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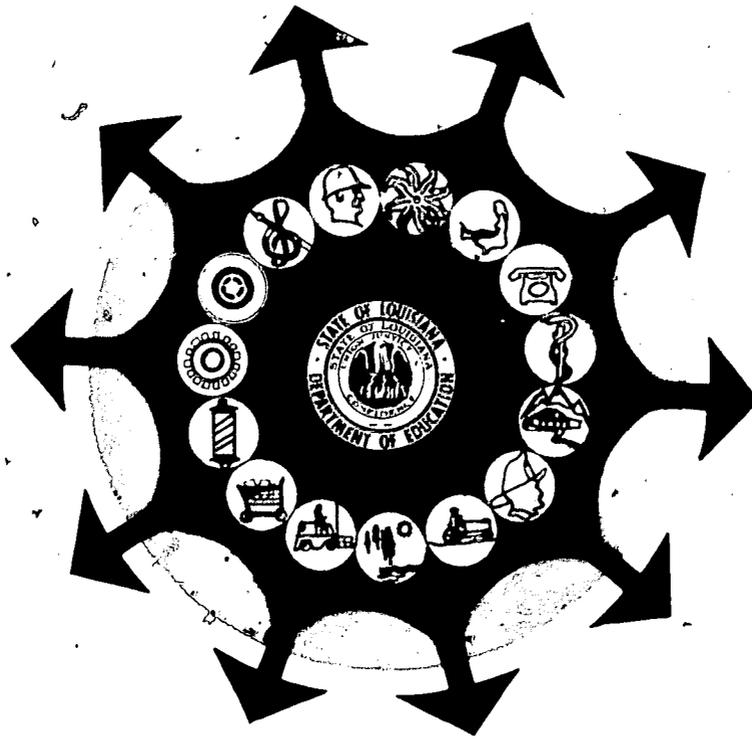
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ABSTRACT

The curriculum guide for secondary level, career-oriented General Mathematics Part 2, correlates performance objectives in basic mathematics with career-oriented concepts and activities. The material is designed to lead the student in a systematic development that provides for continuous progress. The guide is in outline format, providing a curriculum outline, performance objectives, and related (career-oriented) concepts, objectives, and learning activities. The guide encompasses the topic headings of refresher arithmetic and algebra; informal geometry; mathematics related to shop, construction, nursing, homemaking, sports, and travel; and mathematics for electricians. (NJ)

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MATHEMATICS CURRICULUM GUIDE - CAREER ORIENTED GENERAL MATHEMATICS II

BULLETIN NO. 1281

Louisiana State Department of Education
Louis J. Michot, Superintendent
1974

U.S. DEPARTMENT OF HEALTH,
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MATHEMATICS CURRICULUM GUIDE

(CAREER ORIENTED)

GENERAL MATHEMATICS II

LOUISIANA STATE DEPARTMENT OF EDUCATION

Louis J. Michot
State Superintendent

May 1974

VT 102467

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PREFACE

The first working draft of the Mathematics Curriculum Guide Secondary Level was distributed for field testing for the 1973-74 academic year. Feedback indicated that the materials were appropriate for the purposes as stated in the original preface.

The materials presented herein have been changed from the original only in that the mathematical language has been made as uniform as possible for clarity and to conform to the texts adopted by the State of Louisiana. Additional career learning activities have been introduced.

The format has been revised so that it should be easier to correlate the curriculum outlines and performance objectives with the related career oriented concepts and learning activities.

The reader who is seeing the materials for the first time can be assured that the career approach of these guidelines in no way weakens the present program. As in all good educational procedures, materials are included so that all levels may be served. In addition to the ambitious minimum recommendations the guidelines contain ample materials for those students who need to be challenged.

Mathematics is embedded in all of the disciplines and makes a solid base for experiences in career education. This is borne out by the numerous references and career activities from the spectrum of life.

The student is led in a systematic development that is designed to provide for continuous progress. Dignity of the person was always foremost in devising and revising the guidelines. The goals were set to give maximum development of the individual through all types of educational experiences.

Finally, our schools will always have a basic curriculum. The methods of instruction will be constantly changing, and the counselors will continue to lend their influence in guiding the pupil. The career education goals which are interwoven with the traditional will help make more productive citizens of Louisiana's most important assets, its children.

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GENERAL MATHEMATICS II

GENERAL MATHEMATICS II

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

I. Refresher Arithmetic

I. Refresher Arithmetic

A. Whole Numbers (0, 1, 2, 3...)

A. To demonstrate an understanding of whole numbers and to develop proficiency in basic arithmetic operations, the student should be able to:

1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Order of multiple operations

1. Add a column of multi-digit numbers and check by adding in the reverse order.
2. Compute the difference of two given multi-digit numbers and check by the addition method.
3. Compute the product of two multi-digit numbers and check by casting-out-nines.
4. Compute the quotient of multi-digit numbers, and check by the multiplication process.
5. Apply the correct order to an expression involving multiple operations

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

I. Career Concept

Careers require different levels of competence in computation.

Performance Objectives

- A. An airplane pilot uses whole numbers to determine the average flying speed and the flight time for a given trip.

A principal of a school used whole numbers to compute the total enrollment.

- A. An airplane pilot flew an airplane 2,175 miles from Portland, Oregon, to Atlanta, Georgia in 6 hours. Compute the average flying speed. At the same rate, how long will it take to fly from Los Angeles to Indianapolis, a distance of 1,810 miles?

In the Franklin High School there are 5 classes with 32 pupils on roll, 13 classes with 30 pupils, and 12 classes with 28 students. Find the total enrollment of the school.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

B. Number theory

1. Definitions
 - a. Natural number
 - b. Factor
 - c. Even
 - d. Odd
 - e. Common factor
 - f. Greatest common factor
 - g. Prime number
 - h. Composite number
 - i. Multiple
 - j. Common multiple
 - k. Least common multiple
 - l. Prime factorization
2. Fundamental theorem of Arithmetic (unique Prime Factorization Theory)

C. Fractional numbers

B. To demonstrate an understanding of basic number theory, the student should be able to:

1. Define and give examples of:
 - a. Natural number
 - b. Factor
 - c. Even
 - d. Odd
 - e. Common factor
 - f. Greatest common factor (G. C. F.)
 - g. Prime number
 - h. Composite number
 - i. Multiple of a number
 - j. Common multiple
 - k. Least common multiple (L. C. M.)
 - l. Prime factorization
2. Express a number as a product of its prime factors.

C. To demonstrate an understanding of and proficiency in the use of fractional numbers, the student should be able to:

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

7
E. A mathematician applies the concept of prime numbers and composite numbers to the explanation of the Fundamental Theorem of Arithmetic.

B. The fundamental theorem of arithmetic states that every composite number can be expressed as a product of primes. Express each of the following numbers as a product of primes: 24, 18, 32.

C. A ship captain uses fractional numbers to compute the number of nautical miles a ship will travel at a given rate of speed in a given time.

C. A ship steams at $14 \frac{1}{2}$ knots. At that rate how many nautical miles does it go in $6 \frac{1}{4}$ hours? (1 knot = 1 nautical m. p. h.)

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

1. Common fractions
 2. Decimal fractions
 3. Comparing fractional numbers
 4. Scientific notation
- D. Ratio, Proportion, and Percent

1. Definitions
 - a. Lowest terms
 - b. Problem solving
2. Percent
 - a. Conversion

1. Add, subtract, multiply, and divide common fractions.
 2. Add; subtract, multiply, and divide decimal fractions.
 3. Compare two given fractional numbers.
 4. Express a given number in scientific notation.
- D. To demonstrate an understanding of ratio, proportion and percent, the student should be able to:

1. Define ratio, proportion, means terms, extreme terms
 - a. Express a ratio in lowest terms.
 - b. Compute the missing term in a proportion when three terms are given.
2. Define percent
 - a. Convert a common fraction to a decimal fraction and to a percent; a decimal fraction to a common fraction and to a percent; a percent to a common fraction and to a decimal.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

D. A professional typist uses proportion to determine the time necessary to type a manuscript.

A real estate agent uses percent to compute the commission on the sale of a house, and the amount of money the seller will receive.

D. Donna, a professional typist, can type 8 pages of manuscript in 52 minutes. She agreed to type an article of 20 pages. How long will it take her to type the article?

A real estate agent sold a house for \$13,500 and was paid a commission of 5%. What was the amount of his commission? How much did the seller of the house receive?

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

- b. Problem solving

- E. Measurement--Metric and English
 - 1. Definitions
 - a. Approximate number
 - b. Precision
 - c. Greatest possible error
 - d. Accuracy (number of significant digits)
 - e. Relative error
 - f. Percent error
 - 2. Calculations
 - 3. Least precise measurement
 - 4. Precision versus accuracy

- b. Use proportions to solve problems of the type:
 - (1) What is 40% of 50?
 - (2) What percent of 90 is 60?
 - (3) 50 is 20% of what number?

- E. To demonstrate an understanding of measurement, the student should be able to:
 - 1. Define:
 - a. Approximate number
 - b. Precision
 - c. Greatest possible error
 - d. Accuracy (number of significant digits)
 - e. Relative error
 - f. Percent error
 - 2. Compute the precision, greatest possible error, the relative error, and percent error of a measurement.
 - 3. Determine which of several given measurements is least precise.
 - 4. Determine which of two measurements is more precise and which is more accurate.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

E. An auto parts manufacturer uses the concept of tolerance in manufacturing parts.

A watch repairman measures a watch to determine the size of a crystal needed.

E. If the tolerance is $\pm 1/32''$, what is the maximum and minimum allowable length for a part if the dimension is given at $5 \frac{5}{16}''$?

What is the relative error of a measurement of a $1 \frac{1}{4}''$ watch crystal, if the measure is reported to the nearest $1/4$ inch?

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

F. Square Roots

1. Table
2. Algorithm

F. To demonstrate a working knowledge of square roots, the student should be able to:

1. Determine the square root of a given number by using tables.
2. Determine the square root of a given number by using the square root algorithm.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

F. A sheet metal technician applies square root in computing the radius of stretch-out of the top part of a cone-shaped cover.

F. Compute the radius of the stretchout of a cone 3 feet in diameter with an altitude of 2 feet. (The radius of stretchout is equal to the slant height of the cone and can be computed using the formula $H = \sqrt{a^2 + \frac{d^2}{2}}$.)

(a = altitude, d = diameter)

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

II. Refresher Algebra

II. Refresher Algebra

A. Introduction

A. To demonstrate an understanding of algebraic symbols and terms, the student should be able to:

1. Identification of symbols

1. Identify: =, >, <, \leq , \geq , +, -, \times , \div , $\frac{x}{y}$, $\{ \}$, $()$.

2. Definitions

2. Define or illustrate: positive number, negative number, equation, inequality, absolute value, variable, coefficient, exponent, constant, term, like terms, monomial, binomial, trinomial, polynomial.

B. Rational number system

B. To demonstrate an understanding of the rational number system, the student should be able to express, recognize, and use:

1. Closure properties

1. The closure property for:
a. Addition
b. Multiplication

2. Commutative property

2. The commutative property for:
a. Addition
b. Multiplication

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES.

II. Career Concept

Careers require different levels of competence in computation.

Performance Objectives

A. A football player gains or loses yardage on consecutive plays. These results may be represented by positive and negative numbers.

B. People in all walks of life use properties of numbers in solving problems.

A. On four plays the following yardage was made: 15, -2, 6, -8. What was his total gain?

B. A housewife went to the market to buy food for a family picnic. She bought 4 pounds of hamburger meat for \$1.29 per pound, and 4 pounds of weniens for 74¢ per pound. Use the distributive property to represent the cost of the food, then determine the total cost.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

- | | |
|--|---|
| <p>3. Associative properties</p> | <p>3. The associative property for:</p> |
| | <p>a. Addition</p> |
| | <p>b. Multiplication</p> |
| <p>4. Identity properties</p> | <p>4. The identity property for:</p> |
| | <p>a. Addition</p> |
| | <p>b. Multiplication</p> |
| <p>5. Inverse properties</p> | <p>5. The inverse property for:</p> |
| | <p>a. Addition</p> |
| | <p>b. Multiplication</p> |
| <p>6. Distributive property</p> | <p>6. The distributive property for multiplication over addition</p> |
| <p>C. Operations, grouping and factoring</p> | <p>C. To demonstrate a basic skill in algebra, the student should be able to:</p> |
| <p>1. Addition</p> | <p>1. Add:</p> |
| | <p>a. Signed numbers</p> |
| | <p>b. Other polynomials</p> |
| <p>2. Subtraction</p> | <p>2. Subtract:</p> |
| | <p>a. Signed numbers</p> |
| | <p>b. Other polynomials</p> |
| <p>3. Multiplication</p> | <p>3. Multiply:</p> |
| | <p>a. Signed numbers</p> |
| | <p>b. A polynomial by a monomial</p> |
| <p>4. Division</p> | <p>4. Divide:</p> |
| | <p>a. Signed numbers</p> |
| | <p>b. A polynomial by a monomial</p> |

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

C. A meteorologist applies the concept of additive inverse in computing the difference between temperatures above and below zero.

C. If the temperature at New Orleans is 48 degrees and the temperature at Minneapolis is -13 degrees, how many degrees warmer is it in New Orleans than at Minneapolis?

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

5. Grouping

6. Factoring

D. Equations and inequalities

1. Translation

2. Evaluation

3. Solving open sentences

5. Remove symbols of grouping and combine like terms.

6. Factor an algebraic expression by removing the greatest common monomial factor.

D. To demonstrate an understanding of equations and inequalities, the student should be able to:

1. Translate:

a. An English expression into an algebraic expression

b. An English statement into an algebraic sentence

c. An algebraic sentence into words.

2. Evaluate an expression (e.g., $6L - 2W$, if $L = 8$, and $W = 3$.)

3. Solve:

a. An equation in one variable

b. An equation for a specified variable

c. A formula for a specified variable when values are given for all other variables

d. An inequality

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

D. An appliance dealer may use an equation to determine the selling price of an appliance.

D. The cost of a television set is \$175 and the profit is 30% of the selling price, what is the selling price of the television set? What is the profit?
Let x = selling price
Cost + Profit = Selling price
 $\$175 + .30x = x$, $\$175 = .70x$
 $x = \$250$
Profit, $.30x = \$75.00$

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

III. Informal Geometry

III. Basic Geometry Review.

A. Points, lines, and planes

A. To demonstrate an understanding of informal geometry, the student should be able to:

1. Identification

1. Identify points, lines, and planes.

2. Lines

2. Define or identify:

a. Positions of lines

a. Vertical line, horizontal lines, oblique lines

b. Intersecting

b. Intersecting lines

c. Parallel

c. Parallel lines

d. Perpendicular

d. Perpendicular lines

e. Transversal

e. Transversal

B. Angles

B. To demonstrate an understanding of angles, the student should be able to:

1. Definitions

1. Define, identify, and sketch: an angle, a right angle, an acute angle, and obtuse angle, and a straight angle.

2. Measuring angles

2. Determine the measure of an angle by using a protractor.

3. Classifying angles

3. Classify angles from their measures {e.g., if $m(A) = 90^\circ$, $m(B) = 65^\circ$, $m(C) = 120^\circ$, and $m(D) = 180^\circ$ }

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

III. Career Concept

Every career requires some special preparation.

Performance Objectives

A. The ground crew for a football field uses parallel and perpendicular lines in laying out the field for a game.

A. Construct a diagram of a football field given the scale of the drawing and the dimensions of the field.

B. A navigator of an airplane uses angles in constructing a scale drawing to show the position of a plane given the necessary data.

B. Make a scale drawing showing the position of an airplane at the end of 3 hours when flying on a course of 60° , with a ground speed of 250 m. p. h.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

C. Constructions

1. Angle
2. Congruent triangles
3. Regular polygons
4. Bisecting a line segment
5. Bisecting an angle
6. Perpendicular lines
7. Parallel lines

D. Definitions and relationships

1. Angle sum of a polygon

then $\angle A$ is a right angle, $\angle B$ is an acute angle, $\angle C$ is an obtuse angle, and $\angle D$ is a straight angle.

C. To demonstrate a basic understanding of fundamental construction by using a compass and straight edge, the student should be able to:

1. Copy a given angle.
2. Construct congruent triangles.
3. Construct a regular polygon of 3 sides, 4 sides, 6 sides.
4. Bisect a line segment.
5. Bisect an angle.
6. Construct a perpendicular to a given line:
 - a. At a point not on the line.
 - b. From a point not on the line.
7. Construct a line parallel to a given line.

D. To demonstrate an understanding of angle relationships, the student should be able to:

1. Determine the sum of the measures of the angles of:
 - a. A triangle
 - b. A quadrilateral
 - c. A pentagon

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

C. A craftsman uses basic constructions in laying out geometric shapes.

C. A piece of round stock is 3" in diameter. Construct the largest square that can be machined at one end.

D. A machinist uses angle relationship in his work.

D. What angle does side B of a regular hexagonal bar make with the surface plate as shown in the diagram?

CURRICULUM OUTLINE**PERFORMANCE OBJECTIVES****2. Special angle pairs**

- 2. Define and sketch:**
- a. Complementary angles
 - b. Supplementary angles
 - c. Vertical angles
 - d. Corresponding angles associated with parallel lines.
 - e. Alternate interior angles
 - f. Alternate exterior angles

E. Plane figures

- E. To demonstrate a basic understanding of plane figures, the student should be able to:**

1. Definitions

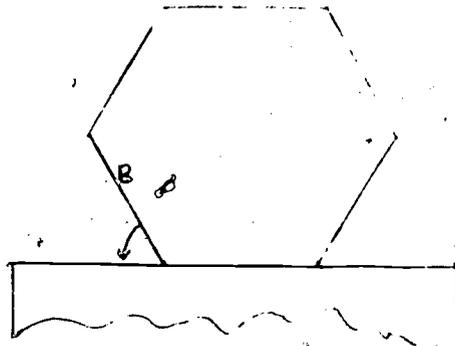
- 1. Define, sketch, and identify:**
- a. Right triangle
 - b. Equilateral triangle
 - c. Isosceles triangle
 - d. Scalene triangle
 - e. Quadrilateral
 - f. Parallelogram
 - g. Rectangle
 - h. Square
 - i. Trapezoid
 - j. Rhombus
 - k. Circle
 - l. Pentagon

2. Perimeter and circumference

- 2. Determine the perimeter or circumference of each figure listed above when the dimensions are given.**

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES



E. A forest ranger computes the area of a circle in determining the area of the forest that he can observe from a firetower.

E. If a forest ranger can see from his tower for a distance of 24 miles in all directions, how many square miles can he watch?

CURRICULUM OUTLINE**PERFORMANCE OBJECTIVES**

3. Area

3. Compute the area of:
- A triangle
 - A parallelogram
 - A rectangle
 - A square
 - A trapezoid
 - A circle

F. Solid figures

- F. To demonstrate a basic understanding of solid figures, the student should be able to:

1. Terminology
- Polyhedron
 - Cylinder
 - Prism
 - Cone
 - Pyramid
 - Sphere

1. Identify:
- A polyhedron
 - A cylinder
 - A prism
 - A cone
 - A pyramid
 - A sphere

2. Lateral and total area

2. Determine the lateral area and the total area of:
- A cylinder
 - A prism
 - A cone
 - A pyramid
 - A sphere

3. Volume

3. Compute the volume of:
- A cylinder
 - A prism
 - A cone
 - A pyramid
 - A sphere

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

F. An automotive technician uses the basic principles of area.

F. A mechanic relines a truck body with flat stock. The floor measures $12' \times 8'$, the sides are $12' \times 4'$, and the front measures $8' \times 4'$. What is the total area covered?

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

IV. Mathematics Related to Shop

IV. Mathematics Related to Shop

A. Measurement

A. To develop a basic understanding of measurement pertaining to the shop and industry, the student should be able to:

1. Linear measuring devices

1. Use and read linear measuring devices both metric and non-metric.
 - a. Steel rule
 - b. Caliper
 - c. Micrometer
 - d. Gauge

2. Speedometer and odometer

2. Distinguish between an odometer and a speedometer, and read each.

3. Feeler gauge

3. Use a feeler gauge to measure the gap on a spark plug.

4. Tolerance

4. Calculate the tolerance of a given manufactured part.

5. Missing dimensions

5. Compute the length of the missing dimension in an irregular figure.

6. Area

6. Compute the area of an irregular figure.

7. Angle

7. Measure an angle using a protractor..

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

IV. Career Concept

Careers are interrelated.

Performance Objectives

- A. A painter computes the area of a cylinder to determine the amount and cost of the paint needed to paint the structure.

- A. A gasoline storage tank 7' in diameter and 18' long is to be painted with two coats of paint. Each gallon of paint has a maximum coverage of 400 sq. ft. for two coats. If paint of this quality sells for \$6.79 per gallon, what will be the cost of the paint required to do the job? (Consider a fractional part of a gallon as a whole gallon.)

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
<ul style="list-style-type: none"> 8. Estimation. 9. Scale drawing 10. Temperature <ul style="list-style-type: none"> a. Reading b. Conversion 	<ul style="list-style-type: none"> 8. Estimate a measurement. 9. Draw a figure to a specific scale. 10. Read a thermometer <ul style="list-style-type: none"> a. Fahrenheit and Celsius b. Convert a Fahrenheit reading to a Celsius reading; a Celsius reading to a Fahrenheit reading.
<ul style="list-style-type: none"> B. Automobile <ul style="list-style-type: none"> 1. Brake horsepower 2. SAE Horespower 3. Displacement 4. Rear axle ratio 5. Work 6. Power 7. Mechanical efficiency 	<ul style="list-style-type: none"> B. To demonstrate a basic understanding of mathematics related to an automobile, each student should be able to: <ul style="list-style-type: none"> 1. Compute the brake horsepower of an engine. 2. Compute the SAE horsepower of an engine. 3. Compute the displacement of an engine. 4. Compute rear axle ratio. 5. Apply the formula for work. 6. Apply the formula for power. 7. Compute the mechanical efficiency of an engine.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

B. An automobile mechanic computes the horsepower of an engine.

B. Find the horsepower developed by an engine having a piston diameter (d) of 4", a stroke length (L) of 5", a mean effective pressure (P) of 42 lb. per square inch, and turning at the rate of 275 rpm (N). In the formula (A) represents the area of the piston and is equal to $0.7854d^2$.

Formula

$$h. p. = \frac{P \times L \times A \times N}{33,000}$$

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

C. Special problems

1. Odometer
2. Using a micrometer
3. Balance
4. Sundial
5. Pulleys
6. Gears
7. Cutting speed
8. Rim speed
9. Screw pitch

C. To extend the above concepts and skills, the student should be able to:

1. Construct a model of an odometer.
2. Use a micrometer to measure several pieces of wire.
3. Build a balance.
4. Construct a sundial.
5. Solve a problem dealing with pulleys.
6. Compute the rpm of a driven gear when the gear ratio and the rpm of the pinion is specified.
7. Compute the cutting speed of a jointer saw.
8. Compute the rim speed of a revolving object.
9. Compute the pitch of a screw.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

C. A machinist computes the pitch of a screw.

A race car designer computes the brake horsepower of an automobile engine.

C. Compute the pitch of several screws and make a chart showing the various pitches.

Compute the brake horsepower of an engine using a prony brake with an arm 4 ft. long. The engine speed is 1200 rpm, and the load is 120 lbs.

Collect data from newspapers on the horsepower of various race cars.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

V. Mathematics Related to Construction

V. Mathematics Related to Construction

A. Carpentry

A. To develop an understanding of mathematics related to carpentry, the student should be able to:

1. Lumber measurement
2. Estimation of board feet
3. Computation
 - a. Cost of lumber
 - b. Unit stress
 - c. Number of shingles
 - d. Steps for stairs
 - e. Pitch of a roof

1. Measure and compute the number of board feet in a piece of lumber.
2. Estimate the number of board feet of lumber necessary to floor a structure to specifications if 1" thick flooring is used.
3. Define computation.
 - a. Compute the cost of lumber.
 - b. Compute unit stresses of various types of building materials.
 - c. Compute the number of shingles needed to cover a roof if the shingles are laid 5" to the weather.
 - d. Compute the number of steps necessary for a rise of stairs, if each riser must be 7 inches.
 - e. Compute the pitch of a roof.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

V. Career Concept

Careers are interrelated.

Performance Objectives

A. A carpenter computes the number of board feet in a given amount of lumber.

A contractor computes the total cost of building a house given the specified information.

A. Using the formula for board feet, compute the number of board feet in the following pieces of lumber: 120 pieces of 2" x 4" x 8'. What is the price of this lumber if it sells for \$126 per M?

A carpenter intends to build three small houses in a low cost subdivision through a subcontract. Using the table, determine the total cost of materials and labor for building each of the three houses.

Subcontract Costs	Two Bedroom Ranch (1000 sq. ft.)	Two Bedroom Provincial (1050 sq. ft.)	Three Bedroom Colonial (1350 sq. ft.)
Lumber and Trim	\$3620	\$3756	\$4100
Carpentry Labor	\$1050	\$1150	\$1600
Insulation	\$ 300	\$ 315	\$ 395
Cabinets	\$ 327	\$ 375	\$ 450
Hardwood Flooring	\$ 200	\$ 265	\$ 370
Total Cost			

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

f. Cost of paint

g. Number of nails

h. Length of rafters

i. Number of studs

4. Estimation of cost of a building

B. Masonry estimations

1. Quantities of cement, sand, and gravel

f. Estimate the amount and the cost of paint necessary to paint a house, interior and exterior.

g. Estimate the number of nails needed for a specified job;

h. Compute the length of rafters for a building.

i. Compute the number of outside studs needed for a wall given the spacing and dimensions of the wall.

4. Estimate the cost of building materials needed to build a house to given specifications.

B. To develop a basic understanding of mathematics related to masonry, each student should be able to:

1. Estimate the quantities of cement, sand, and gravel needed for a concrete wall, given the specifications of the wall and the ratio of the mixture.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

B. A brick mason computes the amount and price of concrete that will be needed to construct a driveway.

A cement finisher determines the cost of cement for a concrete slab for a new house.

B. How many cubic yards of concrete are required for a sidewalk 9 ft. wide, 24 ft. long, and 6 inches thick? How much will it cost at \$24.50 per cubic yard?

Given the diagram below, compute the amount and price of ready mix cement for the slab which is to be 10" thick, if the price is \$24.50 per cubic yard?

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

2. Cost of cement

2. Estimate the cost of cement for a sidewalk.

3. Number of bricks

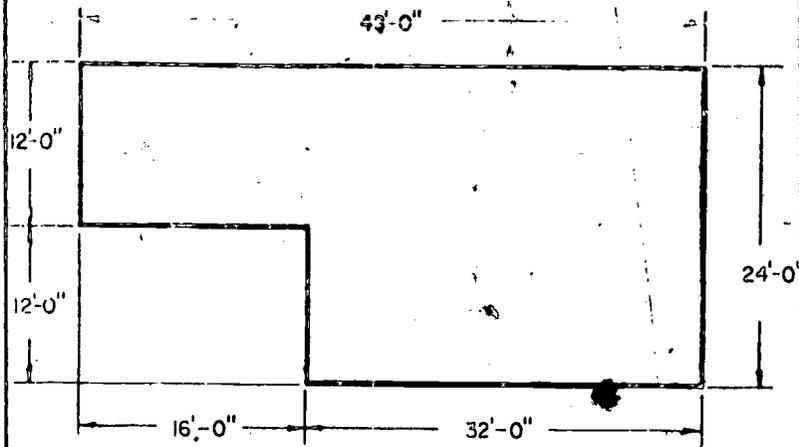
3. Estimate the number of bricks needed for a building.

4. Cost of bricks for a building

4. Estimate the cost of bricking a building.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES



CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

VI. Mathematics for Electricians

VI. Mathematics for Electricians

A. Resistance

A. To demonstrate an understanding of mathematics related to resistance, a student should be able to:

1. Wire
2. Resistors in series
3. Resistors in parallel

1. Compute the resistance of a wire, given the total length and the resistance per unit length.
2. Compute the total resistance of a series of resistors.
3. Compute the total resistance of a given set of resistors in parallel.

B. Ohm's Law

B. To demonstrate an understanding of Ohm's Law, the student should be able to:

- P. Current
2. Voltage
3. Resistance

1. Compute current, given the resistance and voltage.
2. Compute voltage, given the resistance and current.
3. Compute resistance, given the resistance and current.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

VI. Career Concept

In our highly mechanized world, careers that help keep machines and appliances operation efficiently are very important.

Performance Objectives

A. An electrician computes the resistance of wire used in electrical circuits.

B. Radio repairmen compute the total voltage (E) for a circuit.

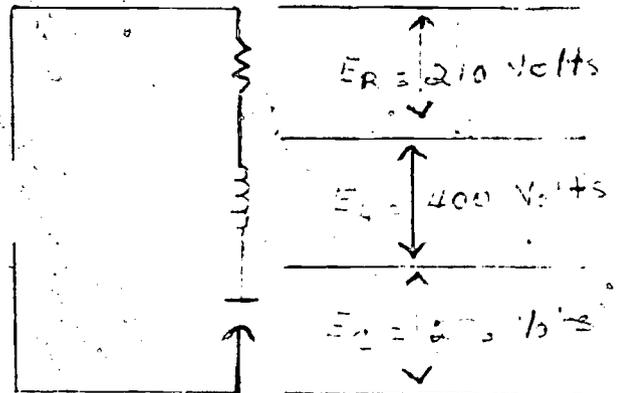
A. What is the resistance, R, of 300' of copper wire with a cross sectional area of 10,380 circular mils?

Use: $R = \frac{K + L}{d^2}$ where R =

resistance, K = resistivity of copper (10.4 ohm circular mil), L = length in feet, d = diameter in mils.

B. Find the total voltage (E) for the circuit shown below:

$$E = \sqrt{E_R^2 + (E_L - E_C)^2}$$



CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

4. Series circuit

4. Compute the total resistance, the line voltage, and the current through each part when given a series of resistors, the voltage across each one, and the current.

5. Line Drop

5. Compute the line drop of a power line given the resistance and the current.

C. Power

C. To demonstrate a knowledge of mathematics related to power, the student should be able to:

1. Wattage

1. Compute the power (wattage) in a d-c circuit, given the voltage and current.

2. Cost

2. Compute the cost of electricity given the rate per kilowatt hour, wattage, and time.

3. Horsepower

3. Convert kilowatts to horsepower.

4. Meters

4. Read electric meters and determine the cost for electricity used between two successive meter readings.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

C. An electrician computes the amount of current an electrical appliance requires and the resistance of the appliance.

C. How many amperes of current will a 550-watt electric iron require if the iron is used on a 110-volt circuit? Compute the resistance of the iron.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

D. Alternating current**1. Frequency****2. Power**

D. To demonstrate a basic understanding of mathematics related to alternating current, the student should be able to:

1. Compute the frequency of an alternating current given the number of poles and the revolutions per minute of the alternator.

2. Compute the power in an a-c circuit when the effective value of the current, the voltage and the power factor is known.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

- D. An electrician computes the frequency of an alternating current produced by a commercial a-c generator.

- D. What is the frequency in hertz (H) of the current furnished by an alternator having 4 poles and running at a speed of 1800 revolutions per minute?

Use: $f = P \times \frac{N}{60}$

where f = frequency in hertz,
 P = number of pairs of poles,
and N = revolutions per minute.

CURRICULUM OUTLINE**PERFORMANCE OBJECTIVES****VII. Mathematics Related to Nursing****A. Numeration**

1. Conversion- Arabic numerals to Roman numerals
2. Conversion- Roman numerals to Arabic numerals

B. Common fractions, decimals and percents

1. Decimal notation
2. Conversion of common fractions to decimals
3. Conversion of decimals to common fractions
4. Basic operations on common fractions

VII. Mathematics Related to Nursing**A. To demonstrate a working knowledge of the Arabic and the Roman system of numeration, the student should be able to:**

1. Convert Arabic numerals to Roman numerals.
2. Convert Roman numerals to Arabic numerals.

B. To demonstrate competency in working with common fractions and percents, the student should be able to:

1. Read and write decimals correctly.
2. Convert a given common fraction to its decimal equivalent.
3. Convert a given decimal to its decimal equivalent.
4. Perform the basic operations of reduction, addition, subtraction, multiplication and division of common fractions.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

VII. Career Concept

Every occupation
contributes to society.

Performance Objectives

A. A registered nurse
interprets the
symbols used by
physicians to prescribe
medications.

B. An office nurse
prepares a specified
solution from stock
solutions.

A. Request a nurse to visit the
class and discuss how she
must be able to interpret
symbols in order to follow
doctors orders concerning
patients. Use sample
prescriptions to illustrate.

B. To calculate the amount of
solute needed to make a
solution of a given strength
nurses may use the following:
$$\frac{\text{Strength desired} \times \text{Quantity desired}}{\text{Strength on hand}} =$$

Amount of solute. How many
grams of sodium bicarbonate
are needed to prepare 500 ml of
a 1% solution?
Solution:
$$\frac{1\%}{100\%} \times 500 \text{ ml} = 5.$$

5/grams of 100 percent pure
sodium bicarbonate are needed.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

- | | |
|---|---|
| <p>5. Basic operations on decimals</p> <p>6. Conversion to percent</p> <p>7. Calculation of percentage</p> | <p>5. Perform the basic operations of addition, subtraction, multiplication, and division of decimal fractions.</p> <p>6. Convert common fractions and decimal fractions to percents and vice versa.</p> <p>7. Calculate the percentage of a given quantity.</p> |
| <p>C. Ratio and proportion</p> | <p>C. To demonstrate a basic understanding of ratio and proportion, the student should be able to:</p> <ol style="list-style-type: none"> 1. Convert a common fraction, a decimal, and a percent to a ratio, such as $3/4 = 3:4$. 2. Set up a proportion and solve for the unknown term. |
| <p>D. Temperature conversion</p> <ol style="list-style-type: none"> 1. Celsius to Fahrenheit | <p>D. To demonstrate a basic understanding of temperature conversion, the student should be able to:</p> <ol style="list-style-type: none"> 1. Convert a Celsius to a Fahrenheit measure by using the following formula: $F = 9/5C + 32$. |

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

C. A private duty nurse makes conversions from scales on one syringe to scales on different syringes.

D. A practical nurse converts a Celsius temperature to a Fahrenheit temperature.

C. A doctor's orders states that the nurse must give U30 of a U40 solution of insulin to a diabetic patient. She does not have a U40 syringe, but she does have a U80 syringe. How does she determine the desired amount using a U80 syringe.
Solution:
 $U30:U40 = X:U80$
 $40x = 2400$
 $x = 60$ units of U40 solution to be given in a U80 syringe.

D. Convert 40°C to Fahrenheit.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

2. Fahrenheit to Celsius

2. Convert a Fahrenheit to a Celsius measure by using the following formula:
 $C = 5/9 (F - 32)$.

E. Measurement

E. To develop a basic understanding of measurement, the student should be able to:

1. Apothecaries' system
 - a. Symbols.
 - (1) Weight
 - (2) Volume (liquid)
 - b. Abbreviations and symbols

1. Use the apothecaries' system by:
 - a. Identifying the symbols used for weight and volume, (Z, \bar{z} , M, O)
 - b. Identifying the abbreviation used for weight and volume.

2. Metric system

2. Identify the symbols for weights and volumes used in the metric system.

3. Household system

3. Identify the abbreviations for weights and volumes used in the household system.

4. Conversion

4. Convert given weights and volumes (liquid) from the apothecaries' system to the other two systems and vice versa.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

E. A nurse converts a doctor's orders concerning a dose of medicine from apothecaries' measure to household measure.

E. Convert Z ff to teaspoonfuls.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

F. Using formulas

1. Calculating children's doses
 - a. Young's Rule
 - b. Fried's Law
 - c. Clark's Rule

2. Problems in solutions

F. To develop a basic competency in calculating dosages, the student should be able to:

1. Calculate children's doses by using:
 - a. Young's Rule

$$\text{child's dose} = \frac{\text{age of child}}{\text{age of child} + 12} \times \text{average adult dosage.}$$
 - b. Fried's Law
 (dosage for infants under one year of age). It may be used for older children.

$$\text{infant's dosage} = \frac{\text{age in months}}{150} \times \text{adult dosage.}$$
 - c. Clark's Rule
 (Narcotics and some antibiotics and other medicines are administered to a child according to his weight.)

$$\text{child's dose} = \frac{\text{child's weight in pounds}}{150} \times \text{adult dosage}$$
2. Solve solution problems by:
 - a. Calculating the amount of pure drug needed to make a certain solution.
 (1) Formula A

$$\text{amount of solute} = \frac{\text{strength desired}}{\text{strength on hand}} \times \text{quantity desired}$$

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

- F. A pediatric nurse calculates a child's dosage of medicine from the known adult dosage.

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

- F. A doctor treated a 4 year old child and ordered the following medicine: hykinone and cortisone acetate. Compute the child's dosage if the adult dosage is 2mg. of hykinone, and 150 mg. of cortisone acetate.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

G. Calculating dosages

1. Oral medications
2. Insulin
3. Hypodermic injection

(2) Formula B using proportions

$$\frac{\text{amount of drug}}{\text{amount of desired solute}} = \frac{\text{strength of desired solution}}{\text{strength on hand}}$$

- b. Calculating the amount of stock solution needed to make a specified dilute solution.
- c. Calculating the amounts of solvent and solute in a solution of a given percentage.

G. To develop a basic understanding in the methods of calculating dosages, the student should be able to:

1. Calculate the amount of oral medication to be given from a stock solution.
2. Calculate insulin dosages according to a syringe calibrated in units.
3. Calculate dosage for an injection in terms of the strength of the drug on hand.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

- G. An Armed Forces nurse calculates dosages from stock bottles.

A private duty nurse calculates dosages for hypodermic injections.

- G. How much of a given stock solution should be given to a patient when a doctor prescribes .75 g terramycin suspension per dose? The stock solution label reads 5 ml = 250mg.

One of the duties of a private nurse is to give hypodermic injections. Many times the medicine is not in liquid form and must be put into solution. The accuracy of the solution is very important to the health of the patient. No more than 2 ml should be used for a subcutaneous injection and no more than 5ml for an intramuscular injection.

CURRICULUM OUTLINE

PERFORMANCE
OBJECTIVES

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

Calculate the following dosages for hypodermic injections. Give (a) the number of tablets to be dissolved; (b) the amount of sterile water to be used as solvent, and (c) the amount of solution to be given to the patient.

1. The dose ordered is .12 mg. s. c. (subcutaneous). The tablets on hand are .6 mg.
a. _____ b. _____ c. _____
2. The dose ordered is 15 mg. I. M. (intramuscular). The tablets on hand are 25mg.
a. _____ b. _____ c. _____
3. The dose ordered is 10 mg. I. M. The tablets on hand are .03 g. Convert to milligrams before calculating.

Part of tablet to be used = $\frac{\text{amount desired}}{\text{amount on hand}}$

Invert the fraction which expresses the part of the tablet to be used and use it in the following formula:
 $\text{Inverted fraction} \times \text{number of tablets} \times \text{number of ml to be given patient}^* = \text{number of ml of solvent.}$

*Select the number of ml to be given the patient by choosing a number divisible by the denominator of the inverted fraction, and which is no more than should be given by the method of injection to be used.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

VIII. Mathematics Related to Homemaking

VIII. Mathematics Related to Homemaking

A. Review

A. To demonstrate a basic understanding of ratio and proportion, the student should be able to:

1. Ratio

1. Define and identify ratio. Reduce a given ratio to simplest form.

2. Proportion

2. Define and identify proportion. Find the missing term of a proportion when three of the terms are given.

3. Application

3. Apply proportion to problem solving.

B. Measurement

B. To demonstrate a basic understanding of measurement, the student should be able to:

1. Linear

1. Convert from a given linear measure to a specified linear measure in the same system. (e. g., convert 42 inches to feet)

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES.

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

VIII. Career Concept

Careers are opportunities
for accomodating differences
in human development.

Performance Objectives

A. A landscape designer
uses a working
✓ knowledge of proportion
in drawing plans for a
specified project.

B. A sales lady in a
fabric store estimates
the amount of fabric
needed for a
garment.

A. Draw a plan of your school
grounds. Design an attractive
plan for landscaping these
grounds over a three year
period.

B. Invite a representative from a
local fabric store to bring
samples of material and discuss
how need and price should
affect the selection of material
for a garment.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
<ul style="list-style-type: none"> 2. Liquid 3. Weight 4. Conversion- Metric to English 	<ul style="list-style-type: none"> 2. Convert from a given liquid measure to a specified liquid measure in the same system. 3. Convert from a given weight measure to a specified weight measure in the same system. 4. Convert metric measures to English measures and English measures to metric measures.
<p>C. Clothing and textiles</p> <ul style="list-style-type: none"> 1. Pattern adjustment 2. Estimating fabric 3. Size of pattern 4. Size of clothing 5. Comparative buying 	<p>C. To demonstrate a working knowledge of the mathematics related to clothing and textiles, the student should be able to:</p> <ul style="list-style-type: none"> 1. Make necessary pattern adjustments. 2. Estimate the amount of fabric required in a width other than that specified. 3. Determine pattern size from given body measurement. 4. Determine clothing size from given body measurement and weight. 5. Compare prices before purchasing.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

- C. A children's clothing saleslady sells clothing and keeps an inventory of merchandise on hand. She also advises customers of the appropriateness of sizes and fabrics for given age groups.

- C. Interview a sales person to discuss the following:
1. The best season of the year to purchase clothing at a savings.
 2. The average rate of discount of end-of-season sales.
 3. The most common size sold.
 4. Quality versus price.
 5. Labeling.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
<p>D. Food and nutrition</p> <p>1. Increasing or decreasing recipes</p> <p>2. Estimating food needs</p> <p>3. Counting calories</p> <p>4. Comparative buying</p>	<p>D. To demonstrate a basic knowledge of the mathematics related to food and nutritional needs, the student should be able to:</p> <p>1. Increase or decrease a recipe as specified.</p> <p>2. Estimate the amount of food needed to feed a specified number of persons.</p> <p>3. Plan a balanced meal with a specified caloric value.</p> <p>4. Compare prices when shopping for food to determine the best buy.</p>
<p>E. Home decorating</p> <p>1. Measuring windows</p> <p>2. Scale drawing for house plan</p> <p>3. Comparative buying</p>	<p>E. To demonstrate a basic understanding of the mathematics related to home decorating, the student should be able to:</p> <p>1. Measure a window accurately to determine the correct yardage necessary for draperies.</p> <p>2. Draw a floor plan to scale.</p> <p>3. Determine the best buy for specified pieces of furniture, when information concerning quality and prices are given.</p>

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

D. A caterer plans, prepares, and serves food for group entertainment. She uses mathematics to estimate the food requirement, and to purchase it at reasonable prices.

D. Plan a wedding reception for 200 guests. A budget of \$500 for food is allowed. Decide on a menu, determine the food costs and the overhead, allowing a reasonable profit.

E. An interior decorator plans and furnishes interiors of homes and institutional buildings. He selects and plans arrangement of furniture, draperies, floor coverings, and accessories.

E. Estimate what it would cost to redecorate your living room. Consult a catalog to determine approximate prices of furniture, draperies, lamps, other accessories, and wall paint or paper.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

F. Family budget

1. Planning

2. Maintaining records

G. Consumer oriented publications

F. To demonstrate a basic understanding of family budgeting the student should be able to:

1. Plan a budget for a specified income providing funds for necessary expenditures and for savings.

2. Set up and maintain records of expenditure and balances within budgeted amounts.

G. To demonstrate an understanding of comparative shopping, the student should be aware of the availability of several publications which present to the consumer the results of unbiased comparative tests of similar products manufactured by different companies.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

F. A family budgets its disposable income to meet current living expenses and to save for the future.

F. Plan a budget for a family that has a disposable income of \$685 per month, if the income is budgeted as follows:

Food 18%

Household Operation 6.5%

Clothing 6%

Shelter 25%

Transportation 18%

Personal Advancement 15%

Savings 11.5%

G. A homemaker plans carefully for the best buys.

G. Mrs. Smith has the following list of groceries to buy:

4 lbs chuck roast (Store A, 87¢ lb., Store B, 93¢ lb.)

Shortening, 3 lbs (Store A, \$1.35 for 3 lb, Store B, \$1.27 for 3 lbs.)

Sugar, 10 lbs. (Store A, \$1.73 Store B, \$1.69)

Apples, 5 lbs. (Store A, 43¢ lb. Store B, 39¢ lb.)

If the items at each store are of equal quality, at which store will she get the best bargain if she plans to buy all four items at one store?

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

IX. Mathematics Related to Sports

A. Baseball

1. Batting average and field average
2. Earned run average
3. Won-loss percentage
4. Games behind
5. Bases accumulated
6. Slugging percentage
7. Box score
8. Scale construction

IX. Mathematics Related to Sports

A. To demonstrate a basic understanding of mathematics as related to baseball, the student should be able to:

1. Compute the batting and fielding averages of a baseball player.
2. Compute the ERA (earned run average) of a pitcher.
3. Compute a team's won-loss percentage.
4. Calculate the number of games a given team is behind the leader in a particular league.
5. Compute the total number of bases accumulated by a player.
6. Compute the slugging percentage of a batter.
7. Complete a box score of a baseball game.
8. Draw a baseball field to scale.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

IX. Career Concept

Individuals may be suited
for several different careers.

Performance Objectives

A. A professional baseball
player computes batting
fielding, and pitching
percentages.

A. Use the information below to
compute the batting, fielding,
and pitching percentages for a
baseball team.

Batting

	AB	R	H	Pct.
Bevanski	95	17	38	
Riley	96	19	32	
Wardman	88	13	29	

Fielding

	PO	A	E	Pct.
Hatton	108	16	1	
Chapman	60	87	3	
Rosseau	51	43	2	

Pitching

	Won	Lost	Pct.
Drewson	17	3	
Shield	15	6	
Phillips	12	5	

Do similar computations for the
local baseball team.

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
9. Team's league progress	9. Illustrate a team's progress in a league by means of a graph.
10. Pitcher's fast ball	10. Compute the speed of a pitcher's fastball from the elapsed time.
11. Percent of games won	11. Relate a team's record to the percent of games won (e. g. , a record of 507 really means that the team won 50.7% of its games).
12. Percentage point	12. Explain the true meaning of the term "percentage point."
B. Football	B. To demonstrate a basic understanding of mathematics as related to football, the student should be able to:
1. Pass completion rate	1. Compute percent of pass completions.
2. Interception rate	2. Compute percent of interceptions.
3. Touchdown pass rate	3. Compute percent of touchdown passes.
4. NFL quarterback rate	4. Compute the NFL percentage for a quarterback.
5. Net yardage	5. Compute the net yardage in a given football game.
6. Numbering system	6. Devise a system for numbering football plays.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

- B. The coach of a football team computes the average weight of his linemen, backfield and entire team.

A statistician for a football league computes the percentage of games won.

- B. The weights of the seven linemen on the State College football team starting with left end are 170, 195, 185, 188, 174, 215, and 182 pounds, respectively. The weight of the backfield men are 168, 182, 175, and 179 pounds. What is the average weight per man of the line? In the backfield? Of the entire team?

Using the information below, compute the percent of wins for teams in this league.

	Won	Lost	Pct.
South	10	1	
East	8	2	
West	4	4	
North	3	6	

CURRICULUM OUTLINE	PERFORMANCE OBJECTIVES
<p>7. Weight average</p>	<p>7. Compute the average weight of: a. A team's line b. A team's backfield</p>
<p>C. Basketball</p> <p>1. Field goal rate</p> <p>2. Free throw rate</p> <p>3. Shot frequency chart</p> <p>4. Single elimination tournament</p>	<p>C. To demonstrate a basic understanding of mathematics as related to basketball, each student should be able to:</p> <p>1. Compute the percent of field goals of a basketball player.</p> <p>2. Compute the percent of free throws of a basketball player.</p> <p>3. Prepare a shot frequency chart.</p> <p>4. Devise brackets for a single elimination tournament for eight teams and for sixteen teams.</p>
<p>D. Individual sports-- scoring, scheduling, and measuring</p> <p>1. Bowling</p> <p>2. Handicap</p>	<p>D. To demonstrate an understanding of mathematics related to individual sports, each student should be able to:</p> <p>1. Compute the score of a player in a bowling game.</p> <p>2. Compute the handicap for a team in a bowling league.</p>

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

C. A statistician for the school basketball team computes the total points scored and the average points per game for each player.

C. Using the information below, find the total points scored by each player and his average per game.

Basketball--
Find the total points scored and average per game to the nearest tenth for each player:

	Games	Field Goals	Foul Goals	Total Points	Average Points Per game
Farley	18	136	74		
Burns	17	129	80		
Monroe	15	123	87		
Smith	16	119	68		
Wood	18	108	59		
Jones	12	95	47		

D. A track coach computes the time for a mile relay team based on the time of each runner.

D. Don, Joe, Fred, and Chester are members of the mile relay team. Each boy runs one-fourth of a mile in a mile relay. In their last race, the boys were clocked in 53.4 seconds, 52.8 seconds, 53.6 seconds and 51.7 seconds respectively. What was the time it took the team to run one mile? (Give your answer in seconds, then change this answer to minutes and seconds.)

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

3. League schedule

3. Devise a schedule for a six-team bowling league and a schedule for an eight team league.

4. Track measure measurement

4. Convert English units used in track to the corresponding metric units.

5. Golfing

5. Determine the iron with lesser pitch of two given numbered golfing irons. Total the score of a golf game (using the terms --birdie, eagle, bogie, and par).

6. Wrestling

6. Total the score of a college wrestling match.

7. Auto racing

7. Compute the braking time of a given automobile in a given race.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

An athletic director of a university determines the winning team at a track meet, the winning team at a wrestling match, and the winning team of a cross country race.

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

Find the winning team in each of the following meets or events:

Track

Find the total points scored by each team if 5 points are given for each 1st place, 3 points for each 2nd place, and 1 point for each 3rd place.

	1	2	3	Total Points
Team A	5	3	4	=
Team B	4	3	3	=
Team C	2	6	1	=
Team D	3	1	5	=
Team E	1	2	2	=

Wrestling

Find the total points scored by each team if 5 points are given for a fall, 3 points for a decision, and 2 points for a draw.

	Team X	Team Y
Fall	2	1
Decision	2	3
Draw	<u>1</u>	<u>1</u>
Total points		

Cross-country

Find the scores of Team A, B, C, D, and E by adding the numbers corresponding to the order in which the first 5 members of each team finished. The team with the lowest score (or smallest sum) is the winner. Which team won if the runners placed as follows: 1. B 2. A 3. D 4. E 5. C 6. A 7. D 8. D 9. E 10. B 11. A 12. C 13. C 14. A 15. C 16. B 17. D 18. B 19. E 20. E 21. E 22. C 23. A 24. E 25. B 26. D 27. C 28. A 29. D 30. E 31. B 32. A.
Score: A | B | C | D | E Winner: Team

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

X. Mathematics Related to Travel

X. Mathematics Related to Travel

A. Latitude and Longitude

A. To demonstrate an understanding of global coordinate relationships, the student should be able to:

1. Definition
 - a. Equator
 - b. Parallel of latitude
 - c. Great circle
 - d. Prime meridian
 - e. International date line
 - f. Nautical mile
2. Geographic location
3. Distance
4. Time zones

1. Explain and define the following terms:
 - a. Equator
 - b. Parallel of latitude.
 - c. Great circle
 - d. Prime meridian
 - e. International date line
 - f. Nautical mile
2. Locate a place on the world globe given the latitude and longitude.
3. Determine the distance between two geographic locations given the latitude and longitude of each.
4. Determine the difference in time given a specified time in two different time zones.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

X. Career Concept

A person's relationships with other people, with his employer, and with society, affect his own career as well as the careers of others.

Performance Objectives

A. A ticket agent computes the flight time of an airplane trip that involves the crossing of one or more time zones.

A. Flight 24/208 left Los Angeles, California at 9:30 A. M. (PDT) and arrived in Pittsburgh, Pa. at 5:48 P. M. (EDT). How many hours did it take to fly from Los Angeles to Pittsburgh? At the time of arrival in Pittsburgh, what time is it in Los Angeles?

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

5. Twenty-four hour clock

5. Convert a 24-hour clock reading to a 12-hour clock reading (e. g., 2030 hours is 8:30 p. m.)

B. Travel by airplane

B. To demonstrate an understanding of travel by air, the student should be able to:

1. Classes of travel

1. Explain the three basic types of service available including:
 a. First class (F)
 b. Coach (Y)

2. Reading a flight schedule

2. Read a flight schedule to determine for a specified flight:
 a. The time of departure
 b. The time of arrival.
 c. The connections in route
 d. The actual hours in flight regardless of difference in time zones

3. Computing fares
 a. Basic
 b. Family plan
 c. Youth

3. Compute fares using:
 a. Basic plan
 b. Family plan
 c. Youth plan

4. Flight insurance

4. Determine the amount of flight insurance desired and the premium for the policy.

5. Baggage and personal effects insurance

5. Determine the amount of insurance desired on baggage and personal effects; compute the premium.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

B. A passenger who travels by air reads fare tables and flight schedules.

- B. Plan a trip from New Orleans to Chicago and use a fare table and flight schedule to determine the following:
1. Time of arrival at the destination on a specified flight.
 2. Number and identity of enroute stops. Time of arrival and time of departure each stop.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

6. Comparison of services

6. Compare the routes, time schedules, and fares of competitive lines to determine the most convenient and economical airline.

C. Traveling by car

C. To demonstrate a basic knowledge of travel by car, the student should be able to:

1. Car ownership

1. Determine the expenses involved in car ownership by:

a. Payments

a. Computing the monthly payments after making a down payment

b. Insurance

b. Computing from insurance charts the following types of coverage on a car: property damage, bodily injury, collision, and comprehensive insurance

c. Operating costs

c. Computing the operating costs to include gasoline, oil, repairs, etc.

d. Depreciation

d. Compute the annual depreciation, and the average annual depreciation for a specified number of years.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

C. An automobile owner computes the operating cost of his automobile for a designated period of time.

C. Mr. Deville kept an account of the expenses of his car for one year. Based on the following data, how much is his operating cost?

800 gallons of gasoline, \$.55 per gallon (average); oil filter (every second oil change), \$3.40 each; 2 pints differential lube, \$.40 per pint; 1 quart transmission fluid, \$1.00 per quart; 1 can rust inhibitor (radiator); \$1.50 per can; 1 power steering belt, \$2.50 each; 12 changes of engine oil (see note) \$.65 per quart; 6 grease jobs, \$2.50 each; miscellaneous repair charges, \$29.40 total; estimated tire wear \$36.00 total (Depreciation not considered).
Note: 5 quarts with filter change;
4 quarts without filter change.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

2. Reading a road map

2. Read a road map to determine:
- a. Which highways to travel to get from city a to city b.
 - b. The distance between two given towns, using the scale in the legend.

3. Determine average speed

3. Determine the average speed maintained on a trip, given the distance and time.

4. Traveling costs

4. Compute the cost of a trip when a credit card is used to pay for the trip.

5. Renting a car

5. Compute the cost of renting a car for a specified length of time.

D. Traveling by bus

D. To demonstrate a basic understanding of traveling by bus, the student should be able to:

1. Reading a schedule

1. Interpret a bus schedule.

2. Computing fare

2. Determine fare for a specified trip.

3. Comparison of cost

3. Compare the cost and/or the advantages of travel by public bus with those of travel by private automobile.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

D. A tourist compares the time and cost of travel by bus with travel by plane to determine the mode of travel he will use on his vacation.

D. A factory worker in Baton Rouge has a three week's vacation. He plans to spend his time in Seattle, Washington. Discuss the advantages and disadvantages of (1) making the trip by air and (2) making the trip by bus. (consider time and cost)

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

E. Traveling by train

1. Reading schedule
2. Computing basic fare
3. Comparison of cost

F. Traveling by ship

1. Modes of travel
 - a. Cruise
 - b. Freight passenger line
2. Computing basic fare
3. Nautical mile

E. To demonstrate an understanding of traveling by train, the student should be able to:

1. Interpret a train schedule.
2. Compute basic fare and baggage charges.
3. Compare cost and/or advantages of travel by train with those of travel by plane.

F. To demonstrate a basic understanding of traveling by passenger ship, the student should be able to:

1. Distinguish between modes of sailing such as a cruise luxury liner and a freight passenger liner.
2. Compute basic fare and express in terms of dollars per day.
3. Compare the cost and/or advantages of traveling on a luxury liner with those of traveling on a freight passenger liner.
4. Determine the distance between two ports in nautical miles.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

E. A consumer makes a comparison between traveling by bus and by train.

E. Compare a trip from New Orleans to New York City by bus with the same trip by train.

F. Many Americans travel to Europe each year for vacation. The trip usually involves several modes of transportation.

F. Using brochures obtained from a travel agency, plan a trip to Europe. Estimate the cost of the trip if fourteen days are to be spent in Europe. Determine what mode of transportation is feasible at a designated point during the trip.

CURRICULUM OUTLINE

PERFORMANCE OBJECTIVES

G. International travel

G. To demonstrate an understanding of international travel, each student should be able to convert American dollars to currency of other countries, using the current rate of exchange.

RELATED CAREER ORIENTED
CONCEPTS AND OBJECTIVES

RELATED CAREER ORIENTED
LEARNING ACTIVITIES

G. A worker at a money exchange station converts American dollars to foreign money.

G. Convert \$100 to Marks, Francs, Drachmas, Lire, and Pounds, using the current rate of exchange.