2

Teacher observation.

Krulik, Stephen, A Handbook of Aids for Teaching Junior-Senior High School Mathematics, W. B. Saunders Co., 1971, pages 45-47.

Procedure(s):

- . The small group is divided into two teams.
- . The cards are shuffled and placed face down.
- . Players from each team play in turn.
- . One card is turned over at a time, the basic phrase is read aloud and the algebraic expression is given orally or written on the chalkboard.
- . For example, if the basic phrase is "p multiplied by 5" the student responds orally or in written form on the chalkboard--"5p."
- . If the team member responds correctly the basic phrase card is kept.
- . If the team member responds incorrectly the basic phrase card is placed in a discard pile.
- . The winner is the team with the most cards after all the cards have been played.

District Resources

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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Title: Concentration
Group Size: small group, entire class,
 (divided into two teams)
Materials: large piece of tagboard, clear
 plastic contact or access to
 laminator, marking pens, large
 index cards, masking tape

Procedure(s):

- . Draw 25 squares on tagboard.
- . Cover with contact or laminate.
- . Make 25 flaps to cover squares with index cards and masking tape.
- . With washable pen, write 25 algebraic expressions on squares, under flaps, and equivalent forms on 25 index cards.
- . Number flaps 1-25.
- . Member of one team draws card, shows it to class, and selects a flap.
- . If forms are equivalent, flap is removed.
- . Team with largest number of flaps wins.
- . Instead of using flaps, envelopes could be used, in which case cards with expressions could be placed in the envelopes.
- . Example of algebraic expression: $5p$
- . Example of equivalent forms: $5 \cdot p$, $5(p)$, $(5)p$, $(5)(p)$, $25 \left(\frac{p}{5} \right)$, $5(p^2-1)$

Teacher observation.

 Worksheet with algebraic expressions with students writing equivalent forms.

District adopted text.

District Resources

320

321

Student Learning Objective(s) A. The student knows the term "variable" means a symbol (usually a letter from the alphabet in lower case) that represents a number(s). State Goal
B. The student knows the expression $5y$ means five times the value of y . District Goal
C. The student knows the expression $\frac{y}{5}$ means y divided by five. Program Goal

1
2, 8

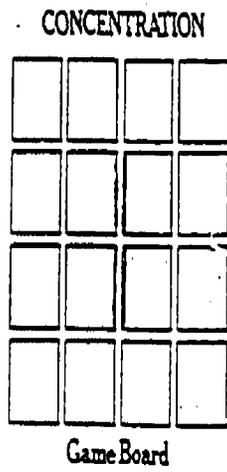
Related Area(s) _____

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Concentration Using Algebraic Expressions
Group Size: two students
Materials: concentration gameboard with 16 squares, 16 squares to cover the squares on the gameboard, 8 of one color and 8 of another

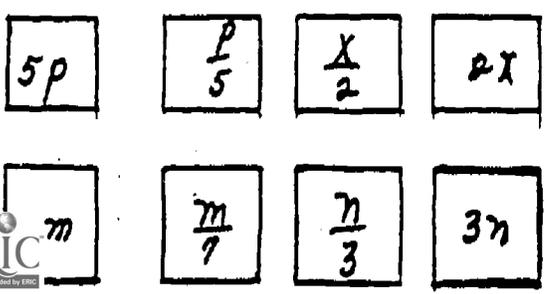
Teacher observation.

District adopted text.



District Resources

Procedure(s):
 . Let eight of the cards be algebraic expression cards.
Example:



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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. Let eight of the cards be equivalent to other cards.

Example:

$5-p$	$\frac{4p}{20}$	$\frac{4x}{8}$	$2(x)$
$(7)m$	$\frac{3m}{21}$	$\frac{3m}{9}$	$3.m$

- . Place all cards face down on the gameboard so that neither player knows which card is which.
- . The first player turns up two cards, one of each color.
- . If the player turns up a matching pair, he/she keeps these cards and takes another turn.
- . If a matching pair was not turned up, the cards are turned face down in their original position after giving the other player a chance to see them.
- . The next player turns up two cards and play continues as before.
- . When all the cards have been taken, the player with the most cards is the winner.

District Resources

324

325

State Learning Objective(s) <u>A. The student is able to solve one step equations by using the</u>	State Goal	1, 10
<u>addition principle. B. The student is able to solve one step equations by using the multiplication</u>	District Goal	
<u>principle.</u>	Program Goal	5,6,8

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources												
<p><u>Title:</u> What's My Pattern? <u>Group Size:</u> entire class <u>Materials:</u> written exercise as below:</p> <table border="0"> <thead> <tr> <th><u>Equations</u></th> <th><u>Number to be Multiplied</u></th> </tr> </thead> <tbody> <tr> <td>$\frac{x}{4} = 8$</td> <td>3</td> </tr> <tr> <td>$\frac{x}{3} = 12$</td> <td>9</td> </tr> <tr> <td>$\frac{x}{2} = 4$ -----</td> <td>2</td> </tr> <tr> <td>$\frac{x}{9} = 4$</td> <td>4</td> </tr> <tr> <td>$\frac{x}{5} =$</td> <td>5</td> </tr> </tbody> </table>	<u>Equations</u>	<u>Number to be Multiplied</u>	$\frac{x}{4} = 8$	3	$\frac{x}{3} = 12$	9	$\frac{x}{2} = 4$ -----	2	$\frac{x}{9} = 4$	4	$\frac{x}{5} =$	5	<p>Have students make up exercises using the "What's My Pattern?" example.</p>	<p>District adopted text.</p>
<u>Equations</u>	<u>Number to be Multiplied</u>													
$\frac{x}{4} = 8$	3													
$\frac{x}{3} = 12$	9													
$\frac{x}{2} = 4$ -----	2													
$\frac{x}{9} = 4$	4													
$\frac{x}{5} =$	5													
<p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Ask the students to draw a dotted line matching the number that must be multiplied to both members of each equality in order to solve the equation. . One example has been done for you. . After all the equations have been matched with a number on the right, study the problems to determine what <u>pattern</u> has developed. . Can you find the <u>pattern</u> that developed? <p><u>Title:</u> Cross-Number Puzzles <u>Group Size:</u> entire class <u>Materials:</u> Cross-Number Puzzles</p>	<p>Short quiz with one-step problems using the addition and multiplication principle.</p>	<p>District Resources</p>												



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

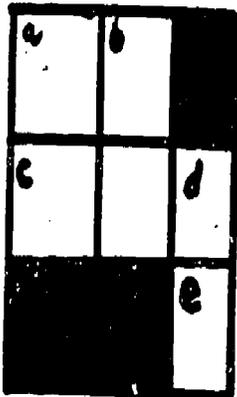
Possible Resources

Procedure(s):

- . The purpose of this activity is to provide students with practice exercises with one-step equations in a different format.
- . Complete the following cross-number puzzles:

Across

- a. $x - = 10$
- c. $x - 50 = 52$
- e. $x + 5 = 10$

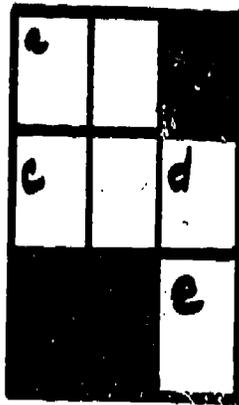


Down

- a. $x - 4 = 7$
- b. $x - 7 = 3$
- d. $x + 13 = 38$

Across

- a. $\frac{x}{4} = 3$
- c. $\frac{x}{5} = 41$
- e. $6x = 30$



Down

- a. $2x = 24$
- b. $3x = 60$
- d. $\frac{x}{5} = 11$

District Resources

Student Learning Objective(s) A. The student is able to solve one step equations by using the addition principle. B. The student is able to solve one step equations by using the multiplication principle.

State Goal

District Goal

Program Goal

1
6, 8

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Kentucky Derby (Roller Derby; Indy 500)
Group Size: small groups (teams of 4-5)
Materials: chalkboard or transparency, toy horses or cards, 3 x 5 cards on which problems have been written

Worksheet with equations using the addition principle and the multiplication principle.

 Students having difficulty with the worksheet should be grouped for reteaching.

District adopted text.

Procedure(s):

- A team advances its horse by correctly solving problems.
- A correct answer moves the horse to the next furlong marker.
- The game can be made to fit the interests of the class just by changing the name to "Roller Derby" or "Indy 500." The same rules apply except that laps are counted instead of furlongs.
- An arbitrary number of laps may be set at the discretion of the teacher.

Addition example:

$$b - 3 = 8$$

$$b =$$

$$x - \frac{1}{2} = 2\frac{3}{8}$$

$$x =$$

Multiplication example:

$$\frac{x}{3} = 5$$

$$x =$$

$$\frac{b}{12} = 6$$

$$b =$$

District Resources

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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Title: What's My Pattern?
Group Size: entire class
Materials: written exercise as below

Check written exercise and pair students having difficulty with more able students for assistance and drill.

District adopted text.

<u>Equation</u>	<u>Number to be added</u>
$x - 2 = 8$	5
$x - 5 = 4$	2
$x - 9 = 1$	1
$x - 1 = 4$	4
$x - 4 = 8$	9

Procedure(s):

- . Ask the students to draw a dotted line matching the number that must be added to both members of each equality in order to solve the equation.
- . One example has been done for you.
- . After all equations have been matched with a number on the right, study the problems to determine what pattern has developed.
- . What pattern has developed?

District Resources

332

333

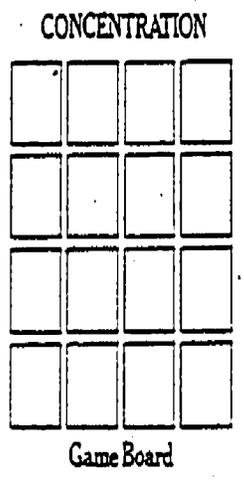
Student Learning Objective(s) The student is able to evaluate numerical expressions by using State Goal

1
2,6,8

the order of operations. first: () District Goal
 second: x, \div , left to right
 third: $+, -$, left to right Program Goal
 Example: $3 \cdot (4-2) + 8 = 3(2) + 8$
 $= 6 + 8$
 $= 14$
 Related Area(s) _____

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Concentration with Numerical Expressions
Group Size: two students
Materials: concentration gameboard with 16 squares to cover the squares on the gameboard, 8 of one color and 8 of another.



Teacher observation.

District adopted text.

District Resources

Procedure(s):
 . Let 8 of the cards be numerical expression cards.
Example:

$5 + 3 \times 7$	$7 = (6=1)$	$8 - (4 3)$	$7 \times (24)$
$48 \div 8 - 4$	$(2=3 \times 1)$	$18 - 4 = 3$	$14 = 8 \div$

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
--------------------------------------	---------------------------------	--------------------

- . Let 8 of the cards be answer cards that match the numerical expressions.
- . Place all cards face down on the gameboard so that neither player knows which card is which.
- . The first player turns up two cards, one of each color.
- . If the player turns up a matching pair, he/she keeps these cards and takes another turn.
- . If a matching pair was not turned up, the cards are turned face down in their original position after giving the other player a chance to see them.
- . The next player turns up two cards and play continues as before.
- . When all the cards have been taken, the player with the most cards is the winner.

Title: Dominoes With Numerical Expressions

Group Size: pairs, small group

Materials: domino set made from tagboard (Cut tagboard into 2.5x5 cm rectangles, on one end write a numerical expression, on the other end write a number. Take care that a numerical expression on one domino will be equivalent to a number on another)

Teacher observation.

District adopted text.

District Resources

Procedure(s):

- . Place dominoes face down on the table.
- . Each player chooses five.
- . Another domino is placed face up on the table and is the starting domino.
- . Players must draw one domino from the unplayed, unchosen dominoes if he/she cannot play from his/her own stack.
- . First player to play his/her last domino is the winner.

337

333



Student Learning Objective(s) The student is able to solve two step equations by using the addition and multiplication principles.

State Goal	1, 10
District Goal	
Program Goal	5, 6, 8

Related Area(s) _____

Suggested Activities: Grade(s) 8

Suggested Monitoring Procedures

Possible Resources

. If the question is answered correctly, the player receives the money allotted to that question.

Note: Gameboard

- . The players choose categories in turn after each question is successfully answered.
- . The player with the most money after all questions have been answered is the winner.

Example of Jeopardy Gameboard:

+ - - x 2 step problem

\$10	$x+1 = 5$	$x-1 = -9$	$\frac{x}{2} = 4$	$2y = 6$	$2x+1 = 7$
\$20	$x+2 = 8$	$x-5 = 31$	$\frac{x}{3} = 7$	$4z = 28$	$3x-1 = 8$
\$30	$x+10 = 25$	$x-8 = 6$	$\frac{x}{9} = 8$	$7n = 49$	$\frac{x}{4} + 2 = 4$
\$40	$x+10 = 154$	$x-10 = 110$	$\frac{x}{12} = 15$	$12x = 144$	$\frac{y}{7} + 1 = 9$
\$50	$x+9 = 148$	$x-8 = 60$	$\frac{x}{17} = 24$	$13x = 139$	$4x+8 = 9$

District Resources

Note: To solve an equation that has addition or subtraction, the addition property of equations is used. To solve an equation that has multiplication or division, the multiplication property of equations is used.

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

311

311

Student Learning Objective(s) A. The student is able to solve two step equations by using the addition and multiplication principles.

State Goal	1, 10
District Goal	
Program Goal	5, 6, 8

Related Area(s) _____

Suggested Activities: Grade(s) <u>8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Number Code
Group Size: individual, entire class
Materials: number code sheet, direction sheet

Quiz with two step equation. Students are to use addition and multiplication principles to solve the problems.

District adopted text.

Procedure(s):

- Have students solve two step equations and use answers to answer "number codes questions."

Direction Sheet:

Solve the following two step equations. Circle the answer in the right spot on the number code sheet and connect each circle with a straight line in order to make a letter. In this case three letters will make a word.

Number Code Sheet

1 7 13	1 7 13	1 7 13
2 8 14	2 8 14	2 8 14
3 9 15	3 9 15	3 9 15
4 10 16	4 10 16	4 10 16
5 11 17	5 11 17	5 11 17
6 12 18	6 12 18	6 12 18
1st letter	2nd letter	3rd letter

District Resources

Suggested Monitoring
Procedures

Possible Resources

Letter one Letter Two Letter Three

$$\frac{x}{3} + 2 = 3$$

$$\frac{w}{2} + 3 = 3\frac{1}{2}$$

$$3a - 4 = 14$$

$$2x + 3 = 5$$

$$4w - 3 = 21$$

$$2a - 14 = 0$$

$$4x + 2 = 14$$

$$2w - 18 = 18$$

$$\frac{a}{3} + 2 = 6$$

$$\frac{x}{5} - 2 = 1$$

$$\frac{13}{w} - 1 = 0$$

$$3a - 26 = 13$$

$$\frac{x}{3} - 6 = 0$$

$$\frac{18}{a} + 5 = 6$$

$$2x - 4 = 8$$

. The number code word is S U M.

Title: Jeopardy

Group Size: small group

Materials: dice, Jeopardy gameboard, clickers, play money (\$25 to each student at start of play), problem cards (25)

Give students a short quiz with two-step problems using the addition and multiplication principles. Group students having difficulty for re-teaching.

District adopted text.

District Resources

Procedure(s):

- . Teacher acts as MC or selects a student to act as MC.
- . Problem cards are placed face down in each space on the gameboard.
- . The highest dice roll determines the student who plays first.
- . Order of turns is to that player's left.
- . The first player chooses a category from which to answer a question. For example, Addition for \$20.
- . When the MC reads the question, the players contend for the right to answer that question by clicking the clicker or raising hands.
- . The player who fails to answer a question gives the MC \$5.00.

325

Page
Suggested
Grade Placement
District
Placement

SUBJECT: Mathematics

SPECIFIC AREA: Numeration: Number Theory

4 5 6 7 8

The student knows:

- . whole numbers are either even or odd. 173 4
- . a prime number is a number divisible by 1 and itself only. 173 5-8
- . numbers that are divisible by a number other than 1 and itself are composite. 175 6-8
- . a composite number can be expressed as the product of primes in only one way ($24=2 \cdot 2 \cdot 2 \cdot 3$). 175 6-8
- . the greatest common factor (g.c.f.) of two or more numbers is the largest of the common divisors of the numbers. 181 6-8
- . the least common multiple (l.c.m.) of two or more numbers is the smallest of the common multiples of the numbers. 189 6-8
- . there are divisibility tests for 2, 3, 4,.....10 (except 7) and they can be used to help factor. 177 6-8

The student is able to:

- . find the primes less than 100. 173 5-6
- . do a prime factorization of a number. 177 6-8
- * . find the g.c.f. of two or more numbers: 181 6-8
 - 18 = 2·3·3
 - 24 = 2·2·2·3 g.c.f. = 2·3 = 6
- * . find the l.c.m. of two or more numbers: 189 6-8
 - 8 = 2·2·2 l.c.m. = 2·2·2·3
 - 6 = 2·3 = 24
- . use divisibility tests for 2, 3 and 5 as an aid in finding the prime factorization. 177 6-8

The student values:

- . numbers as a natural phenomenon and not man-made. 173 4-8
- . numerals as the symbols we use to represent numbers. 173 4-8

OPTIONAL GOALS AND ACTIVITIES

<p>PHYSICAL EDUCATION</p>	<p>MUSIC</p>	<p>SOCIAL STUDIES</p>
<p>ART</p>	<p>LANGUAGE ARTS</p>	<p>MATH</p>
<p>SCIENCE</p>	<p>HEALTH</p>	<p>READING</p>
<p>CAREER EDUCATION</p>	<p>ENVIRONMENTAL EDUCATION</p>	<p>OTHER _____</p>

317

318

Student Learning Objective(s) A. The student knows whole numbers are either even or odd. B. The student knows a prime number is a number divisible by 1 and itself only. C. The student is able to find the primes less than 100. D. The student values numbers as a natural phenomenon and not man-made. State Goal 1
 District Goal
 Program Goal 1,2,8

Related Area(s) E. The student values numerals as the symbols we use to represent numbers.

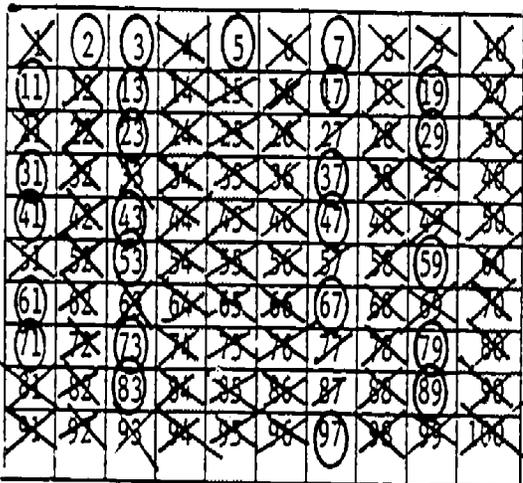
Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Sieve of Eratosthenes
Group Size: entire class
Materials: pencil, graph paper

Procedure(s):

- . Explain to students that the Greek mathematician Eratosthenes discovered a way of finding prime numbers around 200 B.C. It is called the Sieve of Eratosthenes and can be made by following the steps below:
- . Students make a chart from 1-100 on graph paper.
- . Cross out #1 (1 is not a prime).
- . Circle #2, then cross out all multiples of 2.
- . Circle #3, then cross out all multiples of 3.
- . Circle #5, then cross out all multiples of 5.
- . Circle #7, then cross out all multiples of 7.
- . Circle all remaining numbers.
- . They are all prime.

Example:



310

District adopted text.

District Resources

350

Suggested Activities: Grade(s) _____

Suggested Monitoring
Procedures

Possible Resources

District Resources

351



352

Student Learning Objective(s) A. The student knows numbers that are divisible by a number other than 1 and itself are composite. State Goal 1
B. The student knows a composite number can be expressed as the product of primes in only one way ($24 = 2 \cdot 2 \cdot 2 \cdot 3$). District Goal
C. The student values numbers as a natural phenomenon and Program Goal 1, 2, 6, 7
 Related Area(s) not man-made. D. The student values numerals as the symbols we use to represent numbers.

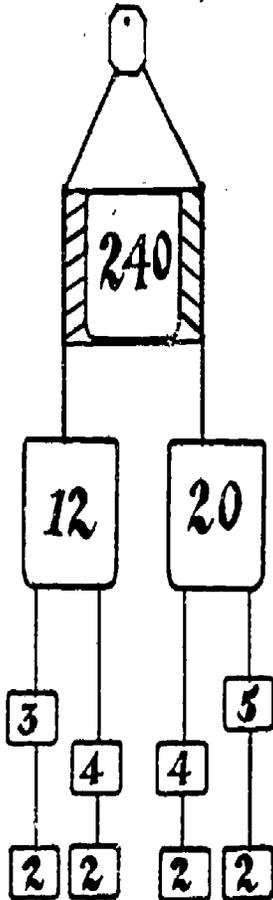
1
1, 2, 6, 7

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Prime Factor Mobiles
Group Size: any number
Materials: index cards, string, wire

- Procedure(s):
- . Establish the process of determining factor trees for composite numbers.
 - . Write the appropriate factor numbers on the index cards and construct the two branches for each of the factors, extending the branches downward as needed.

Example:



Macmillan Mathematics, Teacher's Edition, Thoburn, Tina, et al, 1976, pages 285A, 304, 305.

District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

355

356

Student Learning Objective(s) A. The student knows there are divisibility tests for 2,3,4...10 (except 7) and they can be used to help factor. B. The student is able to do a prime factorization of a number. C. The student is able to use divisibility tests for 2,3 and 5 as an aid in finding the

State Goal	1
District Goal	
Program Goal	2,3,6,7

Related Area(s) prime factorization.

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Factor Rummy <u>Group Size:</u> groups of 4-5 <u>Materials:</u> 60-80 cards numbered from 2-200 (or higher depending on the ability level), dice</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . All the cards are dealt. . The dice are rolled. . Each player plays <u>only one card face down</u> that is a multiple of the number showing on the dice. . If the number 10 shows on the dice, let that be considered the opportunity to lay down any prime number a player might have. . When everyone has played, the cards are turned over and examined. . If anyone plays an incorrect card, he/she must take all those cards from that round into his/her hand. . If more than one person plays an incorrect card, they divide the cards. . If no one makes a mistake, the cards go into a discard pile and are not used during the rest of the game. . A player is not penalized for not playing during a round. . When the round is completed, the dice are rolled again and the procedure repeated. . The winner is whoever can get rid of all his/her cards. 	<p>Observe progress of game.</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>

357

358

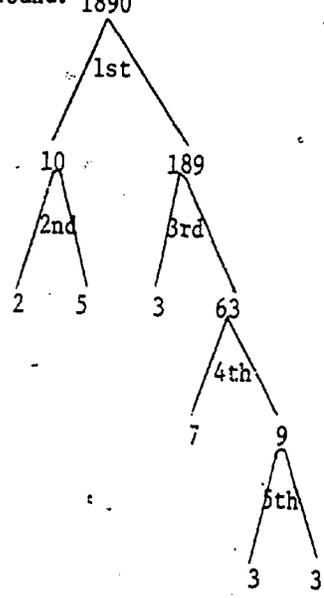


Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Prime Factorization
Group Size: entire class
Materials: pencil, paper

- Procedure(s):
- . Each row is a team.
 - . The teacher gives a large number to the class.
 - . The first person in each row completes the first step in a factor tree and passes the paper back to the next person.
 - . The second person completes another step in the factor tree and passes the paper back.
 - . The paper is passed back with each person completing only one step in the factor tree until the prime factorization is found.
 - . If the prime factorization isn't found by the end of the row, or if a team member or teacher finds a mistake, the paper should go back to the first person to start the problem again.
 - . When the prime factorization is found, that person puts the whole factor tree on the board, and that row wins that round.

Example:



$1890 = 2 \times 3^3 \times 5 \times 7$

District Resources

Student Learning Objective(s) A. The student knows there are divisibility tests for 2,3,4...10 State Goal 1
 (except 7) and they can be used to help factor. B. The student is able to do a prime factorization District Goal
 of a number. C. The student is able to use divisibility tests for 2,3 and 5 as an aid in finding Program Goal 2,3,6,7
 Related Area(s) the prime factorization.

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources																																																	
<p><u>Title:</u> Tests for Divisibility <u>Group Size:</u> entire class <u>Materials:</u> worksheet</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Worksheet is a 7 x 7 array of squares with large numbers in each square. The idea is to cross out multiples of whatever number is being used at that time. <p><u>Example:</u> The teacher will say, "three's" and the students cross out all multiples of three in a certain time limit using the test for divisibility by three.</p> <ul style="list-style-type: none"> If no one gets a Bingo (fill in a line), then another number can be used until someone wins. <p><u>Variation:</u></p> <ul style="list-style-type: none"> Students cross out multiples of four using the divisibility test for 4. <p><u>Example:</u></p> <table border="1"> <tr><td>18</td><td>27</td><td>35</td><td>40</td><td>15</td><td>10</td><td>8</td></tr> <tr><td>49</td><td>81</td><td>75</td><td>63</td><td>55</td><td>42</td><td>7</td></tr> <tr><td>24</td><td>35</td><td>34</td><td>48</td><td>63</td><td>32</td><td>22</td></tr> <tr><td>36</td><td>50</td><td>51</td><td>25</td><td>20</td><td>54</td><td>56</td></tr> <tr><td>28</td><td>16</td><td>60</td><td>76</td><td>64</td><td>84</td><td>88</td></tr> <tr><td>62</td><td>80</td><td>93</td><td>95</td><td>102</td><td>69</td><td>72</td></tr> <tr><td>100</td><td>70</td><td>105</td><td>30</td><td>99</td><td>90</td><td>21</td></tr> </table>	18	27	35	40	15	10	8	49	81	75	63	55	42	7	24	35	34	48	63	32	22	36	50	51	25	20	54	56	28	16	60	76	64	84	88	62	80	93	95	102	69	72	100	70	105	30	99	90	21		<p>District adopted test</p> <hr/> <p>District Resources</p>
18	27	35	40	15	10	8																																													
49	81	75	63	55	42	7																																													
24	35	34	48	63	32	22																																													
36	50	51	25	20	54	56																																													
28	16	60	76	64	84	88																																													
62	80	93	95	102	69	72																																													
100	70	105	30	99	90	21																																													

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

300

304

Student Learning Objective(s) A. The student knows the greatest common factor (g.c.f.) of two or more numbers is the largest of the common divisors of the numbers. B. The student is able to find the g.c.f. of two or more numbers:

$18 = 2 \cdot 3 \cdot 3$

$24 = 2 \cdot 2 \cdot 2 \cdot 3$ g.c.f. = $2 \cdot 3$

$= 6$

State Goal	1
District Goal	
Program Goal	2,3,7

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Euclid's Method of Finding G.C.F.</p> <p><u>Group Size:</u> entire class</p> <p><u>Materials:</u> paper, pencil</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Give two fairly large numbers to the class. . The first person in each row works the first step in Euclid's Method and hands the paper back to the next person. . The second person works the second step and passes the paper back. . The paper is continually being passed until someone finds the G.C.F. of the two original numbers. <p>Note: In Euclid's Method divide the larger number by the smaller one first, then divide the divisor by the remainder, repeating this process until the remainder is zero. The G.C.F. is the last non-zero remainder.</p> <p><u>Example:</u></p> <p style="margin-left: 40px;">28 and 242</p> <div style="margin-left: 40px;"> <p>Divide</p> $\begin{array}{r} 8 \\ 28 \overline{) 242} \\ \underline{224} \\ 18 \end{array}$ $\begin{array}{r} 1 \\ 18 \overline{) 28} \\ \underline{18} \\ 10 \end{array}$ $\begin{array}{r} 1 \\ 10 \overline{) 18} \\ \underline{10} \\ 8 \end{array}$ </div>		<p>District adopted text.</p> <p><u>SEA MATH:</u> <u>Seattle Mathematics Program</u></p> <p>Seattle Public Schools 815 Fourth North Seattle, Wn. 98109 1975</p> <hr/> <p>District Resources</p>

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355



Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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$$\begin{array}{r} 1 \\ 8 \overline{)10} \\ \underline{8} \\ 2 \end{array}$$

$$\text{G.C.F.} = \begin{array}{r} 4 \\ 8 \overline{)8} \\ \underline{8} \\ 0 \end{array}$$

Title: Reverse Times Tables
Group Size: class drill
Materials: chalkboard

Procedure(s):

- Two numbers on board, each set being answers from the multiplication tables of one series (8 and 24).
- The class response might be 2, 4, or 8 with 8 the preferred answer.
- Daily drill will increase awareness of G.C.F.

Title: Factor Grid
Group Size: any number
Materials: factor grid worksheet, as needed

Procedure(s):

- Complete the patterns of dots (left to right, every dot in 1 column, every second dot in 2's column, every third dot in 3's column, etc.)
- Read the chart vertically to determine the greatest common factor (for 6 and 9 the highest level where both have dots is 3).
- Find the greatest common factor for
 - A. 36 and 24 (12) C. 24 and 40 (8)
 - B. 8 and 28 (2) D. 20 and 40 (20)
- Check by finding and multiplying the common prime factors of the given two or more numbers.
- Use Euclid's Method of finding the G.C.F.
 Given 306 and 414 divide the larger by the smaller

District Resources

3
 ERIC
 Full Text Provided by ERIC

$$\begin{array}{r} 1 \text{ R. } 108 \\ 306 \overline{)414} \\ \underline{306} \\ 108 \end{array}$$

Student Learning Objective(s) A. The student knows the greatest common factor (g.c.f.) of two or more numbers is the largest of the common divisors of the numbers. State Goal 1

B. The student is able to find the g.c.f. of two or more numbers: 18 = 2·3·3 District Goal

24 = 2·2·2·3 g.c.f. = 2·3 Program Goal 2,3,7

= 6

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p>Divide the divisor by the remainder.</p> $\begin{array}{r} 2 \\ 132 \overline{)306} \\ \underline{216} \\ 90 \end{array}$ <p>Repeat until the remainder is 0.</p> $\begin{array}{r} 1 \text{ R. } 18 \\ 90 \overline{)108} \\ \underline{90} \\ 18 \end{array}$ <p>The G.C.F. is the last non-zero remainder. (18)</p> $\begin{array}{r} 5 \text{ R. } 0 \\ 18 \overline{)90} \\ \underline{90} \end{array}$ <p>Exercise: Find the G.C.F. of</p> <p style="margin-left: 40px;">A. 108 and 132 (4)</p> <p>See overleaf for illustration.</p>		<hr/> <p>District Resources</p>

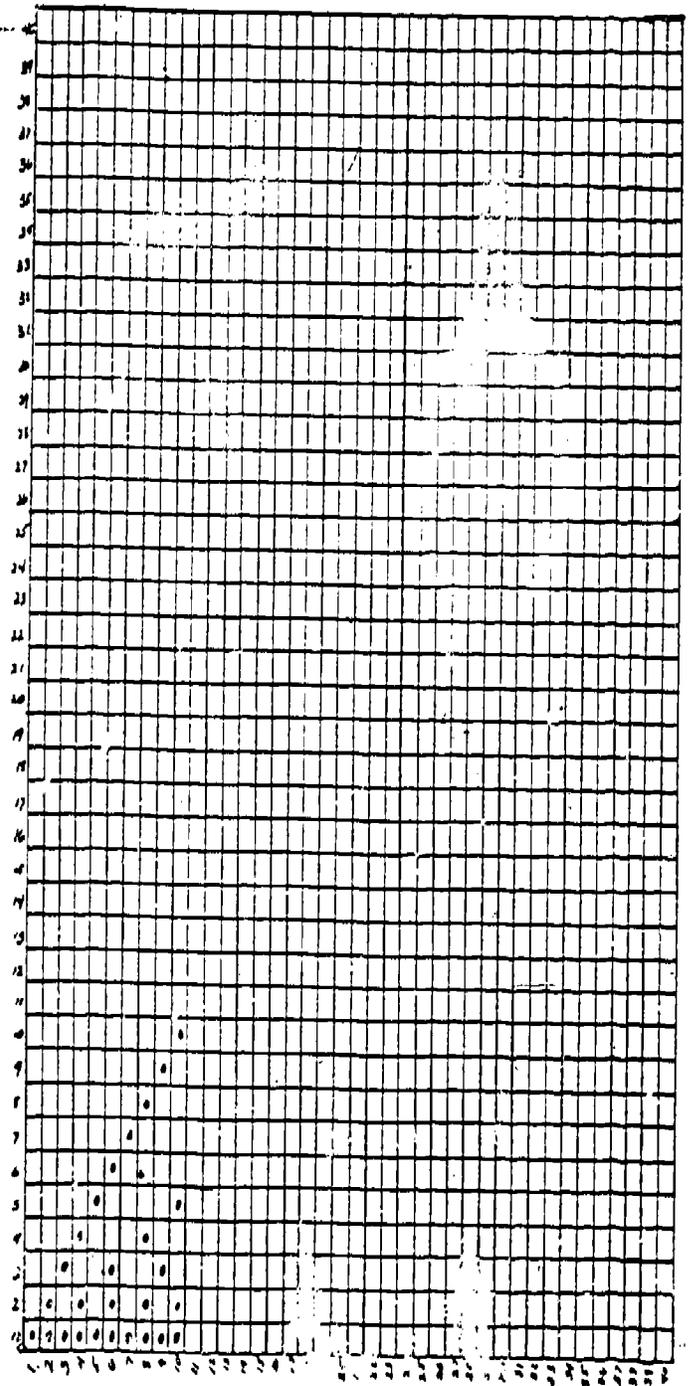


Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

Factor Grid



District Resources

372

372

Student Learning Objective(s) A. The student knows numbers that are divisible by a number other than 1 and itself are composite. B. The student knows a composite number can be expressed as the product of primes in only one way ($24 = 2 \cdot 2 \cdot 2 \cdot 3$). C. The student values numbers as a natural phenomenon and State Goal 1
 District Goal
 Program Goal 1,2,6,7

Related Area(s) not man-made. D. The student values numerals as the symbols we use to represent numbers.

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Concentration with Composites <u>Group Size:</u> two players <u>Materials:</u> concentration gameboard with 16 squares</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Sixteen cards (squares) to cover the squares on the gameboard, eight of one color and eight of another. Eight of the cards are composite numbers for example: <div style="display: flex; justify-content: space-around; border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 24 4 14 6 48 36 81 9 </div> <ul style="list-style-type: none"> Eight of the cards have composite numbers expressed as the product of primes for example: <div style="display: flex; justify-content: space-around; border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 2·2·2·3 2·2 7·2 3·2 3·2·2·2·2 3·2·3·2 </div> <div style="display: flex; justify-content: space-around; border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> 3·3·3·3 3·3 </div> <ul style="list-style-type: none"> Place all cards face down on the gameboard so that neither player knows which card is which. The first player turns up two cards, one of each color. If the player turns up a matching pair he/she keeps the cards and takes another turn. If a matching pair was not turned up, the cards are turned face down in their original position after giving the other player a chance to see them. The next player turns up two cards and play continues. 	<p>Give students a list of composite numbers and have them express the composite as the product of primes, i.e., $24 = 2 \cdot 2 \cdot 2 \cdot 3$</p>	<p>District adopted text</p> <hr/> <p>District Resources</p>



Suggested Activities: Grade(s) 7-8

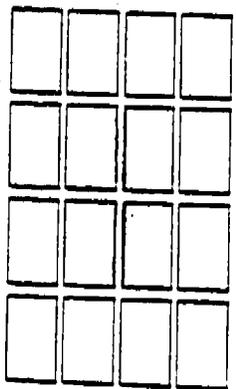
Suggested Monitoring Procedures

Possible Resources

. When all the cards have been taken, the player with the most cards is the winner.

Example of Gameboard:

CONCENTRATION



Game Board

District Resources

373

375

Student Learning Objective(s) A. The student knows the greatest common factor (g.c.f.) of two or more numbers is the largest of the common divisors of the numbers. B. The student is able to find the g.c.f. of two or more numbers: $18 = 2 \cdot 3 \cdot 3$ $24 = 2 \cdot 2 \cdot 2 \cdot 3$ g.c.f. = $2 \cdot 3 = 6$ State Goal 1
 District Goal
 Program Goal 2,3,7

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

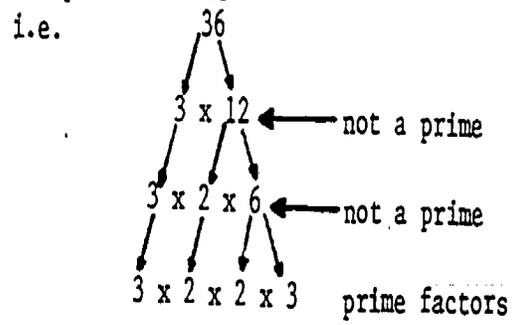
Suggested Monitoring Procedures

Possible Resources

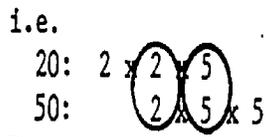
Title: G.C.F. The Prime Factorization Way
Group Size: entire class, small group
Materials: chalkboard, overhead, worksheet

Procedure(s):

- . Review prime factorization of a number with the group.
- . Point out that prime factorization can be used to find the G.C.F.
- . Write a number on the chalkboard or overhead and show how a "factor tree" can be used to determine the prime factors.



The prime factorization of 36 is $3 \times 2 \times 2 \times 3$
 . Put two numbers on the chalkboard and have the class determine the prime factors. List them as follows and circle the prime factors common to both.



- . Point out that both numbers have one 2 and one 5 as factors. Therefore, the G.C.F. of 20 and 50: 2×5 or 10 (Product of the prime factor common to both numbers).

District Resources



Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Suggested Resources

- . Demonstrate with several other numbers how to find the prime factors and the G.C.F.
- . Give students a worksheet and suggest they use similar patterns to find the G.C.F.

District Resources

Student Learning Objective(s) <u>A. The student knows the least common multiple (l.c.m.) of two or more numbers is the smallest of the common multiples of the numbers. B. The student is able to find the l.c.m. of two or more numbers: $8 = 2 \cdot 2 \cdot 2$ $1.c.m. = 2 \cdot 2 \cdot 2 \cdot 3$ $6 = 2 \cdot 3$ $= 24$</u>	State Goal	1
	District Goal	
	Program Goal	2,3,6,7

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Multiple Rummy</p> <p><u>Group Size:</u> groups of 4-5</p> <p><u>Materials:</u> #1 - deck of 60-80 cards numbered from 2-40 (or higher depending on ability level); #2 - deck of 20 cards numbered from 8-40 (composite numbers only)</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Deal all the cards from Deck #1. . Place Deck #2 face down in middle of table. . Turn over first card in Deck #2. . Each student plays two cards face down from his hand that have the card from Deck #2 as their least common multiple. . When all have played, turn over cards and examine. . If anyone plays an incorrect card, he/she must take all those cards played from that round into his/her hand. . If two or more people play an incorrect card, they will split the cards from that round. . If no one makes a mistake, the cards are set aside until the next game. . A player is not penalized for passing (not playing) during a round. . If a player can find three cards that have the same L.C.M., he can play them all at once. . When the round is completed, another card from Deck #2 is turned over and the procedure is repeated. . The winner is whoever can get rid of all his/her cards or whoever has the fewest at the end of the time period. 	<p>Give students a series of numbers with common multiples and ask them to circle the L.C.M. of the two numbers.</p> <p>i.e.</p> <p>3: 3, 6, 9, 12, 15, 18, 21, 24....</p> <p>4: 4, 8, 12, 16, 20, 24, 28, 32....</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

383

384



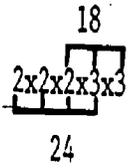
Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

The L.C.M. of 18 and 24 is 72.

Note that no extra factors are used in the L.C.M. i.e.



Give students a worksheet two or more numbers and have students use prime factorization to find L.C.M.'s.

Title: Dominoes
Group Size: groups of 2-3
Materials: 30-40 tiles (wood, cardboard),

Procedure(s):

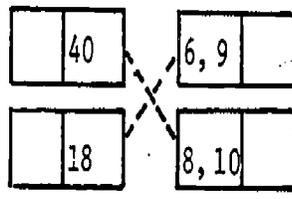
- Players follow the rules of dominoes, matching the side with 1 number to the side with 2 numbers.
- The 1 number side has to be the L.C.M. of the 2 number side.
- If a player is unable to play, he/she must draw from a pile of 10 extras which are set aside for that purpose.

Possible Dominoes:

6,9	60	10,12	40	4,10	36	4,9	20
9,12	48	4,5	12	8,12	18	12,16	12
8,10	15	3,5	48	4,9	18	2,9	40
4,12	40	5,8	15	3,4	15	5,15	20
3,16	20	4,5	18	3,15	60	4,15	36

(Should make at least 2 of each, varying the combinations.)

Give students a worksheet with his/her rows of dominoes (similar to the game only leave one side blank as shown). Students are to draw lines from the two numbers to its L.C.M. i.e.



District Resources



SUBJECT: Mathematics

SPECIFIC AREA: Numeration: Scientific Notation -- Exponents

Page
Suggested
Grade Placement
District
Placement

The student knows:

- . exponential form is an expression of the form M^b . 195 6-8
- . M^b means M as a factor b times ($5^4 = 5.5.5.5$). 195 6-8
- . in M^b , M is the base and b is the exponent. 195 6-8
- . expressing a number in scientific notation is writing it as a number between 1 and 10 multiplied by a power of 10, i.e., $251 = 2.51 \times 10^2$. 197 7-8
- . M^{-b} means $\frac{1}{M^b}$ (the inverse M^b), i.e., $10^{-2} = \frac{1}{10^2}$. 195 8
- . $M^x \cdot M^y = M^{x+y}$ ($3^2 \cdot 3^4 = 3^6$). 195 8
- . $M^x \div M^y = M^{x-y}$ ($2^6 \div 2^4 = 2^2$) 203 8

The student is able to:

- * . evaluate an exponential expression, i.e., $2^3 = 2.2.2 = 8$. 195 6-8
- . name a decimal number including negative exponents in scientific notation: $358 = 3.58 \times 10^2$
 $.00012 = 1.2 \times 10^{-4}$ 197 7-8
- . name a number, including negative exponents in scientific notation in decimal form: $2.65 \times 10^3 = 2650$.
 $6.5 \times 10^{-3} = .0065$ 199 7-8

The student values:

- . scientific notation as a simplified expression of very large or very small numbers. 197 6-8

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION

MUSIC

SOCIAL STUDIES

ART

LANGUAGE ARTS

MATH

SCIENCE

HEALTH

READING

CAREER EDUCATION

ENVIRONMENTAL EDUCATION

OTHER _____

391

Student Learning Objective(s) A. The student knows exponential form is an expression of the form M^b . State Goal

B. M^b means M as a factor b times ($5^4 = 5 \cdot 5 \cdot 5 \cdot 5$). C. The student knows in M^b , M is the base and b is District Goal

the exponent. D. The student knows M^{-b} means $M^{\frac{1}{b}}$ (the inverse M^b), i.e., $10^{-2} = \frac{1}{10^2}$. E. The student Program Goal

knows $M^x M^y = M^{x+y}$ ($3^2 \cdot 3^4 = 3^6$). F. The student knows $M^x \div M^y = M^{x-y}$ ($2^6 \div 2^4 = 2^2$). G. The student is able to evaluate

an exponential expression, i.e., $2^3 = 2 \cdot 2 \cdot 2 = 8$.

1
2,3

Suggested Activities: Grade(s) 8

Suggested Monitoring Procedures

Possible Resources

Title: Concentration: Using Exponents
Group Size: partners
Materials: concentration gameboard with 16 squares

Teacher observation.

District adopted text.

Procedure(s):

- Make 16 squares to cover squares on the gameboard, 8 of one color and 8 of another.
- On 8 of the cards write numerals, using exponents.

Example:

10^{-1}	2^0	2^{-4}	5^3	3^{-3}	7^{-2}	7^2	4^2
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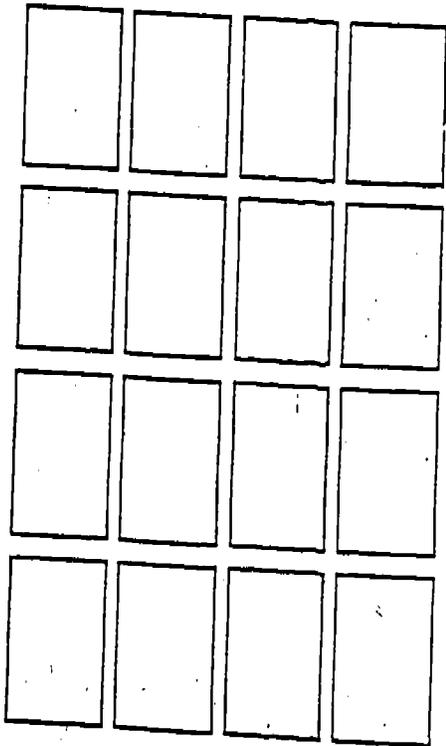
- On 8 of the cards express the equivalent of the numerals above without using exponents.

Example:

$\frac{1}{10}$	1	$\frac{1}{16}$	125	$\frac{1}{27}$	$\frac{1}{49}$	49	16
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- Place the cards face down on the gameboard so that neither player knows which card is which.
- The first player turns up two cards, one of each kind if different colors have been used.
- If the player turns up a matching pair, he/she keeps these cards and takes another turn. If a matching pair was not turned up, the cards are turned face down in their original position after giving the other player a chance to see them.

District Resources

Suggested Activities: Grade(s) <u>8</u>	Suggested Monitoring Procedures	Possible Resources
<p> <ul style="list-style-type: none"> The next player turns up two cards and the play continues as before. When all cards have been taken, the player with the most cards is the winner. </p> <p style="text-align: center;">CONCENTRATION</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Game Board</p>		<p style="text-align: center;">District Resources</p>

394

395

Student Learning Objective(s) A. The student knows expressing a number in scientific notation is writing it as a number between 1 and 10 multiplied by a power of 10, i.e., $251=2.51 \times 10^2$. B. The student is able to name a decimal number including negative exponents in scientific notation: $358=3.58 \times 10^2$ $.00012=1.2 \times 10^{-4}$ C. The student values scientific notation as a simplified expression of very large or very small numbers.

State Goal

1,8

District Goal

...

Program Goal

2,3,7

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Scientific Notation Concentration
Group Size: pairs, small group
Materials: 2 sets of cards, set A having a very large or very small number in decimal notation and set B having an equivalent of one card of set A written in scientific notation.

Observation of activity.

District adopted text

Procedure(s):

- . Shuffle together and lay face down.
- . Each player in turn turns up one card and tries to turn a second up which is equivalent to the first.
- . If the cards match, player draws again.
- . Play continues until all cards have been removed.
- . Player with most pairs is the winner.

Example: Set A in decimal notation:

.0000021 .00000174 .00384 .000148

.00257 .0000196 .0000352 .000172

District Resources

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Example: Set B in scientific notation:

-6 2.10x10	-6 1.74x10	-3 3.84x10	-4 1.48x10
-3 2.57x10	-5 1.96x10	-5 3.52x10	-4 1.72x10

Title: Minute Match-up
Group Size: entire class
Materials: worksheet

Teacher perusal of the worksheet. Group students having difficulty with the concept for reteaching.

District adopted text.

Procedure(s):
 . Match decimal numbers with scientific notation equivalent.

Kind of Radiation	Average Wavelength (Meters)	
Violet	.000000394	5.08×10^{-7}
Blue	.000000508	6.59×10^{-7}
Yellow	.00000058	6.5×10^{-11}
Red	.000000659	5.8×10^{-7}
X-Rays	.000000000482	3.94×10^{-7}
Gamma Rays	.000000000065	4.82×10^{-10}

District Resources

Student Learning Objective(s) A. The student knows expressing a number in scientific notation is writing it as a number between 1 and 10 multiplied by a power of 10, i.e., 251=2.51x10². B. The student is able to name a number, including negative exponents in scientific notation in decimal form:

2.65x10³ = 2650.
6.5x10⁻³ = .0065

C. The student values scientific notation as a simplified expression of very large or very small numbers.

State Goal	1,10
District Goal	
Program Goal	2,3,8

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures	Possible Resources
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Title: Tic-Tac-Toe
Group Size: pairs
Materials: 9 numbers on cards that are to be written in scientific notation, an answer key

Procedure(s):

- The 9 problem cards are placed face down to correspond to the spaces on a Tic-Tac-Toe board.
- The players decide where they would like to place their "X" or "O."
- Players play in turn and attempt to answer the problem for the space they have chosen.
- The first student to get three answers correct in a row, column or diagonal wins.
- Sample gameboard with cards placed face down.

Write each in scientific notation:

8,000,000	.00032	.002
.0169	.000000123	412,000
700	213,000,000	3940

District Resources

Suggested Activities: Grade(s) _____

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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Suggested Monitoring Procedures

Possible Resources

District Resources

402

403

Student Learning Objective(s) <u>The student knows M^{-b} means $\frac{1}{M^b}$ (the inverse M^b), i.e., $10^{-2} = \frac{1}{10^2}$.</u>	State Goal	1,8
	District Goal	
	Program Goal	2,3,7

Related Area(s) _____

Suggested Activities: Grade(s) <u>8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Ordering Integers with Negative Exponents</p> <p><u>Group Size:</u> entire class</p> <p><u>Materials:</u> a set of integers with negative exponents</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Tell the students that they are to be given a set of integers with negative exponents that they are to order according to size, the largest on the left and the smallest on the right. Visual inspection will probably be a very slow and difficult method of ordering the terms. What <u>action</u> should you take in order to make your task easier? (Answer: Write the inverse of each term for ease of ordering.) <u>Example:</u> Set to order: 3^{-2}, 5^{-3}, 10^{-2}, 4^{-3}, 2^{-4}, 6^{-2} 		<p>District adopted text</p> <hr/> <p>District Resources</p>



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		<p>District Resources</p>

Student Learning Objective(s) A. The student knows $M^x \cdot M^y = M^{x+y}$ ($3^2 \cdot 3^4 = 3^6$). B. The student knows $M^x \div M^y = M^{x-y}$ ($2^6 \div 2^4 = 2^2$).

State Goal	1,10
District Goal	
Program Goal	2,3,6

Related Area(s) _____

Suggested Activities: Grade(s) 8

Suggested Monitoring Procedures

Possible Resources

Title: Bingo
Group Size: entire class
Materials: Bingo gameboard as shown below, markers, multiplication and division involving numerical expressions with exponents

- Procedure(s):
- . The caller reads the multiplication and division problems using exponents.
 - . For example, one card might read "B3 squared times 3 to the fourth power". CELL B3 has 3^6 on it. A marker is placed on that cell.
 - . A second card might read "02 to the eighth power divided by 2 squared." Cell O3 has 2^6 on it.
 - . The first player who covers a horizontal, vertical, or diagonal straight line wins.

Sample Card:

1	4^3	8^7	3^3	9^6	8^5
2	5^2	2^3	5^5	4^2	9^4
3	6^6	2^4	free	3^4	2^6
4	6^2	2^2	5^3	7^2	2^5
5	7^4	2^6	6^5	6^3	8^2

B I N G O

District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures	Possible Resources
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District Resources

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410



411

SMALL SCHOOLS PROJECT - Work

Student Learning Objective(s)

$M^x \div M^y = M^{x-y}$ ($2^6 \div 2^4 = 2^2$).

Related Area(s)

Suggested Activities: Grade

Title: Divi

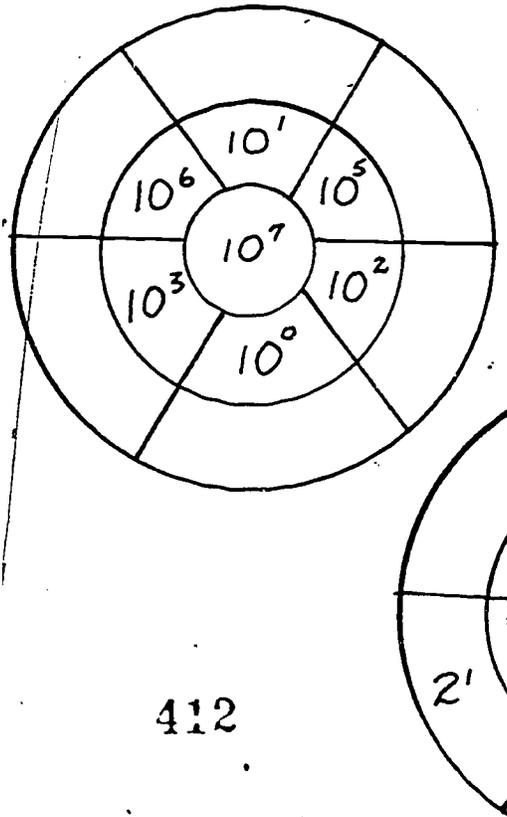
Group Size: enti

Materials: divi

Procedure(s):

- Complete each division with quotient as a single digit

Example:



copy

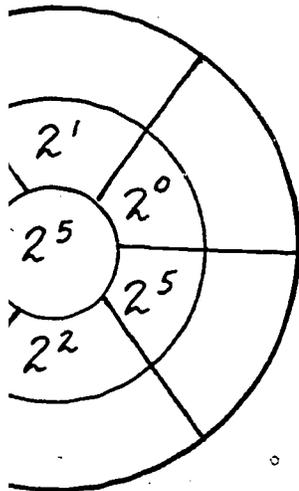
The student knows $M^x \cdot M^y = M^{x+y}$ ($3^2 \cdot 3^4 = 3^6$)

8

Suggested Mon
Procedures

Wheels (Exponents)
ass
wheels
by expressing each

Teacher observ
students havin
the concept fo



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		District Resources

414

415

Student Learning Objective(s) A. The student knows $M^x \cdot M^y = M^{x+y}$ ($3^2 \cdot 3^4 = 3^6$). B. The student knows $M^x \div M^y = M^{x-y}$ ($2^6 \div 2^4 = 2^2$).

State Goal

1

District Goal

Program Goal

3,7

Related Area(s):

Suggested Activities: Grade(s) 8

Suggested Monitoring Procedures

Possible Resources

Title: Multiplication Wheels (Exponents)

Group Size: entire class

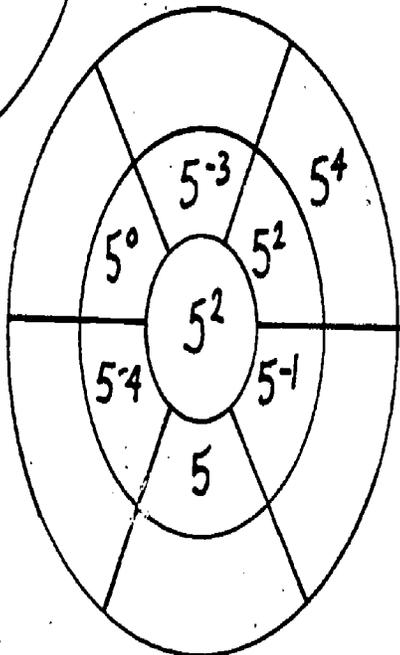
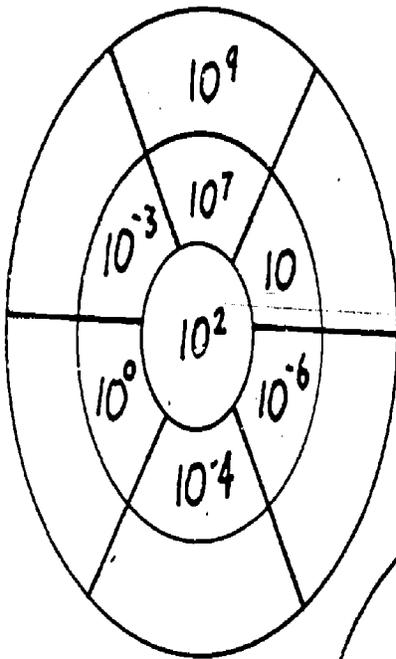
Materials: multiplication wheels

Teacher observation. Group students having difficulty with the concept for reteaching.

District adopted text.

Procedure(s):

- Complete each multiplication wheel by expressing each product as a single exponent.



District Resources

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		District Resources

418

419

SMALL SCHOOLS PROJECT - Working Copy

OBJECT: Mathematics

SPECIFIC AREA: Geometry: Shapes (Two-Dimensional)

The student knows:

- . a rectangle has four right angles (square corners, perpendicular lines) and opposite sides are congruent. 4-6
- . a square is a special rectangle with four equal (congruent) sides. 4-6
- . a parallelogram is a four sided figure with opposite sides equal. 4-6
- . a rectangle is a parallelogram with four right angles, or four 90° angles. 211 6-8
- . a parallelogram is a quadrilateral with opposite sides equal and parallel. 211 6-8
- . a quadrilateral is a four-sided polygon. 7-8
- . a trapezoid is a quadrilateral with one pair of parallel sides. 7-8
- . a rhombus is a parallelogram with four congruent sides. 8
- . a congruence means a point-to-point fit. 213 7-8
- . a polygon is a closed figure made up of straight line segments. 215 7-8

The student is able to:

- *. identify two-dimensional figures: rectangle, parallelogram. 4-5
- . identify two-dimensional figures: quadrilateral, trapezoid, rhombus. 5-8
- . identify and name congruent, two-dimensional shapes. 213 5-7

The student values:

Page
Suggested
Grade Placement
District
Placement

4 5 6 7 8

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

421

422

Student Learning Objective(s) A. The student knows a rectangle is a parallelogram with four right angles, or four 90° angles. B. The student knows a parallelogram is a quadrilateral with opposite sides equal and parallel.

State Goal

1

District Goal

Program Goal

2,4

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

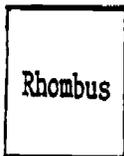
Possible Resources

Title: Three-Dimensional Geo-Shape-0
Group Size: pairs
Materials: pencils, game cards

Procedure(s):

- Decide upon the shapes you want the students to identify. (There may be more than are given in the objectives above.)
- Draw a shape in each square of each level. Shapes can be used more than once.
- Prepare game cards by writing the name of each shape on a card. Cards can be reused until completion of the game.

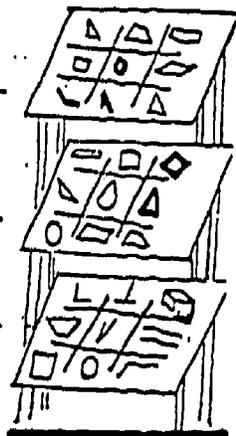
Example:



Level 1 --

Level 2 --

Level 3 --



District Resources

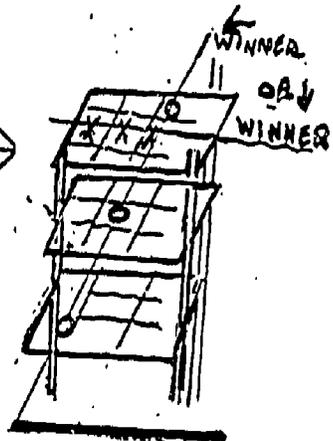
Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

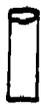
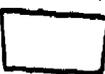
Possible Resources

- Shuffle game cards and place cards upside down on the table.
- The game begins when a player turns the top card over. He/she may place his/her mark (X or O) on either of the three levels on the shape given on the game card. That card is returned to the bottom of the stack. Second player takes his/her turn. A winner is determined by a player getting three marks in a row (just as in Tic-Tac-Toe). Winner may get his/her marks in a row, but on different levels (on a straight line segment).

Example:



Some words and shapes that can be used in the game are:

- | | |
|--|--|
| right triangle  | square  |
| right angle  | rectangle  |
| cone  | parallelogram  |
| cube  | acute angle  |
| cylinder  | obtuse angle  |
| prism  | trapezoid  |
| pyramid  | isosceles triangle  |
| circle  | rhombus  |
| equilateral triangle  | |

Variation:

4. Definitions of shapes may be put on cards instead names of the shapes.

District Resources

Student Learning Objective(s) A. The student knows a congruence means a point-to-point fit.

State Goal

1, 4

B. The student is able to identify and name congruent, two-dimensional shapes.

District Goal

Program Goal

2, 4

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Congruent Concentration
Group Size: two players
Materials: teacher-made cards of pairs of congruent shapes

Procedure(s):

- . Cards are shuffled and placed face down, one by one, in neat rows.
- . First player turns over any two cards he/she wishes.
- . Player must then identify and name the congruent shape before he/she gets to keep the matched pair.
- . If player does not make a match, his/her turn is over and the second player has a turn.
- . The player with the most "matches" is the winner.

District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

429

430

Student Learning Objective(s) A. The student knows a polygon is a closed figure made up of straight line segments. State Goal

1
2,4

District Goal

Program Goal

Related Area(s) triangles, quadrilaterals

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Straw Game
Group Size: small groups (two to four each)
Materials: plastic straws (cut to various lengths), pint container

District adopted text

Procedure(s):

- . Each player in turn draws one straw from container
- . Player then lays straws on table to form triangles quadrilaterals, rectangles or squares.
- . Score points according to polygon formed. First student with a total of ten points wins.

Points For Each

Triangle	1
Quadrilateral	2
Rectangle	3
Square	4

District Resources

Title: Dot-to-Dot
Group Size: two students
Materials: colored pencils, crayons (students can make their own grids on notebook paper, or at the chalkboard)

Procedure(s):

- . Mark out grid work of dots on paper or chalkboard.
- . Students alternate turns at connecting dots to form squares. Each student uses a different color pencil or crayon.
- . When a student forms a square, he/she puts his/her initial inside the square and gets one more move.

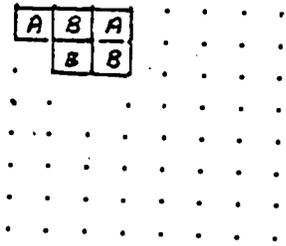
Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

. Game ends when all squares are completed; winner is the one with the most squares.

Example:



District Resources

433

434

SUBJECT: Mathematics

SPECIFIC AREA: Geometry: Shapes (Three-Dimensional)

The student knows:

- . a die is a model of a cube.
- . a ball is a model of a sphere.
- . a can is a model of a cylinder.
- . the great pyramids of Egypt are models of a pyramid.
- . a sugar cone and a funnel without a spout are models of a cone.
- . a triangular prism is a three-dimensional figure with bases which are congruent triangles in parallel planes and lateral faces which are parallelograms.
- . a rectangular prism is a three-dimensional figure with bases which are congruent rectangles in parallel planes and lateral faces which are parallelograms.

The student is able to:

- . identify three-dimensional figures: cube, sphere, pyramid, cone.
- . identify three-dimensional figures: cylinder, triangular prism, rectangular prism.

The student values:

Page
Suggested
Grade Placement
District
Placement

4 5 6 7 8

4-6
4-6
4-6
4-6
4-6
219 7-8
219 7-8

4-5
219 6-7

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

436

437

Student Learning Objective(s) A. The student knows a can is a model of a cylinder. B. The student knows a triangular prism is a three-dimensional figure with bases which are congruent triangles in parallel planes and lateral faces which are parallelograms. C. The student knows a rectangular prism is a three-dimensional figure with bases which are congruent rectangles in parallel planes and lateral faces which are parallelograms. D. The student is able to identify three-dimensional figures: cylinder, triangular prism, rectangular prism.

State Goal	1,4
District Goal	
Program Goal	1,2,4

Suggested Activities: Grade(s) 7-8

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u></p> <p><u>Group Size:</u> individual, entire class</p> <p><u>Materials:</u> cardboard, glue, scissors, models of cylinders, triangular prisms, rectangular prisms</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Have students pass around and touch models of cylinders, triangular prisms and rectangular prisms. . Explain to students details of each model. . Hand out cardboard, scissors and glue. Have students try to make models of cylinders, triangular prisms and rectangular prisms. . Help students who need it. . Display models made in room or school. 		
		<p>District Resources</p>



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

440

441

SUBJECT: Mathematics
 SPECIFIC AREA: Geometry: Points, Lines, Line Segments

Page
 Suggested
 Grade Placement
 District
 Placement

The student knows:

- . a point is an exact location in space.
- . a line segment is part of a line and has two endpoints.
- . a straight line is a set of infinite points on a plane having no endpoints.
- . intersecting lines are lines in the same plane that cross each other.
- . parallel lines are lines in the same plane which do not intersect.
- . perpendicular lines are two intersecting lines that form right angles.
- . a ray is a set of infinite points on a plane with one endpoint.
- . a plane is a set of points that can be connected with a line.

		4	5	6	7	8
221	4-8					
223	4-8					
223	4-8					
227	5-7					
227	5-7					
227	5-7					
231	5-8					
	4-8					

The student is able to:

- . identify a point, a line, and a line segment.
- . identify a ray.
- . measure a line segment.
- . identify the following types of lines: intersecting, parallel, perpendicular.
- . bisect a line segment.
- . construct parallel and perpendicular lines.

223	4-5					
223	5-7					
	4-6					
227	5-7					
225	7-8					
229	7-8					

The student values:

OPTIONAL GOALS AND ACTIVITIES

<p>PHYSICAL EDUCATION</p>	<p>MUSIC</p>	<p>SOCIAL STUDIES</p>
<p>ART</p>	<p>LANGUAGE ARTS</p>	<p>MATH</p>
<p>SCIENCE</p>	<p>HEALTH</p>	<p>READING</p>
<p>CAREER EDUCATION</p> <p>443</p>	<p>ENVIRONMENTAL EDUCATION</p>	<p>OTHER _____</p> <p>444</p>

State Goal
District Goal
Program Goal

Student Learning Objective(s) A. The student knows a point is an exact location in space. B. The student knows a line segment is part of a line and has two endpoints. C. The student knows a straight line is a set of infinite points on a plane having no endpoints. D. The student is able to identify a point, a line, and a line segment. E. The student is able to identify a ray.

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Points, Lines, Line Segments and Rays

Group Size: entire class

Materials: overhead, chalkboard, worksheet

Procedure(s):

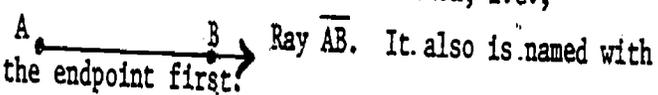
- Explain that a point is an idea, therefore it has no dimension, width, or thickness and cannot be seen. Put a dot on the overhead or chalkboard and suggest it will represent a point.
- Draw a line with arrows on each end and suggest that it is made up of an unlimited number of points, and goes on and on in both directions. A line is named by any two points in it, i.e.,



Thus it can be called line AB, line BC, line CB, line BA, or line CA.

- Suggest that a line segment has two endpoints, i.e., A  B, and is called \overline{AB} or \overline{BA} .

- Draw a ray and explain that a ray has one endpoint, and extends forever in one direction, i.e.,



- Give students a worksheet and have them identify segments, rays, lines and points.

District Resources

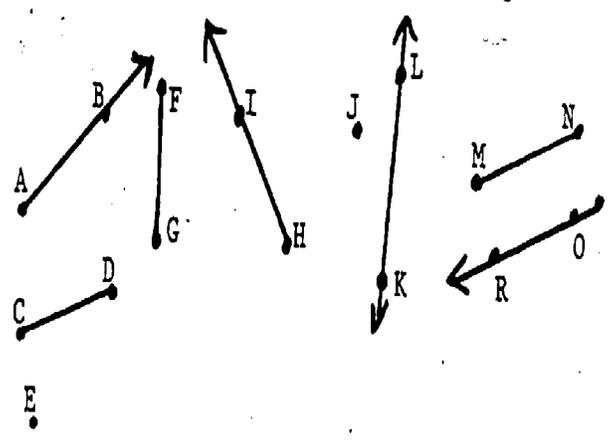
Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

Example:

1. Fill in the chart with the letter names of the following rays, lines, points and segments.



Line Segments	
Rays	
Lines	
Points	

2. Draw and name:
4 lines, 4 line segments, 4 rays, 1 point.

District Resources

447

418

State Goal	1
District Goal	
Program Goal	2,4,6

Student Learning Objective(s) A. The student knows a line segment is part of a line and has two endpoints. B. The student is able to bisect a line segment.

State Goal

District Goal

Program Goal

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Paper Fold Perpendiculars
Group Size: small group, entire class
Materials: paper, pencil

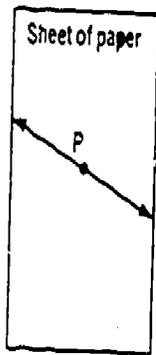
Teacher observation and assistance.

District adopted text

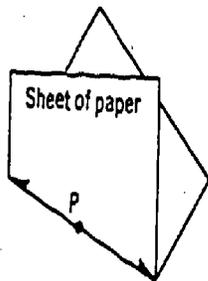
Basic Mathematics, Deans, et al
 American Book Co., San Francisco,
 1977

Procedure(s):

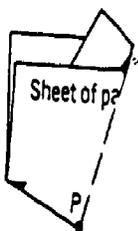
- Have students draw any line and locate a point (p) on it. (Step 1)
- Have students fold the paper back along the line. (Step 2)
- Have students fold the paper back along the dotted line at P so that the base edges match. (Step 3)
- Have students unfold the paper. The dotted line is perpendicular to the initial line at P.
- Note that the dotted line is not drawn, it is constructed by folding.



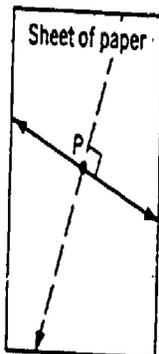
Step 1



Step 2



Step 3



Step 4

District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring
Procedures

Possible Resources

District Resources

451

452

1
2,4,6

Student Learning Objective(s) A. The student knows intersecting lines are lines in the same plane that cross each other. B. The student knows parallel lines are lines in the same plane which do not intersect. C. The student knows perpendicular lines are two intersecting lines that form right angles. D. The student is able to identify the following types of lines: intersecting, parallel, perpendicular. State Goal District Goal Program Goal

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

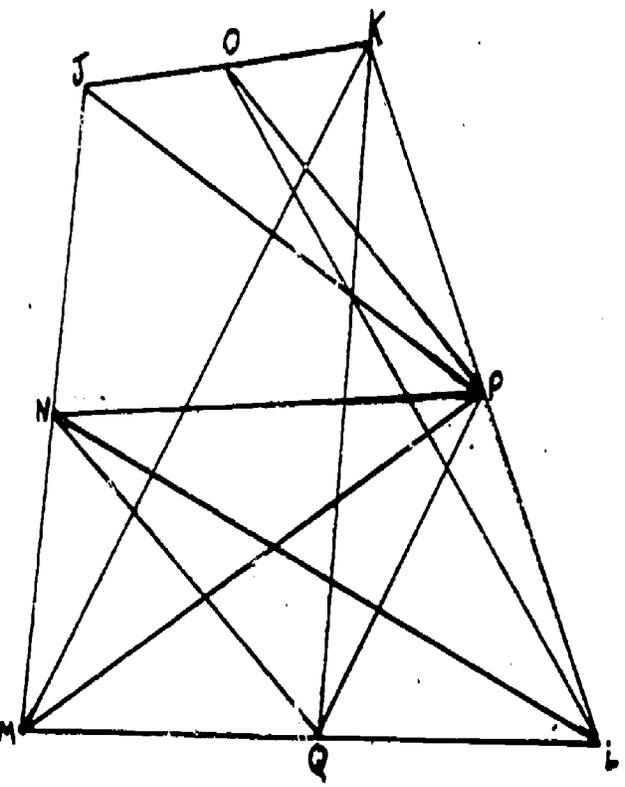
Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Identifying Line Segments
Group Size: small group, entire class
Materials: worksheet, pencil

- Procedure(s):
- Have students identify all pairs of line segments that run parallel by naming the line segments.
 - Have them identify all line segments that intersect and form right angles.

Peruse student worksheet and assist students having difficulty with the concept.

Topic 61, Geometry Figures, Wisconsin Research and Development Center for Cognitive Learning, Rand McNally and Co.



District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

455



456

Student Learning Objective(s) A. The student knows parallel lines are lines in the same plane which do not intersect. B. The student knows perpendicular lines are two intersecting lines that form right angles. C. The student is able to construct parallel and perpendicular lines. State Goal 1
 District Goal
 Program Goal 2,4,6

Related Area(s) _____

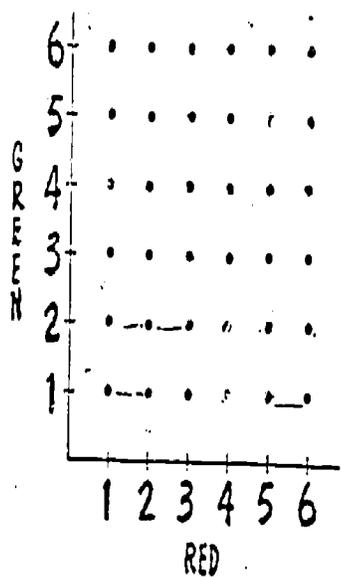
Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Parallel and Perpendicular Line Trace
Group Size: pairs
Materials: worksheet with directions, ruler

Give students a worksheet with parallel and perpendicular lines and have them label them.

District adopted text

- Procedure(s):
- The player throwing the highest total on the dice starts the game.
 - The first player rolls four dice—two red, two green, from the four, he/she chooses one red, and one green---marking the point they represent.
 - One player circles a point, the other "X"s his/hers.
 - Once a point is covered, it belongs to that player.
 - Four in a row wins---vertical, horizontal or diagonal.
 - Have students connect the points to show examples of parallel and perpendicular lines.
 - Have students label the parallel and perpendicular lines.



District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

459

460

Student Learning Objective(s) A. The student knows a ray is a set of infinite points on a plane with one endpoint. B. The student is able to identify a ray.

State Goal

1

District Goal

Program Goal

2,4,6

Related Area(s)

Suggested Activities: Grade(s) 7-8

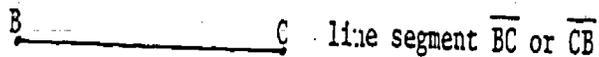
Suggested Monitoring Procedures

Possible Resources

Title: A Ray
Group Size: entire class
Materials: overhead, chalkboard, worksheet

Procedure(s):

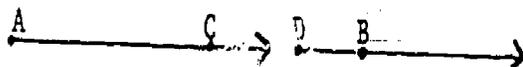
- Review with students the definition of a line segment: a line segment is part of a line. It has two endpoints. The endpoints can be used to name the line segment.



- Draw a line with one endpoint and point out that a ray is a part of a line with one endpoint and extends forever in one direction. To name a ray, name the endpoint first and then another point on the ray:

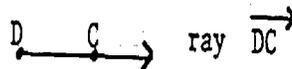
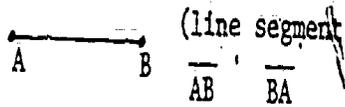


- Give students a worksheet with rays and ask them to identify the rays by letter:



- Students should also be asked to describe the ray identified, i.e., ray with endpoint A and including point C.

Give students a worksheet with line segments and rays and ask them to identify both:



District Resources

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Available Resources

District Resources

403

404

JECT: Mathematics
SPECIFIC AREA: Geometry: Angles, Triangles

Age
 Suggested
 Grade Placement
 District
 Placement

The student knows:

Angles

- . an angle is the union of two rays with a common endpoint.
- . a right angle is 90° .
- . an acute angle is less than 90° .
- . an obtuse angle is more than 90° .
- . supplementary angles are two angles whose sum equals 180° .
- . complementary angles are two angles whose sum equals 90° .

Triangles

- . a triangle is a polygon with three sides.
- . a triangle is a figure with three sides.
- . a right triangle has one right angle.
- . an acute triangle has three acute angles.
- . an obtuse triangle has one obtuse angle.
- . an equilateral triangle has three congruent sides.
- . an isosceles triangle has two congruent sides.
- . a scalene triangle has no congruent sides.

The student is able to:

- . identify congruent angles.
- . measure angles to the nearest degree: right, obtuse, acute.
- * . identify triangles (by angles) right triangle, acute triangle, obtuse triangle.
- . identify triangles (by sides): isosceles triangle, scalene triangle, equilateral triangle.
- . bisect any angle.
- . identify equal angles.

The student values:

	4	5	6	7	8
235					
237					
237					
237					
241					
241					
243					
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243					
239					
6					



OPTIONAL GOALS AND ACTIVITIES

<p>PHYSICAL EDUCATION</p>	<p>MUSIC</p>	<p>SOCIAL STUDIES</p>
<p>ART</p>	<p>LANGUAGE ARTS</p>	<p>MATH</p>
<p>SCIENCE</p>	<p>HEALTH</p>	<p>READING</p>
<p>CAREER EDUCATION</p>	<p>ENVIRONMENTAL EDUCATION</p>	<p>OTHER _____</p>

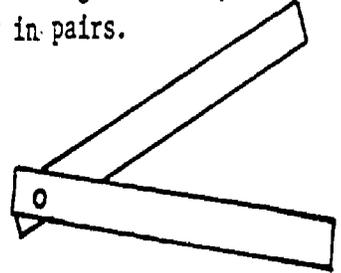
436

437

Student Learning Objective(s) A. The student knows an angle is the union of two rays with a common endpoint. B. The student is able to identify congruent angles. C. The student is able to measure angles to the nearest degree: right, obtuse, acute. (The student has learned to identify right, obtuse and acutes in another objective.)

Related Area(s) _____

State Goal	1,4
District Goal	
Program Goal	2,4

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> What's Your Angle</p> <p><u>Group Size:</u> small groups (three each)</p> <p><u>Materials:</u> strips of tagboard, brass fasteners, protractors</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Illustrate on the chalkboard two intersecting rays with a common end point - identified as an angle to measure. . Discuss and demonstrate how to read a protractor. . Make angle sizers (directions below). . Divide students into teams (three each). . Teacher may act as referee at first, switching to students as they learn the game. <p><u>Directions for "What's Your Angle?"</u></p> <ul style="list-style-type: none"> . Make two angle sizers by punching a hole in the end of each tagboard strip and fastening them together in pairs.  <ul style="list-style-type: none"> . Play What's Your Angle? with three students. . For each round of the game, one person will be the referee and the other two the players. . The game is completed when three rounds have been played and each student has been the referee. . The winner is the player with the greatest score. <p><u>To play a round:</u></p> <ul style="list-style-type: none"> . The referee gives a number of degrees between 0 and 180. 	<p>Teacher observation</p>	<p><u>SEAMATH</u>, Seattle Public Schools, Administration and Service Center, 4th North, Seattle, WA 98109.</p> <hr/> <p>District Resources</p>

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
<ul style="list-style-type: none"> . Each player opens his/her angle sizer to show an angle of that size. . The referee uses a protractor to measure each angle. He/she determines if the angle formed with the angle sizer is congruent or equal to that shown on the protractor. . A point is scored by the player whose angle is nearest to the right size. . A round is completed after ten tries. The student with the most points after three rounds wins. 		
		<p style="text-align: center;">District Resources</p> <p style="text-align: right; margin-top: 200px;">471</p>

470

Student Learning Objective(s) A. The student knows a right angle is 90°. B. The student knows an acute angle is less than 90°. C. The student knows an obtuse angle is more than 90°. D. The student is able to measure angles to the nearest degree: right, obtuse, acute.

State Goal	1, 4
District Goal	
Program Goal	2, 4

Related Area(s) _____

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: The Do-It-Yourself Protractor
Group Size: entire class
Materials: file cards, two tagboard strips, one brass fastener, protractor, paper punch, pencil (for each student)

SEAMATH, Seattle Public Schools, Administrative and Service Center, 815 4th North, Seattle, WA 98109.

Procedure(s):

- . Have each student construct a protractor and angle measure. (see back of page)
- . Illustrate acute, 90°, and obtuse angles on chalkboard and demonstrate how to check with the do-it-yourself protractor.
- . Have the students measure several examples of acute, right, and obtuse angles.

Title: Shapes
Group Size: entire class
Materials: old magazines, bulletin board, chart, scissors

District Resources

Procedure(s):

- . Teacher puts up bulletin board with the shapes right triangle, obtuse triangle, etc., outlined in heavy magic marker.
- . Students cut objects out of old magazines that have the same shape as those outlined on the board.
- . They then pin their pictures to the bulletin board and discuss the similarities.

Variation:
 Students can make a collage of the shapes and pictures.

473

THE DO-IT-YOURSELF PROTRACTOR

The unit angle for the scale that is around this "card" was chosen so that the measure of a right angle is 6.

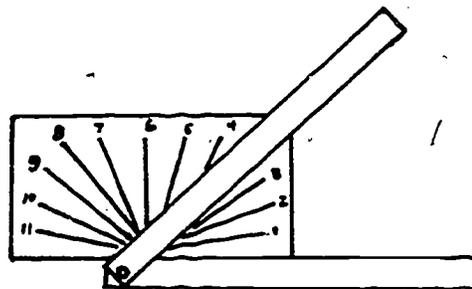
You can use this scale to make your own protractor.

1. Use a file card. Mark the center of the bottom edge of your card.
2. Place your card so that the bottom edge and center mark is on top of the bottom edge and center mark of this "card."
3. Mark the other edges of your card at the points where they meet the unit angle markings.
4. Connect each of these points to the center of the bottom edge.
5. Label your protractor scale to show the number of unit angles. The scale may be labeled from right to left (as shown), left to right, or both ways.



Materials: two tagboard strips; brass fastener; paper punch; the "Do-it-Yourself" protractor.

1. Punch a small hole in one end of each strip. Attach them to each other with the fastener.
2. Spread the strips apart to make a right angle. Make angles that are larger than a right angle. Make angles that are smaller than right angles.
3. Make an angle that is larger than a right angle. Estimate the measure of the angle in your protractor units. Use your protractor to check the estimate.
4. Make other angles. Estimate and then measure in each case.



Student Learning Objective(s) A. The student knows an angle is the union of two rays with a common endpoint. B. The student is able to bisect any angle.

State Goal

1

District Goal

Program Goal

2,4,7

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Angles and Rays
Group Size: individual, entire class
Materials: compass, straightedge, colored pencils

District adopted text.

Procedure(s):

- . Time each student for the following activity. Put times on chalkboard. The fastest time is the winner.
- . Have students draw any four sided figure.
- . Have students pick any two angles of the above figure and label one angle (1) and the other angle (2).
- . Have students color the common end point: of angle (1) BLUE; of angle (2) GREEN.
- . Have the students color the two rays: of angle (1) RED; of angle (2) BLACK.
- . Have the students bisect: angle (1); angle (2).

District Resources

475

476

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

477

478

Student Learning Objective(s) A. The student knows supplementary angles are two angles whose sum equals 180°. B. The student knows complementary angles are two angles whose sum equals 90°.

State Goal

District Goal

Program Goal

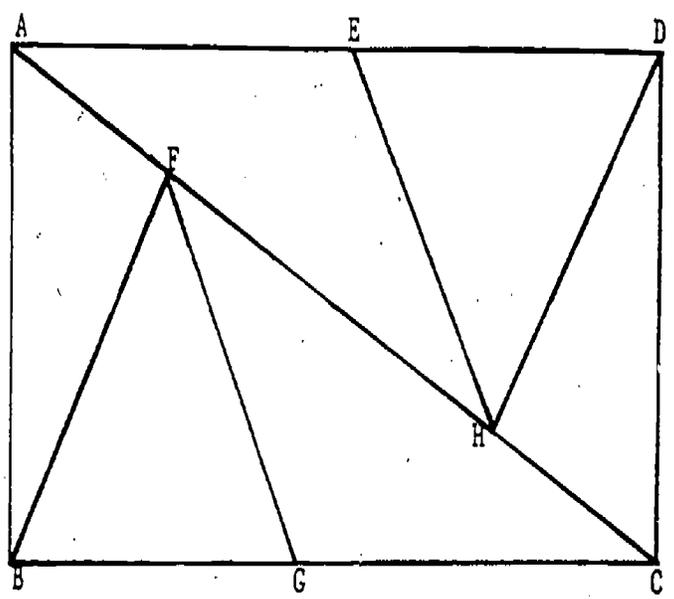
1
2, 4

Related Area(s) _____

Suggested Activities: Grade(s) 7-8 Suggested Monitoring Procedures Possible Resources

Title: Find the Supplementary and Complementary Angles
Group Size: entire class
Materials: worksheet of figure containing supplementary and complementary angles, ruler, protractor

- Procedure(s):
- . Give each student a copy of drawing (below).
 - . Have students find as many supplementary and complementary angles as they can.
 - . Use ruler to check supplementary angles.
 - . Use protractor to check complementary angles.
 - . After naming angles, cut out pieces and fit together to check.



District Resources

Suggested Activities: Grade(s) _____ Suggested Monitoring Procedures Possible Resources

District Resources

481

482



Student Learning Objective(s) A. The student knows a right triangle has one right angle. B. The student knows an acute triangle has three acute angles. C. The student knows an obtuse triangle has one obtuse angle. D. The student is able to identify triangles (by angles) right triangle, acute triangle, obtuse triangle.

State Goal 1, 4

District Goal

Program Goal 2, 4

Related Area(s)

State Goal	1, 4
District Goal	
Program Goal	2, 4

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Tallyangle
Group Size: pairs
Materials: paper, pencil, ruler, protractor, small triangles of assorted shapes (right, acute, obtuse), one pint container

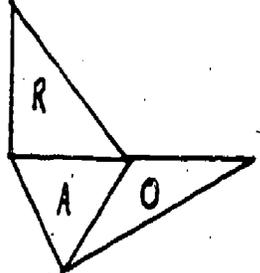
Procedure(s):

- . Put the triangles into a container.
- . Students, without looking at each other's triangles, choose three triangles from container.
- . Students place the three triangles on paper to make a shape. Direct the students to put sides next to each other that are the same length.
- . Students then carefully trace around each shape with a pencil.
- . Each student carefully cuts out his/her shape.
- . Students compare shape to chart to see how many points they have. The person with the most points wins.

Example:

Chart	Point
Shape with largest angle	3
Shape with smallest angle	2
Any right angle	1
Any obtuse angle	1
Shape with most corners	1

Sample Shape
 R - Right Triangle
 A - Acute Triangle
 O - Obtuse Triangle



District Resources

484

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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Title: Know Your Angles and Triangles - "Concentration"

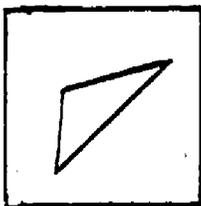
Group Size: small groups

Materials: two sets of game cards

Procedure(s):

- . Prepare two sets of game cards. One set has definitions and the other has illustrations of different kinds of triangles, i.e., equilateral, isosceles, scalene. All cards are numbered on the back.

Example:



Obtuse triangle
1 obtuse angle

- . Students lay cards face down (numbers up) on the desk and play "Concentration" by matching definitions and illustrations.
- . The students with the most sets of cards - wins.

Title: Shapes

Group Size: entire class

Materials: old magazines, bulletin board, chart, scissors

Procedure(s):

- . Teacher puts up a bulletin board with the shapes (right triangle, obtuse triangle, etc.) outlined in heavy magic marker.
- . Students cut objects out of old magazines that have the same shape as those outlined on the board.
- . They then pin their pictures to the bulletin board and discuss the similarities.

Variation:

Students can make a collage of the shapes and pictures.

District Resources

496

495

Student Learning Objective(s) A. The student knows an equilateral triangle has three congruent sides. State Goal

1,4

B. The student knows isosceles triangle has two congruent sides. C. The student knows a scalene tri- District Goal

angle has no congruent sides. D. The student is able to identify triangles (by sides): isosceles tri- Program Goal

2,4

angle, scalene triangle, equilateral triangle.

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Know Your Triangles — "Concentration"

Group Size: pairs

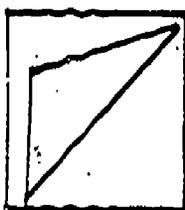
Materials: two sets of game cards

District adopted text.

Procedure(s):

- . Prepare two sets of game cards. One set has definitions and the other has illustration of different kinds of triangles, i.e., equilateral, isosceles, scalene. All cards are numbered on the back.

Example:



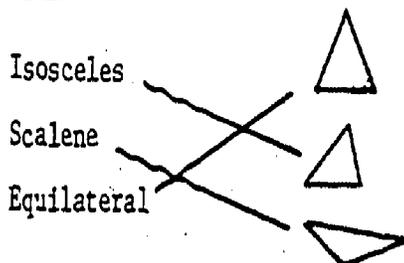
Scalene triangle
no congruent sides

- . Students lay cards face down (numbers up) on the desk and play "Concentration" by matching definitions and illustrations.
- . The student with the most sets of cards wins.

Variation(s):

- . On a worksheet, have students match names of triangles with illustrations of triangles.

Example:



District Resources

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
<p>. Also have students match definitions of triangles and names of triangles.</p> <p><u>Example:</u></p> <p>Isosceles three congruent sides</p> <p>Scalene two congruent sides</p> <p>Equilateral no congruent sides</p>		
		<p>District Resources</p>

499

490

OPTIONAL GOALS AND ACTIVITIES

<p>PHYSICAL EDUCATION</p>	<p>MUSIC</p>	<p>SOCIAL STUDIES</p>
<p>ART</p>	<p>LANGUAGE ARTS</p>	<p>MATH</p>
<p>SCIENCE</p>	<p>HEALTH</p>	<p>READING</p>

CAREER EDUCATION

ENVIRONMENTAL EDUCATION

OTHER _____

492

493

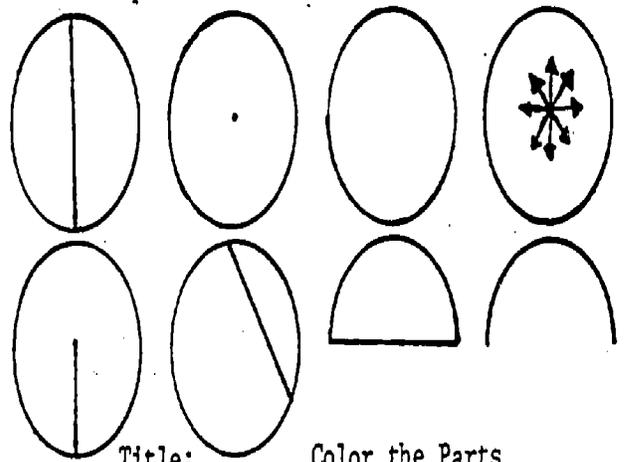
Student Learning Objective(s) <u>A. The student knows the circumference of a circle is the same as the</u>	State Goal	1
<u>perimeter of a circle. B. The student knows a cord is a straight line within a circle whose end-</u>	District Goal	
<u>points touch the circumference. C. The student knows an arc is a portion of the circumference of a</u>	Program Goal	2,4,8

Related Area(s) circle. D. The student is able to locate properties of a circle: cord, arc, semicircle.

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Circle Rummy
Group Size: two to three
Materials: deck of cards (see illustration)
 four of each type.

Procedure(s):
 . Student shuffles cards and deals five cards to each player (except person who starts game, he/she gets six). He/she discards one card.
 . Object is to get books of three or four.
 . Next person either takes discards or draws.



Title: Color the Parts
Group Size: entire class
Materials: worksheet with several examples of circumference, cords, arcs, diameters, radius, and circles on the one worksheet, crayons

Procedure(s):
 . Students are asked, either by the teacher to the whole class, or by a job card, to color the: cords of a circle green, arcs red, circumferences purple, etc. Since there are several examples on each worksheet, colors will be used more than once.

District Resources

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		District Resources
496		497

SMALL SCHOOLS PROJECT - Working Copy

	Page	Suggested Grade Placement	District Placement					
SUBJECT: <u>Mathematics</u>								
SPECIFIC AREA: <u>Geometry: Perimeter</u>								
						4	5	6
								7
								8

The student knows:

- . the perimeter of polygons is determined by adding together the lengths of all sides.
- . the circumference of a circle is found by multiplying the diameter times pi ($C = \pi d$ or $C = 2r \cdot \pi$).
- . a polygon is a closed figure made up of straight line segments.
- . pi is the relationship between the circumference and the diameter of a circle, or approximately 3.1416.

253	4-6
257	7-8
255	7-8
259	7-8

The student is able to:

- *. determine the perimeter of polygons.
- . determine the circumference of a circle, given the diameter or radius.
- . determine the diameter or radius given the circumference.
- . determine the missing sides of a polygon, given the other sides and the perimeter.

253	4-8
259	7-8
257	7-8
255	7-8

The student values:

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

400

500

Student Learning Objective(s) <u>A. The student knows the perimeter of polygons is determined by adding together the lengths of all sides. B. The student is able to determine the perimeter of polygons.</u>	State Goal	1
	District Goal	
	Program Goal	2,4,6

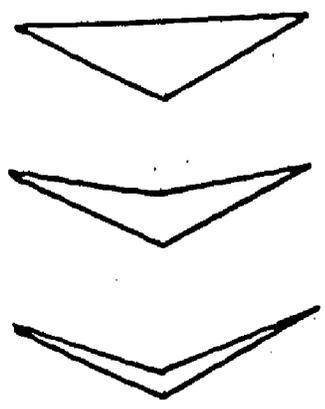
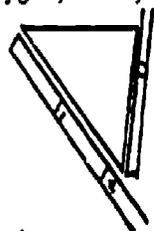
Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title:
Group Size: entire class
Materials: rulers, worksheet of polygons

Procedure(s):

- Have students use rulers to add up the distance around the polygon, i.e., measure continuously on the ruler.
- Relate the continuous measurement by adding up the sides of the polygons to get the distance around or perimeter.
- Practice finding the perimeter of the remaining polygons on the worksheet.
- Have students compare the perimeter of the following types of polygons:



Teacher observation.
 Worksheet of polygons with students finding the perimeter when given the length of all the sides.

District adopted text.
 District Resources

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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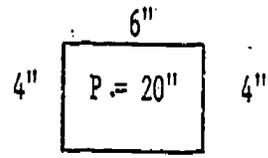
Title: Demonstration
Group Size: entire class
Materials: colored chalk, string, chalkboard

- Procedure(s):
- Draw a polygon on the chalkboard using a different color for each lateral.
 - Ask different students to come up and cut a piece of string the same length as the blue line, red line, etc.
 - Ask how much string was used. Students hold up their cut pieces in a line.
 - Together write the number sentence on the board, i.e., blue line + red line, etc. = distance around the figure or perimeter.
 - Then write in numbers on the laterals. Again write the number sentence.
 - Draw other polygons with measurements. Ask volunteers to come to the chalkboard to determine perimeter.

Title: What's the Perimeter?
Group Size: entire class
Materials: geoboards, rubber bands

- Procedure(s):
- Pair up students, each pair having a geoboard and rubber bands.
 - One of the pairs designs a shape on the geoboard. The other student works out the perimeter of the shape.

Give the students a worksheet with drawings of polygons showing the length of each side and have them compute the perimeter.
 The first problem could be a polygon showing the length of three sides and the perimeter with the students uniting the lengths for determining the perimeter of a polygon, i.e.



Teacher observation.

District adopted text.

District adopted text.

District Resources

503

504



Student Learning Objective(s) A. The student knows the perimeter of polygons is determined by adding together the lengths of all sides. B. The student knows a polygon is a closed figure made up of straight line segments. C. The student is able to determine the missing sides of a polygon, given the other sides and the perimeter.

State Goal

1

District Goal

Program Goal

2,4,6

Suggested Activities: Grade(s) 7

Suggested Monitoring Procedures

Possible Resources

Title: Missing Side
Group Size: individual, small group
Materials: small strips of paper of various lengths with length written on the strip, cards giving number of sides and perimeter of desired figure.

2 cm

3 cm

4 cm

5
30 cm

4
40 cm

Assist students to identify impossible perimeters, i.e., if given perimeter is greater than or equal to twice the sum of lengths of the sides drawn.

District adopted text.

Procedure(s):

- . Have students draw a card at random.
- . Have students draw at random a number of strips equal to one less than the number of sides for the given figure, i.e., three sides, draw two; five sides, draw four.
- . Have students lay out figure using one strip for each side and determine the length of the remaining side.
- . NOTE: If given perimeter is impossible, draw additional strips and combine with another to form longer side.

District Resources

505

506

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

507

508

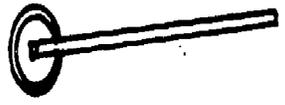


Student Learning Objective(s) <u>A. The student knows the circumference of a circle is found by</u>	State Goal	1
<u>multiplying the diameter times pi ($C = \pi \cdot d$ or $C = 2r \cdot \pi$).</u>	District Goal	
<u>B. The student is able to determine the diameter or radius given the circumference.</u>	Program Goal	2,4,6

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Measuring Wheel
Group Size: entire class
Materials: three inch plastic lids attached to one foot piece of lath at center of lid, i.e.,



Procedure(s):

- . Have the students place a mark on the edge of the lid.
- . Have students carefully roll the lid one revolution and measure the distance covered. (This should equal the circumference of the lid).
- . Have the students divide this distance by three (diameter of lid). The answer should come out 3.1 or very close to it which is the approximate value of π .
- . Have the students reverse the operation. (Students will find $\pi \cdot d = C$).

Variation

- . For variety or extension of the activity, use a 26" bicycle tire attached to a bike fork, compute circumference of the tire in classroom, then have the students use tire as measuring wheel to measure the school parking lot, football field, etc.

Worksheet of problems with the student given the circumference of a circle and asked to find the radius; asked to find the diameter.

District adopted text.

District Resources

Suggested Activities: Grade(s) _____

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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Suggested Monitoring Procedures

Possible Resources

District Resources

511

512

Student Learning Objective(s) <u>A. The student knows the circumference of a circle is found by</u>	State Goal	1
<u>multiplying the diameter times pi ($C = \pi \cdot d$ or $C = 2 \pi r$).</u>	District Goal	
<u>B. The student knows pi is the relationship between the circumference and the diameter of a circle, or approximately 3.1416. C. The student is</u>	Program Goal	2,4,6
<u>able to determine the circumference of a circle, given the diameter or radius.</u>		

Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Marty Math Makes a Pi</p> <p><u>Group Size:</u> pairs</p> <p><u>Materials:</u> cylinders (cans) of various diameters, string and ruler (or cloth tape measure), pencil, paper</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . In each pair, one student is to measure and one is to record. . Have students measure the diameter of a can. . Have students measure circumference with tape measure, string and ruler, or by rolling cylinder on flat surface exactly one turn. . Have students divide circumference by diameter. . Have students repeat with several cylinders. . Compare results of divisions. . NOTE: Students have found approximate value of pi. . Have students measure diameter of can and predict the approximate circumference, then measure to test prediction. 	Worksheet of problems with the student determining the circumference of a circle given the diameter; when given the radius.	<p>District adopted text.</p> <hr/> <p>District Resources</p>

513

514



Suggested Activities: Grade(s) _____ Suggested Monitoring Procedures Possible Resources

Suggested Monitoring Procedures

District Resources

515

516



SUBJECT: Mathematics

SPECIFIC AREA: Geometry: Area: rectangles, triangles, circles

Page
Suggested
Grade Placement
District
Placement

The student knows:

- . area is a two-dimensional surface.
- . area is measured in square units.
- . a square unit is represented by unit² (cm², dm²).
- . the area of a rectangle is determined by multiplying the length times width ($A = lw$).
- . the area of a parallelogram is determined by multiplying the base times the height ($A = bh$).
- . the area of a triangle is determined by multiplying one-half the base times the height ($A = \frac{1}{2}bh$).
- . the area of a circle is determined by multiplying pi times radius squared ($A = \pi r^2$).

263
263
263
263
273
273
277

6-8
6-8
6-8
6-8
6-8
6-8
7-8

4 5 6 7 8

The student is able to:

- * . compute the area of a rectangle given the length and width.
- . compute either the length or width of a rectangle given the area and one dimension.
- . compute the area of a parallelogram given the base and height.
- * . compute the area of a triangle given the base and height.
- . compute the height or base given the area and one dimension.
- * . compute the area of a circle given either the diameter or radius.
- . compute the radius or diameter of a circle given the area.

269
263
273
277

6-8
7-8
6-8
6-8
7-8
7-8

The student values:

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	- ENVIRONMENTAL EDUCATION	OTHER _____

513

519

Student Learning Objective(s) A. The student knows area is a two-dimensional surface. B. The student knows area is measured in square units. C. The student knows a square unit is represented by unit² (cm², dm²). D. The student knows the area of a rectangle is determined by multiplying the length times width (A = lw). E. The student is able to compute either the length or width of a rectangle given Related Area(s) _____ the area and one dimension.

State Goal

1

District Goal

Program Goal

2,4

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Demonstration: What is Area?
Group Size: entire class
Materials: piece of string twenty inches long, cloth large enough to cover a student desk

Observe students during demonstration and note students having difficulty with the concept being presented.

District adopted text.

Procedure(s):

- . Give a student the piece of string and ask the student to cover his/her desk with it. Ask the student why the string won't do the job. (String only covers one dimension, linear measurement, or length).
- . Then give the student the cloth to cover the desk. Discuss the second dimension. (The cloth has two dimension, length and width; therefore, the surface is covered by these two dimensions.

District Resources

520

521

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		District Resources

522

523

Student Learning Objective(s) A. The student knows area is measured in square units. B. The student knows a square unit is represented by unit² (cm², dm²). C. The student knows the area of a rectangle is determined by multiplying the length times width (A = lw). D. The student is able to compute either the length or width of a rectangle given the area and one dimension.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Area, Area
Group Size: individual, small group, entire class
Materials: scissors, pencil, paste, graph paper (preferably two contrasting colors)

Procedure(s):

- . Student receives a polygon drawn on graph paper.
- . Also he/she receives a rectangle or square which has the same area as the polygon.
- . Have the student calculate the area of the rectangle. Then cut the polygon on the lines into rectangles and squares. Fit and paste the pieces into the rectangle.
- . Have the student calculate the area of each piece and sum the areas, showing the total area is equal to the sum of the partial areas.
- . See diagrams on back of page.

Observation of students in the activity.
 Give the students a worksheet with several problems on finding the area of a rectangle when given the length and width.
 Vary the problems by having students solve problems when only the area and the length is given (find the width) or when the area and the width is given (find the length).

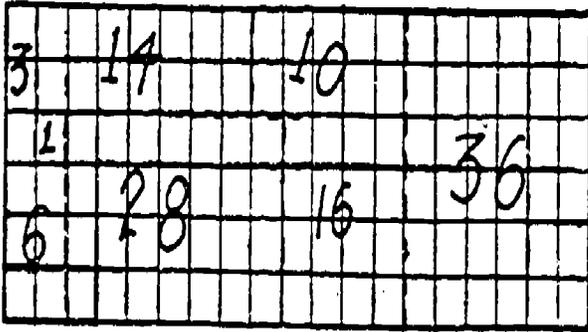
District adopted text.

District Resources

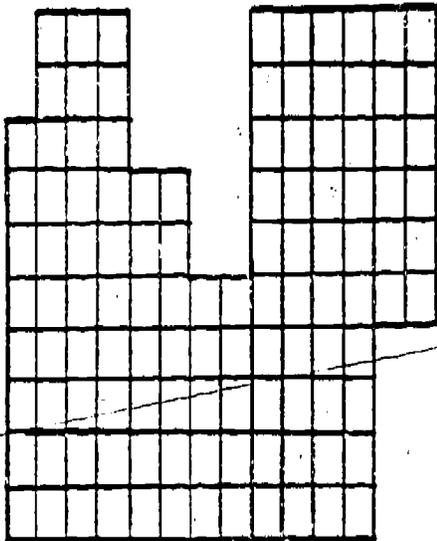
524

525





Rectangle of an area of 114 square units.



Polygon with area of 114 square units.

Variation:

- Start with rectangle and cut and paste to form a house plan, labeling rooms and area of each.

District Resources

527

Student Learning Objective(s) A. The student knows area is measured in square units. B. The student knows a square unit is represented by unit ² (cm², dm²). C. The student knows the area of a rectangle is determined by multiplying the length times width (A = lw). D. The student is able to compute the area of a rectangle given the length and width.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

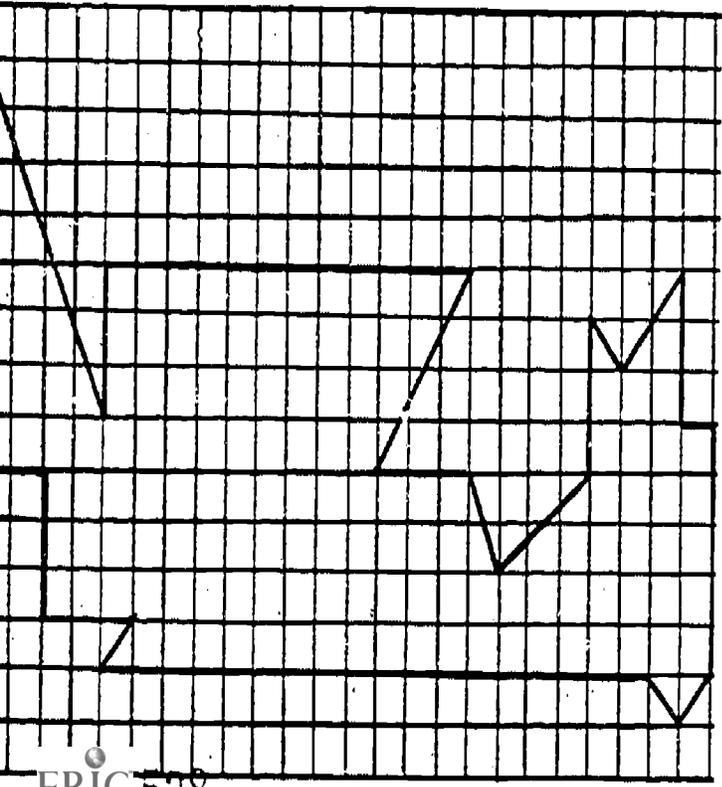
Title: Area of "Whatsit"?
Group Size: entire class
Materials: graph paper, straightedge

Give students a worksheet with rectangles showing the length and width and have them compute the area.

District adopted text.

Procedure(s):

- Each student draws a closed figure (Whatsit) on his/her graph paper using a straightedge. The figure must be:
 - drawn on the lines of the graph paper.
 - drawn from the corner of one square on the grid to the corner of another square (making a diagonal line) See illustration.
 - all straight lines, no curves!
- Students may then trade drawings and compute the area of the figure. (Student must compute area for both rectangles and triangles.)



District Resources

Suggested Activities: Grade _____

Suggested Monitoring
Procedures

Possible Resources

District Resources

Student Learning Objective(s) A. The student knows area is measured in square units. B. The student knows a square unit is represented by unit² (cm², dm²). C. The student knows the area of a rectangle is determined by multiplying the length times width (A = lw). D. The student is able to compute the area of a rectangle given the length and width.

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 7-8

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Paint the Room <u>Group Size:</u> entire class <u>Materials:</u> tape measures, label from paint can</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Divide the class into four groups; assign a wall of classroom to each group. Have each group compute the area of the painted surface on the assigned wall. Have the students read the paint can label to decide how much paint would be required to repaint the assigned wall. Have the groups check each other for accuracy. 	<p>Monitor the groups noting those having difficulty with the problem.</p> <p>Use a worksheet with problems on area of a rectangle. Vary the worksheet by using different rectangular shapes.</p>	<p>District adopted text.</p>

District Resources

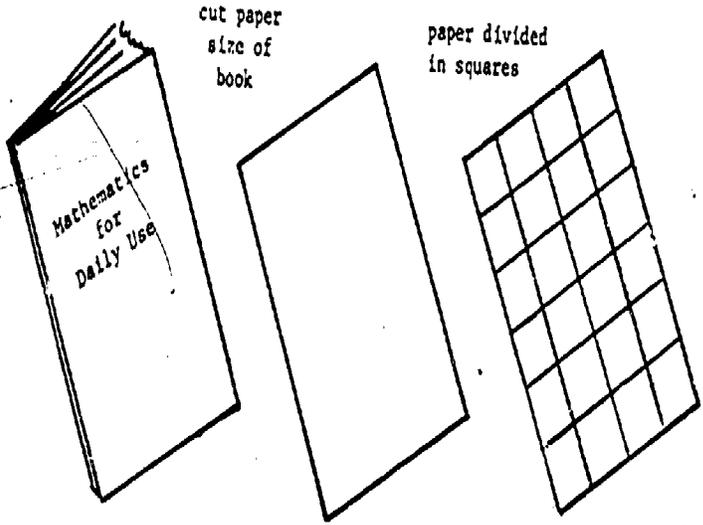
<p><u>Title:</u> Area = Square Units as Unit² <u>Group Size:</u> entire class <u>Materials:</u> a specific student text, a piece of paper cut to fit the surface of the student text</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Have the student divide the cut paper into squares. Ask the student to count the squares in order to find the area. Area is measured in square units. Point out that there are the same number of squares or units in each row; therefore, a more efficient way to count units is to multiply the two dimensions. <p>Area = L x W square units, or Area = L x W unit²</p>	<p>Observe students, noting those who master the concept easily and those having difficulty.</p>	<p>District adopted text.</p>
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Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources



District Resources

534

535

Student Learning Objective(s) A. The student knows area is measured in square units. B. The student knows a square unit is represented by unit² (cm², dm²). C. The student knows the area of a rectangle is determined by multiplying the length times width (A = lw). D. The student is able to compute either the length or width of a rectangle given the area and one dimension.

State Goal

District Goal

Program Goal

1
2,4,6

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Geoboard Area
Group Size: entire class
Materials: geoboards for one-half of the class, rubber bands

Teacher observation during activity.

Worksheet with problems to solve involving the area of a rectangle.

District adopted text.

Procedure(s):

- . Have students work in pairs. Give each pair a geoboard and rubber bands.
- . One of the pairs sets up a rectangle on the geoboard for the other two to solve for area.
- . Members of the pair alternate working with the geoboard.
- . Students may also give problems:
 i.e., Area is 24 cm² and length is 6 cm; find the width.
 Area is 24 cm² and width is 4 cm; find the length.

District Resources

Suggested Activities (Graders)	Suggested Monitoring Procedures	Possible Resources
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District Resources

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538

539

Student Learning Objective(s) A. The student knows area is measured in square units. B. The student knows a square unit is represented by unit² (cm², dm²). C. The student knows the area of a triangle is determined by multiplying one half the base times the height ($A = \frac{1}{2}bh$). D. The student knows the area of a parallelogram is determined by multiplying the base times the height ($A = bh$). E. The student is able to compute the area of a triangle given the base and height.

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 7-8

	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Triangles and Parallelograms Compared</p> <p><u>Group Size:</u> individual, small group, entire class</p> <p><u>Materials:</u> rectangle cut from construction paper, parallelogram(s) cut from construction paper, scissors, ruler, pencil</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Have the students measure length and width of rectangle and calculate area of the rectangle ($A = lw$). Have students draw a diagonal; then have them carefully cut on diagonal. Have the students observe the shapes of the resulting figures and compare the two triangles. Ask students if the triangles are the same size. Ask students to compare the area of one triangle to the area of the rectangle. Have students repeat this process with parallelograms ($A = bh$). Ask students if a formula can be derived for the area of the triangle. ($A = \frac{1}{2}bh$) 	<p>Observation of students during the activity.</p> <p>Give students a worksheet with figures of triangles and parallelograms. Have them indicate the formula to use when finding the area of each one. Have them compute the area using the formula they chose.</p>	<p>District adopted text.</p>
		<p>District Resources</p>

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

542

513

Student Learning Objective(s) A. The student knows the area of a circle is determined by multiplying pi times radius squared ($A = \pi r^2$). B. The student is able to compute the area of a circle given either the diameter or radius.

State Goal

District Goal

Program Goal

1
2,4,6

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

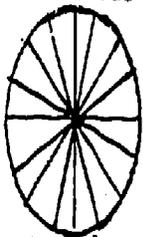
Title: Area of a Circle by Visual Aid
Group Size: individual, small group, entire class
Materials: circle of given radius as shown below, scissors, worksheet

Observation of the activity.
 Check worksheets and group students needing additional help.

District adopted text.
 ESD 189 film F1627 "Developing the General Equation of a Circle"

Procedure(s):

- Review radius (r), circumference (c), area of parallelogram ($A = bh$), \approx means one number is approximately equal to another.
- Have students cut out parts of the circle.



and put them together as a parallelogram.



$1/2xc$

Explain:

$$\begin{aligned}
 \text{Area of parallelogram} &= b \times h \text{ since } h=r \\
 &= b \times r \text{ since } b=1/2c \\
 &= 1/2 \times c \times r \text{ since } c = 2\pi r \\
 &= 1/2 \times 2 \times \pi \times r \times r \\
 &= 1 \times \pi \times r \times r \\
 &= \pi r^2 \text{ since area of parallelogram} = \text{area of circle}
 \end{aligned}$$

District Resources

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p style="text-align: center;">Area of circle = πr^2</p> <p>Have students do number of problems involving finding the area of a circle given the radius or diameter (worksheet).</p>		
		District Resources
<p style="text-align: center;">516</p>		<p style="text-align: center;">517</p>

Student Learning Objective(s) A. The student knows the area of a circle is determined by multiplying pi times radius squared ($A = \pi r^2$). B. The student is able to compute the radius or diameter of a circle given the area.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

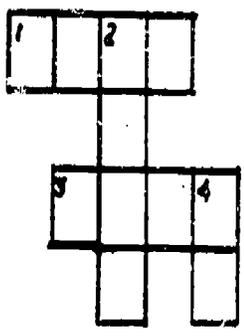
Title: Circle the Area
Group Size: individual, entire class
Materials: worksheets (crossword puzzles to be made by teacher)

Check crossword puzzles.
 Give students a worksheet with several problems on finding the area of a circle and some on computing the radius or diameter of a circle when given the area.

Procedure(s):

- Review formula $A = \pi r^2$; finding square roots. Use $3.14 = \pi$
- Explain process of finding the radius or diameter from the area of circle.
- Have two or three students do problems on the board.
- Have students do worksheets (crossword puzzles).
- Post the best worksheets on the bulletin board.

Example:



ACROSS:

- Find the area of a circle whose $r = 4$ cm.
- Find the area of a circle whose $r = 3$ cm.

DOWN:

- Find the area of a circle whose $r = 2$.
- Find the radius of a circle whose area is 11,304 square units.

District Resources

Suggested Activities: Grade(s)	Suggested Monitoring Procedures	Possible Resources
		District Resources
550		551

SUBJECT: Mathematics

SPECIFIC AREA: Geometry: Volume

Page

Suggested
Grade Placement

District
Placement

4 5 6 7 8

The student knows:

- . the volume of a rectangular prism is determined by multiplying the length times height times width ($V=lhw$).
- . the volume of a cube is determined by multiplying side (edge) times side times side ($V= s . s . s$).
- . the volume of a cylinder is determined by multiplying pi (π) times radius squared times height ($V= \pi r^2h$).
- . a cubic unit shall be represented by unit³ (cm^3, m^3, dm^3).

281 7-8

285 7-8

287 7-8

281 7-8

The student is able to:

- *. determine the volume of a rectangular prism given the length, height and width.
- *. determine the length, height or width of a rectangular prism given the volume and two of the three dimensions.
- *. determine the volume of a cube given the length of one side.
- . determine the length of a cube side given the volume.
- *. determine the volume of a cylinder given the radius (or diameter) and height.
- . determine the radius, diameter or height of a cylinder given the volume and one dimension.

281 7-8

281 7-8

285 7-8

285 7-8

287 7-8

289 7-8

The student values:

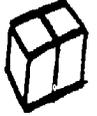
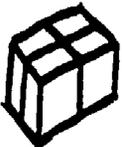
OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

Student Learning Objective(s) A. The student knows the volume of a rectangular prism is determined by multiplying the length times height times width ($V=lhw$). B. The student knows a cubic unit shall be represented by unit³ (cm^3, m^3, dm^3). C. The student is able to determine the volume of a rectangular prism given the length, height and width. D. The student is able to determine the length, height or width of a rectangular prism given the volume and two of the three dimensions.

1
District Goal
2,4
Program Goal

Suggested Activities: Grade(s) 7-8

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Dimensions of Rectangular Solids</p> <p><u>Group Size:</u> small group</p> <p><u>Materials:</u> sugar cubes (or wooden cubes)</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Select one cube and record dimensions of rectangular solid formed by one cube. <div style="display: flex; align-items: center; margin-bottom: 10px;">  $= 1 \times 1 \times 1 = 1 \text{ unit}^3$ </div> <ul style="list-style-type: none"> Select another <div style="display: flex; align-items: center; margin-bottom: 10px;">  $= 1 \times 2 \times 1 = 2 \text{ unit}^3$ </div> <ul style="list-style-type: none"> Another <div style="display: flex; align-items: center; margin-bottom: 10px;">  $= 1 \times 3 \times 1 = 3 \text{ unit}^3$ </div> <ul style="list-style-type: none"> Another <div style="display: flex; align-items: center; margin-bottom: 10px;">  $= 1 \times 4 \times 1 = 4 \text{ unit}^3$ </div> <p>and</p> <div style="display: flex; align-items: center;"> 555  $2 \times 2 \times 1 = 4 \text{ unit}^3$ </div>	<p>Teacher observation.</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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Continue in like fashion through any given number of cubes.
Possibilities:

Cubes Number of Rectangular Solids

1	1
2	1
3	1
4	2
5	1
6	2
7	1
8	3
9	2
10	2
11	1
12	3
13	1
14	2
15	3
16	3
17	1
18	4
19	1
20	4
etc.	

District Resources

Student Learning Objective(s) A. The student knows the volume of a rectangular prism is determined by multiplying the length times height times width. (V=lhw). State Goal
B. The student knows a cubic unit shall be represented by unit³ (cm³, m³, dm³). District Goal
C. The student is able to determine the volume of a rectangular prism given the length, height, and width. Program Goal
D. The student is able to determine the length, height, or width of a rectangular prism given the volume and two of the three dimensions.

1
2,4

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Discovering a Formula for Volume
Group Size: small group
Materials: . 6" x 4" x 2" box constructed from tagboard or chipboard
 . let 2" represent the height
 . 1" wooden cubes (obtain from almost any kindergarten classroom)

Procedure(s):

- . Have the student place layer of blocks to cover bottom of box.
- . What fraction of the capacity (volume) is filled?
- . How many blocks were used?
- . How many cubic inches do they represent?
- . Fill the remainder of the box with the one-inch cubes.
- . How many cubes were used in all?
- . How many cubic inches represents the volume?
- . Are we able to discover a short cut to counting in order to determine the volume?
- . Lead the students to discover the following formula:

$$V = l \times w \times h$$

District adopted text.

District Resources

Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Demonstration of Volume of Rectangular Prism</p> <p><u>Group Size:</u> entire class, small groups</p> <p><u>Materials:</u> stack of rectangular cards, or dominoes, separate piles of congruent rectangles cut from wood or cardboard, overhead projector</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Place one rectangle on overhead projector—observe shape. . Calculate surface area. . Place others on top and observe that shape has not changed, but the object now has height. . Demonstrate that the volume of the rectangular prism is a multiple of the volume of the first rectangle; thus, the volume is equal to the length times width (area) times height. . In small groups, calculate volume of stacks of rectangles using formula $V=lhw$. <p><u>Title:</u> The Rectangular Prism Problem</p> <p><u>Group Size:</u> partners</p> <p><u>Materials:</u> tagboard, masking tape, scissors, 1 cm cubes</p>	<p>Worksheet with rectangular prisms wherein the volume is given as well as two of the three dimensions. Students are to determine the missing dimension.</p>	
<p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . You and your partner have been assigned the task of constructing a rectangular prism whose volume is 300 cm^3. . The base is a rectangle 4 cm by 15 cm. . The measurement indicating the length of the altitude is lost. . Your first task is to take the given data and compute the altitude of the rectangular prism. . From tagboard draw a pattern for this rectangular prism. Put all the needed dimensions on your pattern. . Now construct the prism. . Place 1 cm cubes in your rectangular prism to prove it actually holds 300 of them. 		<p>District Resources</p> <p style="text-align: right;">582</p>

Student Learning Objective(s) A. The student knows the volume of a cube is determined by multiplying side (edge) times side times side ($V = s \cdot s \cdot s$). B. The student knows a cubic unit shall be represented by unit³ (cm^3, m^3, dm^3). C. The student is able to determine the volume of a cube given the length of one side. D. The student is able to determine the length of a cube side given the volume.
 Related Area(s) _____

State Goal	1
District Goal	
Program Goal	2,4

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Cubed
Group Size: three
Materials: two or more different game cards, chips or markers

District adopted text.

Procedure(s):

. One player acts as caller. The purpose of this activity is to find the volume of cubes given the length of one side. It is played like Bingo. The caller draws a card giving a letter and a number, i.e., C5. The number is the length in units of one side of a cube. The player then must cube the called number or $5^3 = 125$, and place a chip on the C125 spot on his card (if he/she has such a spot) and so on until a winner is obtained.

C	U	B	E	D
27	512	64	1	343
125	64	125	343	64
216	343	FREE	27	216
512	1	125	216	512
64	729	1	1000	27

District Resources

Caller Cards Needed:

- C-1 U-1 B-1 E-1 D-1
- C-2 U-2 B-2 E-2 D-2
- C-3 U-3 B-3 E-3 D-3
- C-4 U-4 B-4 E-4 D-4
- C-5 U-5 B-5 E-5 D-5
- C-6 U-6
- C-7

504

Suggested Activities: Grade(s)	Suggested Monitoring Procedures	Possible Resources
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Title: Quiz Down
Group Size: four or more
Materials: none

Teacher observation noting students who have difficulty with the concept. Group those students for reteaching.

Procedure(s):

- . Have students divide into two teams.
- . Each student must answer his/her question or he/she sits down. The last team standing is the winner.

Sample questions: 3

- What does cm mean?
- What is the volume of a cube whose side is 5m long?
- How do you find the volume of a cube?
- If the volume of a cube is 27 cu. in., what is the length of one of its sides?

Title: The Best of All Cubes
Group Size: small group
Materials: clear, plastic decimeter cube, 1 cm cubes or 10 rods (10 cm³) liter pitcher and water

Procedure(s):

- . Estimate how many 1 cm cubes it will take to fill the plastic container.
- . Have student write his/her estimate.
- . Cover the base of his/her large cube.
- . Count and record the number of cubes, that is, the number of cm³.
- . Determine how many layers of cubes will be needed to fill the large plastic container.
- . Determine a short cut method of computing the volume, a method other than counting.
- . Is the student able to write a short cut method as a formula?
- . Which holds the most water, the plastic container, or the liter pitcher?
- . Have the student prove his/her point.
- . Have the student determine the true relationship between the two containers.

District Resources

Student Learning Objective(s) A. The student knows the volume of a cylinder is determined by multiplying pi (π) times radius squared time height ($V = \pi r^2 h$). B. The student knows a cubic unit shall be represented by unit³ (cm^3, m^3, dm^3). C. The student is able to determine the volume of a cylinder given the radius (or diameter) and height.
 Related Area(s) _____

State Goal	1
District Goal	
Program Goal	2,4

Suggested Activities: Grade(s) 7-8

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Calculate, Construct, and Demonstrate</p> <p><u>Group Size:</u> pairs</p> <p><u>Materials:</u> tagboard, masking tape, scissors, graduated liter pitcher, water.</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . A cylinder that has never been constructed has a volume of 704 cm^3. It has a height of 14cm. The radius is unknown. . The students problem is to take the given data and to figure the radius. . From tagboard, have the student draw a pattern for the cylinder whose dimensions were given in part. . Have students put dimensions on the pattern, and construct this cylinder. . Have the student demonstrate to the class that the cylinder actually holds 704 cm^3 of water. 	<p>Teacher observation</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>

507

508



Suggested Activities: Grade(s)	Suggested Monitoring Procedures	Possible Resources
		District Resources
		570

Student Learning Objective(s) A. The student knows the volume of a cylinder is determined by multiplying pi (π) times radius squared times height ($V = \pi r^2 h$). State Goal 1
B. The student knows a cubic unit shall be represented by unit³ (cm^3, m^3, dm^3). District Goal
C. The student is able to determine the volume of a cylinder given the radius (or diameter) and height. Program Goal 2,4
D. The student is able to determine the radius, diameter or height of a cylinder given the volume and one dimension.

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Demonstration of Volume of Cylinder</p> <p><u>Group Size:</u> entire class; small group</p> <p><u>Materials:</u> checks, poker chips, coins, records, other discs of equal diameter; overhead projector</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Place one disc on overhead projector. Do calculations for surface area of disc (πr^2). Place other discs on top. Have small groups of students calculate volumes using other discs any number high ($\pi r^2 \times h$). Have the students determine if the surface area of the circle has changed. If so, what has changed. Have the students determine how the surface area and the volume are related. Have the students determine the volume of one checker and then two checkers. Have the students determine a formula to calculate the volume of any cylinder. 	<p>On a worksheet print the formula for determining the volume of a cylinder. Students are to graphically show how to arrive at the formula as a follow-up of the activity.</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

573

574

SUBJECT: Mathematics

SPECIFIC AREA: Graphs

Page
Suggested
Grade Placement
District
Placement

4 5 6 7 8

The student knows:

- . a picture graph (pictograph) is a visual representation of a set of data where each picture represents an object.
 - a. graphs which deal with whole numbers.
 - b. graphs where picture represents other than whole numbers.
- . a bar graph is a visual representation of a set of data where one unit may represent 1, 2, 5 or 10 items.
- . a line graph represents data by specific points on a grid, the points being joined by lines to form a visual representation (or pattern).
- . an ordered pair of numbers identifies a point on a grid.
- . a double bar graph compares two sets of data.
- . a circle graph shows information in terms of percentage of a fraction of the whole.
- . a table is a collection of data displayed in a specific order according to its variables.
- . a vertical axis is the vertical line along which a coordinate is measured.
- . a horizontal axis is the horizontal line along which a coordinate is measured.
- . coordinates are sets of numbers used to locate a point in space: (4, 3), (2, 1).

K-1
K-3
4-6
2-3
2-4
293 5-6
293 5-6
6-7
5-8
5-6
5-6
293 5-6

The student is able to:

- . read and construct a picture graph (pictograph) from given and/or collected data (whole numbers).
- . read and construct a picture graph (pictograph) from given and/or collected data (whole numbers and fractional parts).
- . collect data.
- . order or rank collected data in the form of a table.
- . plot data from tables.
- *. read and interpret data on a simple bar graph.
- . read and interpret data on a multiple bar graph.
- *. construct a bar graph from given data or from collected data.
- . construct a multiple bar graph from given data or from collected data.
- *. construct a single line graph from given data or from collected data.
- . construct a multiple line graph from given data or from collected data.
- . read and interpret data on a circle graph.
- . construct a circle graph from given data or collected data.

293 K-3
4-6
2-4
5-8
5-8
2-4
295 5-7
3-4
295 5-6
4-5
6-8
299 6-7
299 6-7

The student values:

575

3
 : OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING

CAREER EDUCATION

ENVIRONMENTAL EDUCATION

OTHER _____

577

578

Student Learning Objective(s) A. The student knows an ordered pair of numbers identifies a point on a grid. B. The student knows a double bar graph compares two sets of data. C. The student knows coordinates are sets of numbers used to locate a point in space. (4, 3), (2, 1). D. The student is able to read and interpret data on a multiple bar graph. E. The student is able to construct a multiple bar graph from given data or from collected data.

State Goal	1
District Goal	
Program Goal	2,4,6

Suggested Activities: Grade(s) 7

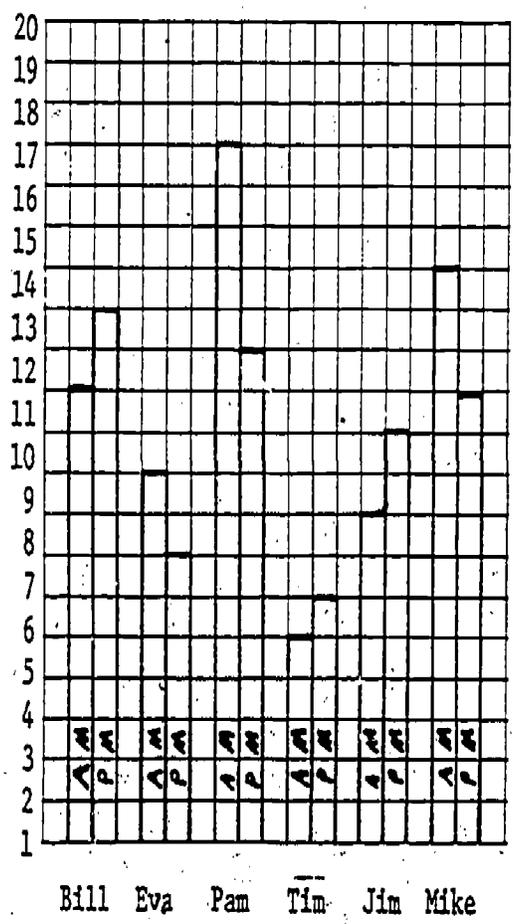
Suggested Monitoring Procedures

Possible Resources

Title: Double Tic-Tac-Graph
Group Size: pairs
Materials: paper, pencil, graph paper

Procedure(s):
 . Students play twenty games of tic-tac-toe in the morning, twenty in the afternoon, keeping track of the winners or cat games.
 . Then they construct a double bar graph to show the results.

Example:



District adopted text

District Resources

Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
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Variation: Have students from two classes polled as to their favorite sports, foods, colors and make appropriate graphs.

NOTE: Hangman or other short games could be used also.

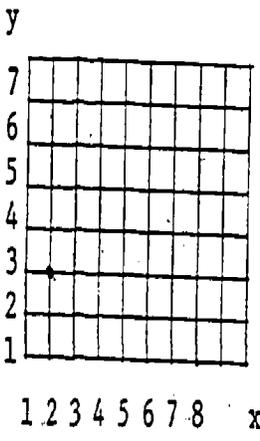
Title: Five in a Row
Group Size: entire class
Materials: overhead projector, transparency of an x-y coordinate grid, or worksheet with grid

Teacher observes responses and makes necessary corrections.

Procedure(s):

- . Explain terms before playing game.
- . Divide students into two teams. To one team at a time, call two numbers from zero to ten, i.e., 2,3.
- . Team members plot the two numbers on the grid, i.e. go two over on the x or horizontal axis and up three on the y or vertical axis, and mark the point where the two intersect.

Example:



- . Students then multiply the two numbers, i.e., $2 \times 3 = 6$. If answer is correct, team gets to keep their mark on the grid. If answer is incorrect, mark is removed.
- . The first team to set five marks in a row on the grid (horizontally, vertically or diagonally) wins the game.

District Resources

580

591

State Learning Objective(s) A. The student knows an ordered pair of numbers identifies a point on a grid. State Goal 1
B. The student knows a double bar graph compares two sets of data. District Goal
C. The student knows coordinates are sets of numbers used to locate a point in space. (4, 3), (2, 1). Program Goal 2,4,6
D. The student is able to read and interpret data on a multiple bar graph.
D. The student is able to construct a multiple bar graph from given data or from collected data.

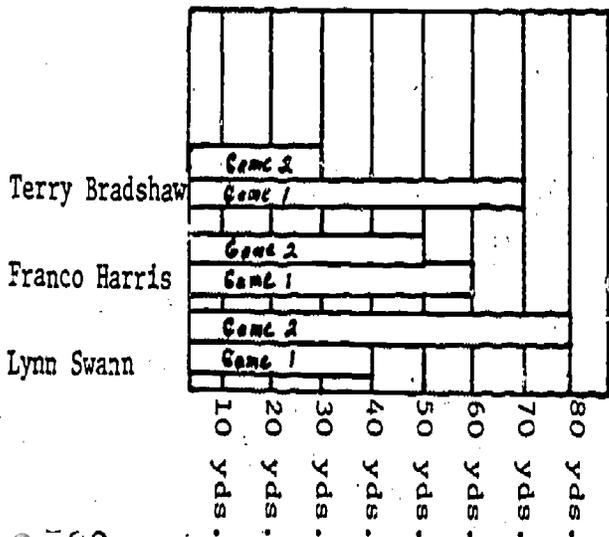
Suggested Activities: Grade(s) 7 Suggested Monitoring Procedures Possible Resources

Title: Bar None
Group Size: entire class
Materials: graph paper grid already dotted, strips of colored construction paper (each with its own value: red=1 unit, blue=2 units, green=5, black=10, orange=20)

Teacher leads responses and helps, if necessary.

- Procedure(s):
- . Give each student a grid worksheet and a collection of the unit strips.
 - . Pick some familiar topic such as number of yards different football players carry the ball per game.
 - . Put data on board.
 - . Help students put amounts (units) on a horizontal axis and subjects on vertical axis.
 - . Then have students pick colored strips that would equal same number as data on board.
 - . Arrange largest colored strip on bottom, then in order, etc.

Example:



District Resources



Suggested Activities: Grade(s) 7

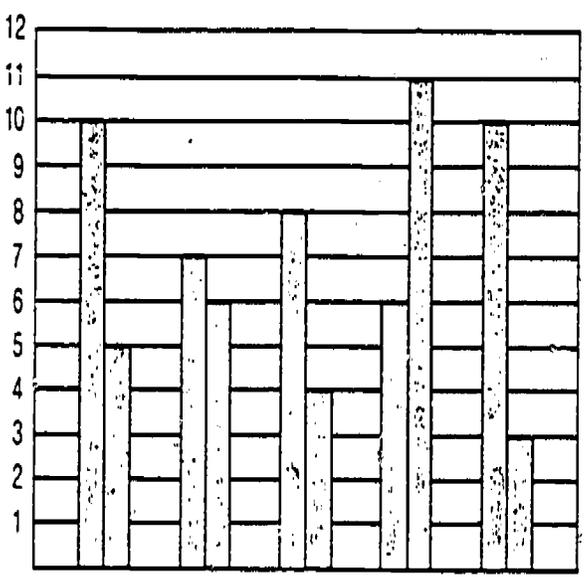
Suggested Monitoring Procedures

Possible Resources

Title: Graph Greats
Group Size: entire class
Materials: graph worksheet without units and names but with bars and units marked

Procedure(s):

- . Give pairs of students prepared graph worksheet. Have the bars and units marked but unnamed.
- . Let students name and mark the bars and units so anyone can interpret the graph.
- . When finished, students trade graph papers with other pairs of students.
- . Then ask students questions that would apply to all graphs such as:
 - What is the name of the graph?
 - What are units?
 - How does bar number 2 compare to bar number 5?
- . Responses can be oral or students may write them on paper and then discuss.



District Resources

584

585

Student Learning Objective(s) The student is able to construct a multiple line graph from given data or from collected data.

State Goal	1
District Goal	
Program Goal	2,4,6

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title:

Group Size: entire class

Materials:

Procedure(s):

- Construct a multiple line graph showing the enrollments of each of the rooms in the building. It is suggested that only three grades be charted.

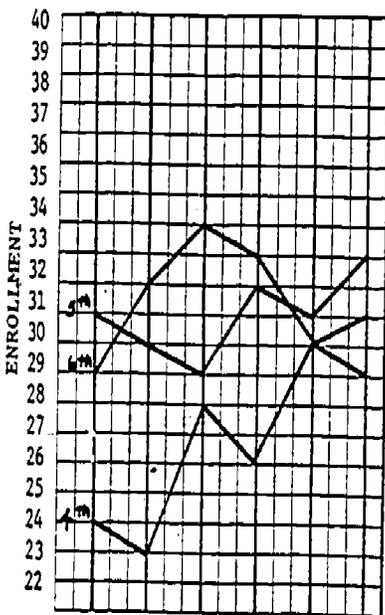
Example:

Room Enrollments

<u>4th Grade</u>	<u>5th Grade</u>	<u>6th Grade</u>
Rm. 1	Rm. 7	Rm. 13
2	8	14
3	9	15
4	10	16
5	11	17
6	12	18

District Resources

4th Grade (Red)
5th Grade (Green)
6th Grade (Brown)



586

587

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		District Resources

Student Learning Objective(s) <u>A. The student is able to read and interpret data on a circle graph.</u>	State Goal	1
<u>B. The student is able to construct a circle graph from given data or collected data.</u>	District Goal	
	Program Goal	2,4,6

Related Area(s) _____

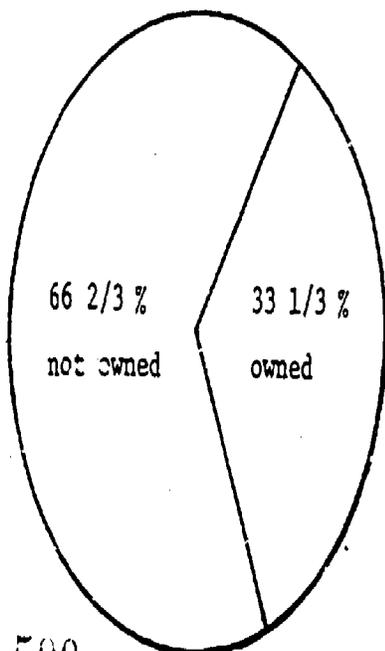
Suggested Activities: Grade(s) <u>7</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Monopoly Graphing
Group Size: small groups
Materials: Monopoly game, paper, pencil, colors

Procedure(s):

- . Have the students play a regular game of Monopoly for half an hour.
- . Stop at the end of the half-hour and collect data: the amount of property owned by each individual, the amount not owned.
- . Figure the percentages of owned and unowned property in relationship to all the property on the board.
- . Construct a circle graph to illustrate data.

District Resources



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		District Resources

502

503

SUBJECT: Mathematics

SPECIFIC AREA: Probability and Statistics

Page
Suggested
Grade Placement
District
Placement

The student knows:

- . that probability is expressed in ratios which is a comparison.
- . the probability of an event can be expressed as a fraction (common) or a per cent.
- . that probability is the number of desired outcomes compared to the number of possible outcomes. Example: The probability of heads up if a coin is flipped. Number desired: 1 (heads). Number possible: 2 (heads or tails). Probability is 1/2 or 50%.
- . the average (mean) of a set of scores is found by dividing the sum of the scores by the number of scores.
- . the median of a set of scores is the middle scores when the scores are in numerical order.

		4	5	6	7	8
303	6-8					
303	6-8					
	6-8					
	4-8					
305	6-8					

The student is able to:

- *. find the average of a set of scores.
- *. find the mean of a set of scores.
- *. find the median of a set of scores.
- find the probability of an event.

	4-6					
	7-8					
305	6-8					
303	6-8					

The student values:

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

505

596

Student Learning Objective(s) A. The student knows that probability is expressed in ratios which is a State Goal
comparison. B. The student knows the probability of an event can be expressed as a fraction (common) District Goal
or a per cent. C. The student knows that probability is the number of desired outcomes compared to
the number of possible outcomes. Example: The probability of heads up if a coin is flipped. Program Goal

1
1,4

Number desired: 1 (heads). Number possible: 2 (heads or tails). Probability is 1/2 or 50%. D. The student is able to find the probability of an event.

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

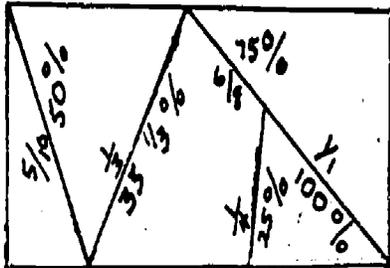
Title: Probability Puzzle
Group Size: small groups of two or more
Materials: paper, ruler, scissors

Give students a matching exercise using a ratio or fraction matched to a per cent, i.e.

District adopted text.

Procedure(s):

- Have each student make a design like the one below. Each segment in the design should have a probability expressed as a fraction or ratio on one side and its per cent on the other side.



- ___ 1/2 a. 40%
- ___ 1/4 b. 33 1/3%
- ___ 3/4 c. 50%
- ___ 1/3 d. 25%
- ___ 2/5 e. 20%
- ___ 5/8 f. 65%
- g. 75%

- Cut apart the design to make a puzzle.
- Have students trade puzzles and try to put them back together by matching probability fraction or ratio and its per cent.

Title: Probability Flip
Group Size: small groups of four to six
Materials: one coin for each student, one die per group

Procedure(s):

- Have the students flip the coin 100 times and keep data on the number of heads and tails.
- Have the students roll the die 100 times and keep data on the number of 1's, 2's, 3's, 4's, 5's and 6's rolled.

District Resources

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
---	---------------------------------	--------------------

- Explain to students how to find probability. Probability is a number that expresses our degree of belief that an outcome will occur. The formula for probability is:

$$\text{probability} = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

- Ask them to compare the computed probability of flipping a coin and rolling a die. How close did they come?
- Give students problems on finding probability of an event, i.e.

Betty is going to choose a date from the month of January at random. Give the probability that she will choose January 13, 1/31; January 21, 1/31; January 9 and 10, 2/31; January 11, 12, 14; 3/31; a date consisting of two digits 22/31; a date with one in it 13/31; a date with three in it 5/31; a date with an even number 15/31.

District Resources

600

500

Student Learning Objective(s) A. The student knows the median of a set of scores is the middle score when the scores are in numerical order. B. The student is able to find the median of a set of scores. State Goal

1
1,4

District Goal

Program Goal

Related Area(s) _____

Suggested Activities: Grade(s) 7-8

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Median, Median <u>Group Size:</u> entire class <u>Materials:</u> overhead transparency, overhead</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> . Indicate to students that sometimes statisticians describe data by using the term median, which means the middle score. . Note that the median has as many numbers above it as it has below it. . Use a list of scores such as math scores of a class to show how the median score is obtained, i.e., math scores 74, 62, 96, 74, 51, 43, 89, 89, 76, 89, 95, 76, 100. <p><u>Example:</u></p> <ol style="list-style-type: none"> 1. Arrange in order, lowest to highest: <ul style="list-style-type: none"> 100 96 95 89 89 89 76 - median 76 74 74 62 51 43 2. Point out that in cases where there are two middle numbers, the median is the middle of the two numbers: 	<p>Observe teams noting students having difficulty with the concept. Group for reteaching.</p>	<p>District adopted text</p> <hr/> <p>District Resources</p>

Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

Example: 95
 90
 83
 72 median is 71.5 or 77-1/2
 71
 64
 41
 40

- . Divide students into groups of four to eight. Have each group line up in front of a desk. Place a packet of identical problems on each desk (at least two per person).
- . Have the groups put the problems on the board with answers (in relay style).
- . The first team through (all correct) is the winner.

Title: Puzzle of Averages
Group Size: entire class
Materials: worksheet of puzzle

District adopted text
Mathematics Around Us, Scott
 Foresman and Co., Palo Alto,
 Calif., 1975

Procedure(s):

- . Give students the following puzzle, and indicate it is solved like a scrabble game, but has more liberal rules - read forward, backward, up, down.
- . Ask students to record the number of times they find the words, mean, median, mode statistics, and sample in the game.
- . Ask students which of the words occurs the median number of times; the mean, the mode.

Example:

 E D O M O D E
 E
 S D
 S T A T I S T I C S
 M M A
 O P N
 D L
 E D O M E D I A N
 E
 N A E M O D E
 N O
 D
 E

District Resources

604

603



Page
Suggested
Grade Placement
District
Placement

JECT: Mathematics

SPECIFIC AREA: Measurement: Time

4 5 6 7 8

The student knows:

- . the names of the days of the week.
- . the names of the months.
- . the names of the months in sequence.
- . the short hand of the clock is the hour hand.
- . the long hand of the clock is the minute hand.
- . the term "minute" refers to a unit of time measurement.
- . the term "hour" refers to a unit of time equal to 60 minutes.
- . the basic units of time covered in K-3; hour (60 minutes), half-hour (30 minutes), quarter hour (15 minutes), five minute intervals.

K-1
1-2
1-2
2
2
2
2
4

The student is able to:

- *. tell time to the hour.
- *. tell time to the half hour.
- *. tell time to the quarter hour.
- *. tell time by 5-minute intervals.
- *. write time in notation, i.e., 12:00, 12:30, 12:15, 12:55.
- . tell time in minutes from both clock face and digital.
- . use p.m. and a.m. notation in writing times.
- *. convert a unit of time to another unit (hours, minutes, seconds, days, weeks, months, years).
- . compute time intervals between two times.
- . read time charts.
- . solve work problems.

1-2
1-2
2-3
3-4
1-4
4
4
4-8
309 4-8
309 4-8
311 4-8

The student values:

...ation as a useful skill in time measurement.

K-3

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER <u>607</u>

600

607

Student Learning Objective(s) <u>A. The student is able to compute time intervals between two times.</u>	State Goal	1
<u>B. The student is able to read time charts.</u>	District Goal	
	Program Goal	1,2,3,4
Related Area(s) _____		

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
---	---------------------------------	--------------------

Title: Time to Travel
Group Size: small groups
Materials: per group: Greyhound time table, paper to keep track of travel, map of Pacific Northwest

- Procedure(s):
- Each group is given three days (72 hours) to travel around the Pacific Northwest.
 - They are to keep track of the time they are traveling and the time between travel. At the end of the third day, they must return to their starting point.
 - The group which has spent the most time on the bus and the least amount of time waiting is the winner.

District Resources

609

609

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

610

611

Suggested Activities: Grade(s) _____

Suggested Monitoring
Procedures

Possible Resources

District Resources

615

614



Page
Suggested
Grade Placement
District
Placement

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: Money

4 5 6 7 8

The student knows:

- . the basic units of money covered in K-3; penny, nickel, dime and quarter, half-dollar, dollar.

4-6

The student is able to:

- . write the value of money equal to or less than \$1,000.00
- *. count change totaling less than \$20.00, beginning with a certain value.
- . determine if the amount of change received from a purchase is correct.
- . make purchase and change from \$100.00 or less.
- *. add and subtract two money values using dollar and cents notation.
- . solve money problems using money by use of multiplication or division.
- . multiply or divide a given amount of money.
- . estimate money to the nearest dollar.

4-6

4-6

4-6

4-6

4-6

4-6

4-6

4-6

The student values:

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

617

618

JECT: Mathematics
 SPECIFIC AREA: Measurement: Metric Linear

Page
 Suggested
 Grade Placement
 District
 Placement

The student knows:

- *. the abbreviation for the commonly used metric units of lengths:
 mm — millimeter, cm — centimeter, m — meter, km — kilometer.
- . the less commonly used metric units of lengths: dm — decimeter,
 dam — decameter, hm — hectometer.
- . the prefix meaning: milli--1/1000, centi--1/100, deci--1/10,
 deca--10, hecto--100, kilo--1000.
- . meter may also be spelled metre.
- . the term millimeter refers to 1/10 of a centimeter and 1/1000
 of a meter.
- . the term centimeter refers to 1/100 meter and 10 millimeters.
- . the term decameter refers to 10 meters.
- . the term hectometer refers to 100 meters.

4-6
 4-6
 4-6
 4-6
 4-6
 4-6
 4-6
 4-6

The student is able to:

- . identify the unit of measurement most appropriate for a given
 task.
- *. measure a specific length to the nearest mm, cm, m.
- . estimate to within ±20% lengths of familiar objects in mm, cm,
 and m.
- . use the meter stick to measure to the nearest mm, cm.
- . convert from one linear measurement to another linear measurement
 within the metric system.
- . distinguish which units are more precise.
- . round to the least precise measurement for computational purposes.

4-5
 4-6
 4-6
 4-6
 5-6
 317 6-8
 317 6-8

The student values:

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: Linear

Page
Suggested
Grade Placement
District
Placement

The student knows:

- . the term "centimeter" refers to a metric unit of linear measurement.
- . the term "inch" refers to an English unit of linear measurement.
- . the term "meter" refers to a metric unit of linear measurement equal to 100 centimeters or 10 decimeters.
- . the term "foot" refers to a unit of linear measurement equal to 12 inches.
- . the term "yard" refers to a unit of linear measurement equal to three feet or 36 inches.
- . the term "half-inch" is a unit of linear measurement.
- . the term "quarter-inch" is a unit of linear measurement.
- . two quarter-inches equal one half-inch.
- . four quarter-inches equal one inch.
- . four quarter-inches equal two half-inches.
- . the term "kilometer" is a metric unit of linear measurement.
- . the term "perimeter" refers to the linear measurement around a given space (geometry).
- . the term "mile" is an English unit of linear measurement used to indicate distance.

	4	5	6	7	8
1					
1					
2					
2					
2					
3					
3					
3-4					
3-4					
3-4					
3-4					
3-4					
3-4					

The student is able to:

- *. compare size using the following terms: longer, smaller, largest, smallest, taller, tallest, longest, shortest, same.
- *. measure an object(s) using centimeters.
- *. measure the length of an object(s) using inches.
- *. measure length using a meter stick.
- *. measure length using a foot ruler.
- *. measure length using a yardstick.
- *. estimate lengths..
- . measure a specific length to the nearest half-inch.
- . measure a specific length to the nearest quarter-inch.
- . measure the perimeter of a simple geometric figure.
- . compute distance in miles.

K-1
1
1
2
2
2
2-3
3-4
3-4
3-4
3-4

The student values:

620

Student Learning Objective(s) <u>A. The student is able to distinguish which units are more precise.</u>	State Goal	1
<u>B. The student is able to round to the least precise measurement for computational purposes.</u>	District Goal	
	Program Goal	1,2,6

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> How Big?</p> <p><u>Group Size:</u> small groups</p> <p><u>Materials:</u> sets of twine cut to specific metric lengths, task cards</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Teacher makes sets of twine metric linear; measures and labels them. The teacher assembles sets in packets. Specify that objects are to be measured in more than one unit, and that items can be measured by combinations of measures, i.e., meters and cm. <p><u>Example:</u></p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">TASK CARD</p> <p>Measure how high, then how wide the following items are: door, window and the teacher's desk. Express the measure in metres and centimeters. If the measure were rounded off to the most precise unit what unit would it be?</p> </div>	<p>Teacher checks completed task cards.</p>	<p>District adopted text.</p> <hr/> <p>District Resources</p>



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

Title: Measure with Metrics
Group Size: small group, entire class
Materials: meter sticks, centimeter ruler, a variety of items to measure, i.e., paperclip, empty .22 caliber casing, baseball, cookie, stick of chewing gum, BB, room, baseball bat, etc.

- Procedure(s):
- . Give students a worksheet with a list of items to measure.
 - . Have students write in what measuring unit they should use to measure the item, i.e., meter stick, centimeter ruler.
 - . Have students estimate the length of the item, then measure it and check their estimates.

Example:

Item	measuring unit		measure- ment
	selected	estimate	
baseball bat	meter stick	3/4 meter	1 meter
pencil	centimeter ruler	10 cm.	17 cm.

Basic Metric Measurement Skills,
 Lola May and Vernon Hood, Media
 Research Associates, 1976

District Resources

621

623



SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: Metric Capacity

Page
Suggested
Grade Placement
District
Placement

The student knows:

- *. the abbreviation of the commonly used metric units of capacity (volume): ml - milliliter, l - liter.
- . the abbreviation for the less commonly used metric units of capacity: cl - centiliter, dl - deciliter, dal - decaliter, hl - hectoliter.
- . the prefix meanings: milli---1/1000, centi---1/100, deci---1/10, deca---10, hecto---100, kilo---1000.
- . liter may also be spelled litre.
- . the term milliliter refers to 1/1000 of a liter.

	4	5	6	7	8
4-6					
4-6					
4-6					
4-6					
4-6					

The student is able to:

- . use the graduated cylinder to measure to the nearest ml and l.
 - *. use l and ml to measure liquids.
 - . estimate capacity to within $\pm 20\%$ of the capacity.
 - . convert from one measurement to another measurement within the metric system.
 - . distinguish which units are more precise.
- NOTE: for cubic measurement of volume see GEOMETRY.

4-6					
4-6					
4-6					
5-6					
6-8					

321

The student values:

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: **Mathematics**

SPECIFIC AREA: **Measurement: Capacity (Volume)**

Page
Suggested
Grade Placement
District
Placement

4 5 6 7 8

The student knows:

- . the term "liter" refers to a metric unit of volume measurement.
- . the terms "cup," "pint," "quart" and "gallon" refer to units of capacity measurement.
- . two cups equal one pint.
- . four cups or two pints equal one quart.

1-3
1-3
1-4

The student is able to:

- . measure capacity using the liter as the unit of measurement.
- * . measure capacity using a "cup," "pint," "quart," or "gallon" as the unit of measure.

1-3
1-3

The student values:

Student Learning Objective(s) <u>The student is able to distinguish which units are more precise.</u>	State Goal	1,6
	District Goal	
	Program Goal	2,4,6
Related Area(s) _____		

Suggested Activities: Grade(s) 7-8

	Suggested Monitoring Procedures	Possible Resources
<p><u>Title:</u> Metric Measures <u>Group Size:</u> small group, entire class <u>Materials:</u> sets of containers</p> <p><u>Procedure(s):</u></p> <ul style="list-style-type: none"> Point out to students that in metric capacity the basic units are the liter (l) and the milliliter (ml). Metric cups are also used as an aid in measuring. Show students a chart for comparison as follows: 1000 milliliters = 1 liter 250 milliliters = 1 metric cup 4 metric cups = 1 liter Have students measure liquid and dry items referring to the chart when necessary, i.e., water, sand, flour, cornmeal, juice. Give students a worksheet and have them express answers in the most precise metric terms. 	<p>Have students choose the most sensible measure:</p> <ol style="list-style-type: none"> milk carton 2 ml 2 l juice pitcher 25 ml 1 l sack of cornmeal 380 ml 5 l one metric cup of water 250 ml 1 l cottage cheese box 125 ml 3 l 	
<p><u>Example(s):</u></p> <ol style="list-style-type: none"> A recipe calls for 1/5 metric cup: how many milliliters are needed? (50 ml) How many metric cups are 1-1/2 liters? (6 ml) Measure two metric cups of juice. How many milliliters is that? (125 ml) How many liters? (1-1/2 l) 		<p>District Resources</p>

627

628



Suggested Activities: Grade(s) _____

Suggested Monitoring Procedures

Possible Resources

District Resources

620



620

SMALL SCHOOLS PROJECT - Working Copy

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: Metric Weight

Page

Suggested
Grade Placement

District
Placement

4 5 6 7 8

The student knows:

- *. the abbreviation for the commonly used metric units of weight:
mg - milligram, g - gram, kg - kilogram.
- . the less commonly used metric units of weight: cg - centigram,
dg - decigram, dag - decagram, hg - hectogram.
- . the prefix meanings: milli - 1/1000, centi - 1/100, deca - 10,
hecto - 100, kilo - 1000.
- . the term "gram" refers to weight.
- . the term "kilogram" refers to 1000 grams.
- . the term "milligram" refers to .001 grams.
- . the term "metric tonne" refers to 1000 kilograms.
- . the difference between mass and weight.

4-6
4-6
4-6
325 4-6
325 4-6
4-6
325 6-8
8

The student is able to:

- . identify the unit of measurement most appropriate for weighing a
given object.
- *. measure the weight of an object to the nearest gram.
- . estimate within $\pm 20\%$ the weight of a familiar object.
- . use a balance scale to weigh objects.
- . convert from one unit of weight to another unit of weight within
the metric system.
- . distinguish which units of weight are more precise.

4-5
4-6
4-6
4-6
5-6
329 6-8

The student values:

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING
CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____

633

Student Learning Objective(s) A. The student knows the term "gram" refers to weight. B. The student knows the term "kilogram" refers to 1000 grams. C. The student knows the term "metric tonne" refers to 1000 kilograms.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title:
Group Size: entire class
Materials: worksheet

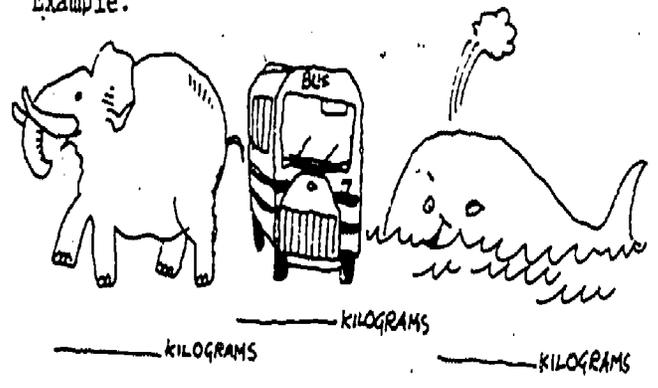
Teacher observation.

Kit: "Metric Measurement", Educators Library of Media for Staff Development, vol. 3 1976
ESD Catalog
F: "Metre and Litre are Neater" ibid.

Procedure(s):

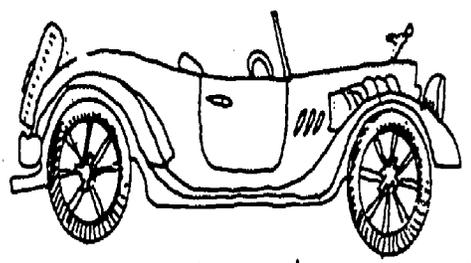
- Explain that 1000 kilograms equal 1 metric tonne.
- Give students worksheets illustrated with heavy objects. Include the weight in kilograms beneath each illustration.
- Students round the weight to the nearest metric tonne.

Example:



- Variation: Give students weights reported in metric tonne and have them convert to kilograms.

Example:



2t = kg (ANS. 2000)

District Resources

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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District Resources

636

637

Student Learning Objective(s) The student knows the difference between mass and weight.

State Goal	1
District Goal	
Program Goal	2,4

Related Area(s) Science

Suggested Activities: Grade(s) 8

Suggested Monitoring Procedures

Possible Resources

Title: Other Planets
Group Size: small group or entire class
Materials: world almanac, encyclopedia, science text

Peruse student charts to check their knowledge of the concept.

Science Instructor

Procedure(s):

- . Have students develop a chart of the planets with columns for distance from the sun, mass, force of gravity and student mass and weight.
- . Use science text, almanacs, encyclopedias to obtain the needed information.
- . Have students convert gravitational pull of other planets in relationship to the earth to determine their weight on the various planets.
- . NOTE: The chart will indicate that weight will vary on each of the planets whereas mass remains constant.

Example:

Planet	Mass	DISTANCE FROM EARTH	GRAVITATIONAL PULL AT SURFACE (EARTH = 1)	STUDENT MASS	WT.
Mercury					
Venus					
EARTH					
MARS					
JUPITER					
Saturn					
Uranus					
NEPTUNE					
Pluto					

District Resources

*NOTE - The gravitational pull on the surface may be given in different terms in references. The teacher may want to use a common set of figures for this chart.

Suggested Activities: Grade(s) <u>8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: From Here to Outer Space
Group Size: small group, entire class
Materials: cartoon, reference books

Metric Ease, Carne Bennett

Procedure(s):

- . Point out that in common usage the term weight is used when mass is measured. Actually, weight is a measure of gravitational force exerted by a planet on an object whereas mass is a measure of the amount of matter in an object. Weight varies while the mass of an object does not. For instance, on the moon a person would weigh less than on earth but the mass of the person would be the same in both places.
- . Student uses cartoon and finishes worksheet.
- . The student finds relative weights for given weights on the different planets.

Example:

Mass and Weight

You are an astronaut. Weigh yourself in kilograms and complete the information as in the cartoons.

<p>Earth -</p>  <p>mass: 78 kg scale reads: 78 kg</p>	<p>EARTH</p> <p>mass _____</p> <p>scale reads _____</p>
<p>Space</p>  <p>mass: 78 kg scale reads: 0 kg</p>	<p>SPACE</p> <p>mass _____</p> <p>scale reads _____</p>
<p>Moon</p>  <p>mass: 78 kg scale reads: 13 kg</p>	<p>MOON</p> <p>mass _____</p> <p>scale reads _____</p>

Divide your earth weight by 6 to find your moon weight.



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District Resources

611

Student Learning Objective(s) The student is able to distinguish which units of weight are more precise.

State Goal

1

District Goal

Program Goal

2,4

Related Area(s)

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

Title: Heads or Tails?

Group Size: small group

Materials:

Procedure(s):

- . On a sheet of paper write the names of all players across the top of the page. Down the left margin write the names kilogram, hectogram, decagram, gram, decigram, centigram and milligram.
 - . A numeral such as 435.678 is written before the game starts and represents a measure of 435.678 grams. (Use a six-digit numeral).
 - . Five coins are flipped simultaneously and the first player can then choose to move the decimal point to the right as many places as he/she has "heads" showing or to the left as many places as he/she has "tails" showing.
 - . In no case may player form a numeral that requires the addition of zeros to place the decimal point the proper number of places.
 - . If a movement to the right or left cannot be accommodated with the results of his/her coin toss, player must pass.
 - . After the decimal point has been moved the player must correctly identify the new measure name in terms of the previous name.
- For example: If the original number represented a measure of 435.678 grams and the player chose to move the decimal three places to the right, the new number would represent a measure of 435.678 milligrams.

Let's Play Games in Metric,
Henderson, National Textbook Co.

District Resources

Suggested Activities: Grade(s) 7-8

Suggested Monitoring Procedures

Possible Resources

- . If player correctly identifies the new measure he/she places a check (✓) under his/her name across from the proper measure (milligram).
- . The play then moves to the next person, who begins with the measure 435.678 milligrams and flips the coins to determine the placement of the decimal point.
- . Play continues in this manner until someone has completed checking all the measure names listed on the scoresheet.
- . The first player to do this is the winner.
- . Players will develop various strategies to move the decimal point to complete their columns and to block the completion of their opponents' columns.

District Resources

621

615



Page
Suggested
Grade Placement
District
Placement

SUBJECT: Mathematics
SPECIFIC AREA: Measurement: Metric Temperature

4 5 6 7 8

The student knows:

- . degree Celsius is used to measure temperature.
- *. Celsius and Centigrade are the same.
- . the abbreviation for Celsius is C.
- *. common temperature references: 0°C is freezing point of water, 37°C is normal body temperature, 100°C is boiling point of water.

3-4
3-4
3-4
333 3-4

The student is able to:

- *. read a thermometer.
- *. calculate differences in degrees.

333 4-8
335 4-8

The student values:

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION	MUSIC	SOCIAL STUDIES
ART	LANGUAGE ARTS	MATH
SCIENCE	HEALTH	READING

CAREER EDUCATION	ENVIRONMENTAL EDUCATION	OTHER _____
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624

623



Student Learning Objective(s) <u>A. The student knows common temperature references: 0°C is freezing</u>	State Goal	1
<u>point of water, 37°C is normal body temperature, 100°C is boiling point of water. C. The student is</u>	District Goal	
<u>able to read a thermometer.</u>	Program Goal	1,2,4,6

Related Area(s) _____

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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Title: Celsius Bingo
Group Size: small group, entire class
Materials: blank Bingo cards, 3" x 5" cards with descriptions of temperatures

- Procedure(s):
- Teacher writes a list of common Celsius temperatures on chalkboard.
 - Students prepare Celsius Bingo cards by writing the temperatures in the blank squares in any order.
 - Teacher (or student) reads temperature descriptions from 3" x 5" cards and students cover the corresponding temperatures on Bingo cards with some sort of marker. (One card at a time.)
 - Student first covering a row horizontally, diagonally or vertically wins.

Example:

<u>Temperatures on Bingo Cards</u>	<u>Temperature descriptions on 3"x5" cards</u>
100°C	water boils
37°C	normal body temp.
0°C	water freezes
28°C	summer day
82°C	car radiator
52°C	drinkable tea
-1°C	winter day

- Other temperatures that can be used are:
 outdoor sport weather - football, soccer, etc.
 water in a fish bowl
 oven temperature for baking brownies

District Resources



Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
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Title: Celsius Temperatures
Group Size: entire class
Materials: centimeter graph paper

Teacher observation.

Metric Tasks, Skill Developmental Activities, Marilyn Sue Corey, Love Publishing Co., Denver, Colo. Task 36.

- Procedure(s):
- Have students construct a Celsius thermometer by doing the following:
 - Students draw on centimeter graph paper a number line 110 cm long. Have them make the thermometer 3 cm wide. (Add strips of graph paper if necessary to make strip long enough.)
 - Students number each line starting at -5°C at the bottom, and numbering by ones to the top of the thermometer. (Position thermometer vertically when writing numbers.)
 - Have students mark on thermometer the following degrees:

body temperature	37°C
boiling H_2O temperature	100°C
freezing temperature	0°C
summer day	28°C
winter day	-1°C
fish bowl temperature	—
oven temperature for baking brownies	—

District Resources

Example:

		3
		2
		1
		0
		-1
		-2
		-3
		-4
		-5

652

651



Student Learning Objective(s) <u>A. The student knows common temperature references: 0°C is freezing point of water, 37°C is normal body temperature, 100°C is boiling point of water. B. The student is able to calculate differences in degrees.</u>	State Goal	1
	District Goal	
	Program Goal	1,2,4,6
Related Area(s)		

Suggested Activities: Grade(s) <u>7-8</u>	Suggested Monitoring Procedures	Possible Resources
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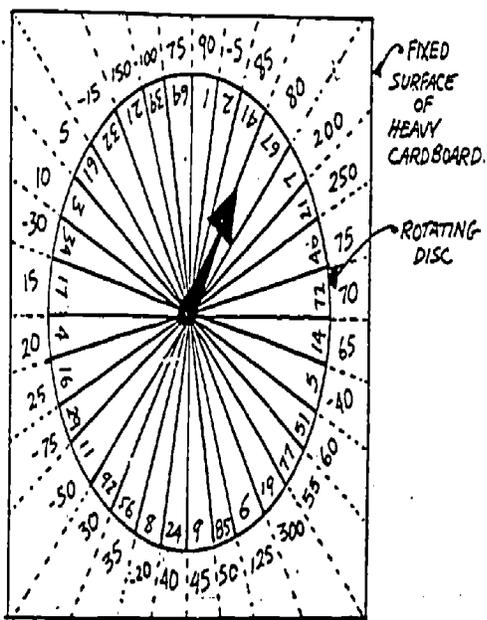
Title: Celsius Subtract
Group Size: small groups
Materials: oak tag temperature spinners (as shown below)
Procedure(s):

- Construct spinner(s) as illustrated below.
- Students in small group take turns spinning.
- Students calculate net difference in degrees Celsius by subtracting number on rotating disc from number on fixed surface that spinner lands on. (Teacher may need to check answers.)
- If answer is correct, student counts that answer as points.
- If answer is incorrect, student subtracts that answer from total points.
- Student accumulating 500 points first wins.

Variation:

- The center disc can be rotated to introduce new subtraction facts.

Example:



District Resources

654

Suggested Activities: Grade(s) _____	Suggested Monitoring Procedures	Possible Resources
		District Resources

District Resources

625

656

SUBJECT: Mathematics

SPECIFIC AREA: Measurement: English

Page
Suggested
Grade Placement
District
Placement

The student knows:

- the basic units of the English system of linear measurement and their abbreviations: in.--inch, ft.--foot(feet), yd.--yard, mi.--mile.
- the basic units of the English system of volume and their abbreviations: c.--cup, pt.--pint, qt.--quart, gal.--gallon.
- the basic units of the English system of weight and their abbreviations: oz.--ounce, lb.--pound, t.--ton.
- the basic unit of temperature is Fahrenheit and the common reference freezing of water is 32°, body temperature is 98° and boiling water is 212°.

4 5 6 7 8

4

4

4

4-6

The student is able to:

- maintain the skills learned in grades K-3.

4-8

The student values:

657

OPTIONAL GOALS AND ACTIVITIES

PHYSICAL EDUCATION

MUSIC

SOCIAL STUDIES

ART

LANGUAGE ARTS

MATH

SCIENCE

HEALTH

READING

CAREER EDUCATION

ENVIRONMENTAL EDUCATION

OTHER

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