Directions and materials for 57 mathematical games and activities are provided in this commercially-prepared package. Suggested use is with pre-school through third grade levels. General content areas include functions and graphs, geometry, logical thinking, measurement, numbers and operations, problem solving, sets, and statistics and probability. (DT)
INTRODUCTION

HAPPY MATH + happy teacher = happy kids

The games and activities presented in this book have all been selected because they teach and reinforce mathematical content in a "fun way". The ideas are suggested for use with preschool through third grade.

The material is listed in alphabetical order. This is for convenience only, as use of the games and activities have no sequential order. Any lesson may be given at any time to teach a concept or provide skill-building activities. An index has been provided for convenience in locating the activities according to math content.

Permission is hereby granted to reproduce only the student materials in this book for classroom use.

We encourage teachers to make any adaptations that will give them and their children "Happy Math" experiences.

We wish to give our thanks to all those teachers and authors who either taught us how to use these ideas with children, or taught the teachers who taught us.
THE AUTHORS

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Nancy Nason received her B.A. from the University of California at Los Angeles and has taught art in the Beverly Hills School District at the secondary level. She has had much primary experience in Dependent Schools in Germany and the American School in Mexico. Her recent years have been spent in Honolulu as a color and design coordinator.

Special Acknowledgment

To Michael Beckner, age 8, Studio City, California, for the Little Mathian.
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**Shape**

| recognition,                  |      | Substitution               |      |
| Club Members                  | 13   | rule for,                  |      |
| Geometry Cards                | 55   | Where’s My Cage            | 176  |
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**Strategy**

| component parts,              |      | Fifteen                    | 34   |
| Geometry Cards                | 55   | Mini Hex                   | 95   |
| Shape Clues                   | 144  |                            |      |

| symmetry,                     |      |                            |      |
| Order of Symmetry             | 120  |                            |      |

| arrangement,                  |      |                            |      |
| Grab Bag Graphing             | 78   |                            |      |
| Moving Squares                | 98   |                            |      |

**Subtraction**

| Common Difference             | 24   |                            |      |
| Difference Skills             | 31   |                            |      |
| Freddy, the Kangaroo          | 48   |                            |      |
Arrow Codes

Use page 3 for children to find the secret message.

Name a beginning letter and indicate by arrows which direction to go to find each secret letter of the message.

For example: Given N ↓, the letter immediately below the letter N is an S. Continue this procedure to complete the secret word.

N ↓ leads to the letter S
I ← leads to the letter M
F → → leads to the letter I
C ↓ ↓ ← leads to the letter L
D → leads to the letter E

For additional secret messages use pages 4 - 7.

Messages may be made simple or complex according to the level of the children's ability. Let children have fun discovering what happens when arrows go:

\[ \uparrow \downarrow, \rightarrow \leftarrow, \rightarrow \left\uparrow, \rightarrow \left\downarrow, \left\uparrow \rightarrow \]

Note: The letter Z which is not often used, has been omitted in order to make an even 5 x 5 grid.

Variation: Children develop their own secret messages for their classmates.

Objectives:

To interpret flow direction
To introduce vectors
Solutions to Secret Messages

Page 4
Happy Math

Page 5
Good Work

Page 6
You Have Won

Page 7
Make One of Your Own
Secret Message

B↓→
F↑
R←
V←
O↓↓

D↓↓←
G←↑
S→
L→↑
Secret Message

B ↓  ____
N →  ____
T ↑  ____
N ↑↑  ____

Y ↔ ↔  ____
M → →  ____
V ↑  ____
G ↓  ____
Secret Message

Y↑↓ ___
S↑ ___
P↓← ___
G↑↓ ___
A↑← ___
Q↓ ___
C↑ ___
Q↓ ___
R↑→ ___
B↓↓ ___
Secret Message

M ↗ _____
G ↗ _____
G ↗ _____
I → ↑ _____

M → → _____
I ↗ → _____
I → ↑ _____

J ↗ → _____
C ↗ ↔ _____

R → ↗ _____
C ↗ ↗ _____
P → ↓ ↔ _____
N ↗ _____

N ↑ ↓ _____
M ↓ ↓ _____
D ↓ ↔ _____
Banker's Choice

Provide groups of children with objects that represent ones, tens, and one one hundred. These can be in the form of:

a) construction paper squares, rectangles that will exactly fit ten of the squares, and one large square that ten rectangles will fit, or

b) plastic chips of different colors

c) any rods, squares and cubes

Give each group of players a pair of dice. One player is the banker and the other players take turns tossing the dice and going to the bank to get the number of objects that are shown on their dice.

Whenever a player collects ten ones, he must exchange them at the bank for one ten.

As soon as a player obtains ten tens, he exchanges them for the one hundred.

Winner is the player who takes the one hundred first. He then becomes the banker for the next game.
Variations:

Play the game Trade 3.

Materials:

one die
red objects, blue objects, and green objects

Players take turns tossing the die and taking the number of red objects as shown on the die.

Players must trade 3 red objects for a blue, then 3 blues for a green object.

First player to get a green object is the winner. Winner is the banker for the next game and chooses the number of objects to be traded for each next color (4, 5, 6, etc.)

Above games can be played in reverse. Players begin game with a given object or numbers of objects that represent the square of the base chosen for that game. (If game is played in base 10, the green object represents 100; if game is played in base 3, the green object represents 9; if game is played in base 4, the green object represents 16, etc.)

Players take turns tossing die to determine how many ones they can deposit at the bank. Exchanges are made in the base decided for the game being played.

The first player to deposit all his ones is the winner and banker for the next game.

Objectives:

To understand place value
To build regrouping skills
Use page 11 for the game board. Color if desired.

Use page 12 to make spinner, use beans for markers.

Players take turns spinning for a number and move that many spaces.

Children follow directions when they land on them.

Winner is the first player to blast off.

Objectives:

To understand the counting order of numbers

To follow directions
Blast Off!

Full Moon.
Go 2 spaces.

Storm.
Go back 3 spaces.

President calls.
Go 3 spaces.

Holding.
Lose 1 turn.

Astronaut sick.
Go back 4 spaces.

Mission A-O.K.
Go 5 spaces.

Need rest.
Lose 1 turn.

Gas leaking.
Go back 3 spaces.

Weather good.
Go 2 spaces.

Start
Countdown
Club Members

Experiences in hunting for patterns.

Display a row of shapes, figures or numbers that have common attributes. Underneath, display some that have none of the attributes common to the first group. In the third row display a mixture of those that have the common attribute and those that do not. Ask the children to choose which belong to the first group.

Examples:

These are members of the club.

UC A < Π L

These are not members.

0 △ ◊ □ △

Which of these are members?

◊ Σ Δ Γ

Note: Members are all open shapes.
These are members of the club.

These are not members.

Which of these are members?

Note: Members are all triangles.
These are members.
10, 250, 50, 1,000
These are not members.
5, 27, 249, 17
Which of these are members?
6, 20, 40, 3,976

Note: Members all end with zero.

Other suggested attributes:

- Shapes with all straight sides
- Shapes with curved sides
- Shapes with one line inside
- Shapes with one point inside
- Shapes with a tail
- Letters of the alphabet made from only straight lines
- Numbers made from only one straight line
- Numbers made from only curved lines
- Numbers that count by 3's or 4's etc.

Variation:

Put display on a ditto sheet for individual activity.

Objectives:

To recognize patterns
To see relationships
Coordinate Pictures

Use pages 18 to 23.

Children make dots from the ordered pairs. The first number of the ordered pair tells how many lines to count over and the second number tells how many lines to count up. Always start counting in the lower left hand corner. This is ordered pair (0,0).

Example for the ordered pair (3,2)

Dots are listed in columns.

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>
| 3 | 6 | etc.

Make the dots in the above order, connect them as they are made, and make a picture.

Objective:

To gain skill in plotting coordinate points
Answers to Coordinate Pictures

Page 18  Sailboat
Page 19  Star
Page 20  House
Page 21  Tree
Page 22  Turtle
Page 23  Ship
Common Difference

Use page 25.

Have children place a different number in each of the rectangles and find their differences. Explain that the difference is found by subtracting the smaller number from the larger one. Then have them follow the arrows and put the differences in the triangles. Continue putting differences in each succeeding shape indicated by arrows.

Stop when all differences contain the same number.

Continue pattern with different shapes if the differences are not common in the circles.

Encourage children to find a way they can always arrive at a common difference in the circles, or in the diamonds, one step more than the circles etc.

Objective:

To reinforce subtraction facts
Common Difference
(use numbers 1-5)
Count Down

Children form a circle around the room. Game starts with children taking turns counting by two's up to 20 and continues with children counting by three's up to 30, then four's to 40 etc. If a child misses his count he sits down. Last child up is the winner.

Objectives:

To develop skills for multiplication

To find number patterns
Counting Fun

Name a number and have the class give the next higher number. Pace the speed and difficulty of the numbers according to the children's ability.

Vary the rule and ask children to name the next lower number, the number that is two more, five more, ten more, etc.
Counting Fun
(Cont'd)

Begin counting by two's, three's, four's, etc. and ask the children to join you when they have discovered your pattern. All the counting stops when you hold up your hand.

Some patterns to try are:

2, 5, 8, 11, 14, ....
4, 7, 10, 13, 16, ....
23, 28, 33, 38, .......
7, 17, 27, 37, .......
56, 54, 52, 50, .......

Objectives:

To understand the counting order of numbers

To build skills in finding patterns
Count Up High

Use Page 30.

Children work in small groups. Each group receives a pair of dice and each player receives a game page and two markers.

One marker is placed under the ones column and the other is placed under the tens column.

Players take turns tossing the dice, adding the numbers showing on the dice, and moving their marker up the ones column that many spaces.

When a player's toss takes him past the nine space, he then moves the tens marker.

Player who reaches 100 first is the winner.

Variation:

Play same games using other bases.

Objectives:

To understand place value
To build counting skills to one hundred
Difference Skills

Give children page 32.

Teacher tosses two dice and tells children the numbers showing on each die. Children determine the difference. Tell them the difference is found by subtracting the smaller number from the larger one, or by counting how many numbers there are from one number to the other.

Repeat for ten tosses and have children record each difference on their score papers.

Give the answers orally and let the children check their work.

Variation:

Small groups of children take turns tossing the dice and recording their differences. After five turns children add up their scores and lowest score wins.

Objective:

To reinforce subtraction facts
Score

1

2

3

4

5

6

7

8

9

10

Total
Experiment with ABC 's

An activity for groups of 2 or 3 students.

Give them a very easy book and ask them to open to any page.

Let them keep a record of the number of times each letter of the alphabet appears.

(i.e. all the a's, e's, t's etc.)

Have them graph the results. (See "Picture Stories" page 132 for graphing directions.)

Compare the graphs from several groups. See if some letters appear more often than the others. Are there some letters that did not appear at all?

Make a prediction as to what the graph would look like on any page. Let a volunteer test the prediction.

Extended activity:

Do the same activity with a more advanced book.

Objectives:

To introduce probability and statistics

To build graphing skills
Fifteen

A game for two players.

Place 15 objects (such as beans, counters, disks etc.) between two players.

Players take turns removing only one, two, or three objects at a time.

Winner is the player who makes his opponent take the last object.

Encourage children to find a pattern that they can use to make sure that they always win.

Variations:

For young children begin with five objects.

For older or more advanced children begin with 21 objects.

Objectives:

To find patterns

To develop skills of strategy
Find My Home

Use page 36.

Cut out animals and place on different points of the grid.

Display to small groups of children.

Give children page 37 and let them fill in the ordered pairs for each animal’s home. (See page 16 for another lesson on ordered pairs.)

Objective:

To build skill in naming ordered pairs.
My home is at _______
Find the Numbers

Children love to search. Pages 39 to 41 provide opportunities for them to search for numbers.

For children who are just learning to recognize numbers, use overhead projector and let children work in small groups.

Older children each receive their own copy and work independently.

Objective:

To recognize and identify numbers
Five in a Row
Tic Tac Toe

Use page 43.

Two players use the same page.

A game for two children.

Players determine who is going to make x's and who is going to make o's.

Players take turns tossing dice.

They read the two numbers on the dice as ordered pairs. (See page 16)

A player may use them in either order he chooses and places his mark on the grid.

Winner is first player to get five of his marks in a row.

Variation:

This could be played with 2 teams and the grid on chalkboard or overhead projector.

Objective:

To build skills in plotting ordered pairs
Five in a Row

![Graph Diagram]
Select two teams.

Display a board with removable cards arranged in an array.
Mark numbers on cards and face numbers toward board. Re-
arrange cards for each game.

Children will take turns naming an ordered pair. (See
page 16 for directions.) The card in lower left hand
corner is (0,0).
That card is turned over and it is the score for that team.

Teams take turns and running scores are kept.

When all cards are turned over, the team with the highest score wins.

Objectives:

To reinforce addition facts

To build skills in naming ordered pairs
Forwards and Backwards

Ask the children to give some words that are spelled the same forwards and backwards. (mom, pop, dad, level, pep, pop, etc.)

Tell them they can make numbers that are the same forwards and backwards.

Put a 2 or more digit number on the board. Put its reverse under it and add. If the sum is not a number that reads the same forwards and backwards, then reverse the sum, place it underneath and add those two numbers.

Continue repeating this process until a sum appears that reads the same forwards and backwards.

For examples see next page.
Note: For younger children use only numbers from 1 - 4.

Example:

\[
\begin{align*}
23 + 32 &= 55 \\
30 + 03 &= 33 \\
14 + 41 &= 55
\end{align*}
\]

Objectives:

To reinforce addition facts

To introduce Palendromes
Freddy the Kangaroo

Use pages 49 and 50.

Make a number line on the chalkboard or overhead projector from $-10$ to $+10$.

```
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10
```

Introduce Freddy and explain that he likes to carry candy canes in his pocket. The candy canes are numbered and the number on the candy cane tells where Freddy wants to go.

A $+3$ on a cane tells that Freddy wants to go $3$ jumps.

A $-3$ on a cane tells that Freddy wants to go $3$ jumps.

Give some examples by putting Freddy on any number on the number line. Insert a candy cane and have a child move Freddy where he wants to go. Include several examples involving zero.

Children complete pages 51 and 52.

Variation:

For smaller children use only positive numbers.

Objectives:

To use a number line for addition and subtraction

To build skill in using negative numbers
Freddy the Kangaroo

1. Freddy starts at \(+2\). He carries a \(+3\) candy cane. He lands on \(+5\).

2. Freddy starts at \(+4\). He carries a \(-4\) candy cane. He lands on \(\_\_\_\_\).

3. Freddy starts at \(-3\). He carries a \(-5\) candy cane. He lands on \(\_\_\_\_\).

4. Freddy starts at \(-3\). He carries a \(+6\) candy cane. He lands on \(\_\_\_\_\).

5. Freddy starts at \(-2\). He carries a \(0\) candy cane. He lands on \(\_\_\_\_\).

6. Freddy starts at \(+4\). He carries a \(+3\) candy cane. He lands on \(\_\_\_\_\).


Make up some problems of your own

Freddy

Starts at _____, carries cane _____,
lands on _____.

Starts at _____, carries cane _____,
lands on _____.

Starts at _____, carries cane _____,
lands on _____.

Starts at _____, carries cane _____,
lands on _____.

Starts at _____, carries cane _____,
lands on _____.
Fun With $\textcolor{red}{\geq}, \textcolor{blue}{\leq}, \textcolor{green}{=}$

Game for two or more players.

Use page 54.

Players take turns tossing dice and recording the numbers shown on the dice on any two lines on the worksheets. After ten turns, and all lines have a number, a leader calls, "go."

Players then write $\textcolor{red}{\geq}, \textcolor{blue}{\leq}, \textcolor{green}{=} \text{ in each } \textcolor{red}{\bigcirc}.$

First player to finish his paper correctly wins the game and he may be the leader for the next game.

Variation:

Leader tosses the dice for every turn, and children place numbers on any line of their choice.

Objective:

To understand inequalities.
Geometry Cards

The Geometry Cards, pages 63-71 (include 26 master cards of squares, triangles, rectangles and diamonds, and 45 sub-set cards. The sub-set cards contain the parts that make up the master cards.)

The cards are designed to build skills in recognizing shapes, visual discrimination, matching, special relationships, and logical thinking.

The following pages offer a few of the numerous games and activities that provide hours of fun and learning for children.

Note:

It is not necessary to discuss the vocabulary with the children unless they ask about it. The purpose of including the geometric words on the cards is so that children will become aware that shapes have names. Repeated use of the cards will familiarize children with these names and many children will learn them on their own.

Objective:

To recognize geometric shapes and their component part:
Geometry Cards

Card Guessing

A game for two to five players.

A leader selects a master card and places it face down in the center of the group.

All sub-set cards are placed face up in the center.

Players take turns placing a sub-set card beside the master card. If the sub-set card is part of the master shape, the leader allows it to remain. If not, it is to be returned to the set of sub-set cards.

The player who guesses the shape on the master card first is the winner and becomes the leader for the next game.
Fast Draw

Game for two to five players.

Shuffle cards and place them face down. (Use the same number of decks for the game as there are players.)

Players take turns drawing a card from the pile.

When a player has drawn a master card and its complete sub-set, he puts it down on the table.

When all cards have been drawn the game ends.

Winner is the player with the most number of complete sets.
Geometry Cards

Filling Wholes

A game for two to five players.

Players use one deck of cards.

Players place all the master cards for three different shapes face up in the center. The sub-set cards that go with the master cards are placed face down.

Players take turns drawing a sub-set card. If the card belongs to one of the master cards in the center, the player places it on that master card.

Players must match sub-sets correctly. If the first card placed on a master card is an angle, then all the other sub-set cards for that master card will be angles.

Players have to keep any cards they cannot play.

Game is over when all cards have been drawn.

Winner is the player with the least number of cards in his hand.
Geometry Cards

Follow the Leader

Teacher introduces the activity by selecting a master card and, not letting anyone see it, gives directions telling how to make the shape shown on the card. The children are to follow the directions exactly as given to discover what shape has been selected.

Example:

Make a point. Go across a short distance. Stop. Do not lift the pencil and go the same distance down. Do not lift the pencil and make a straight line back to the beginning point.

(a triangle)

After the children understand what to do, a leader is selected. The leader draws a card and gives the directions.

When the leader is finished, the children can share their interpretations of the directions.
Geometry Cards

Geometry Relay

A game for two or more players.

Give each player a set of geometry cards.

Players shuffle their cards.

When given the signal to "Go," each player makes as many matching pairs as fast as he can.

First player to match all the pairs in the deck is the winner.

Variation:

Match master cards with sub-set cards.
Geometry Cards

High Toss

A game for 2 to 6 players.

For 2 players use 1 deck of cards.

For 4 players use 2 decks of cards.

For 6 players use 3 decks of cards.

Separate master cards from the sub-set cards. Sub-set cards are placed face down.

Players take turns tossing a die and taking as many sub-set cards as indicated by the toss. When a player gets a complete sub-set he may take the master card that goes with it.

After all the cards have been drawn, the player with the most number of master cards is the winner.
Geometry Cards

Take One

A game for 3 players.

Use pairs of master geometry cards.

Cards are shuffled and evenly distributed to each player.

When all cards are dealt, players match pairs, (any two cards that are alike), take them out of their hand and set them aside.

Players then take turns drawing one card from either of the other players he chooses. When he draws a card that will match one in his hand, he adds that pair to his pile.

Play continues until all pairs have been matched.

Player with the most pairs is the winner.
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<tr>
<th></th>
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Square

Square

Square

Square

Square

Square

Rectangle

Square

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<th>Angle</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Rectangle</td>
<td>Angle</td>
<td>Angle</td>
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</table>

Angle | Angle
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<tbody>
<tr>
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<td><strong>Diamond</strong></td>
</tr>
<tr>
<td><strong>Rectangle</strong></td>
<td><strong>Rectangle</strong></td>
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<tr>
<td><strong>Triangle</strong></td>
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<td><strong>Diamond</strong></td>
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</tr>
<tr>
<td>Triangle</td>
<td>Angle</td>
<td>Angle</td>
</tr>
</tbody>
</table>
Go!

Game for 2 to 5 players.

Use the 26 cards on the next 5 pages.

Dealer passes out five cards, face down, to each player. Then he places a card, face up, in the center of the table. This is the "Go!" card.

As soon as the "Go!" card is shown, players turn their cards over and line them up.

Players try to equal the number on the "Go!" card by making up a math sentence starting with the number or the first card, to equal the second card. Then he uses the number on the second card in a math sentence to equal the third card, until all cards are used.

Winner is the player who reaches the "Go!" card first. The game stops and the winner must repeat his sentence to all the players. If the player gives an incorrect sentence, he is out of the game and play continues until there is a new winner.

Example:

```
1  4  5  2  5
1+3=4  4+1=5  5-3=2  2+3=5  5+3=8
```

Objective:

To reinforce basic addition and subtraction facts

To understand that addition increases a number and subtraction decreases a number
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
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<tr>
<td>3</td>
<td>4</td>
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<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
Grab Bag Graphing

Each child has his own grab bag of shapes.

Use page 79.

Put shapes inside a paper bag and shake them up.

Have children draw out five shapes without looking.

Pass out graph on page 80 for children to make a picture of their collection. Have them trace each shape drawn from the bag in one of the squares. Keep shapes in the correct row.

Let them count how many shapes are in each set. Encourage children to compare their graphs.

Talk about: greater than, less than, equal, how many ways could they have been selected, etc.

Objectives:

To construct bar graphs from self-gathered data

To use counting to determine more, less, and equal
Toss a handful of large objects such as blocks, oranges, empty cartons etc. on the table. Leave them for a few seconds, then cover them.

Ask the children to guess how many were in the group. Let them prove their guess by counting.
Next, toss smaller objects such as erasers, pencils, rulers, compasses etc. Have children guess the number and prove by counting. If this skill is mastered, try even smaller objects such as popcorn, kidney beans, pat 'r clips, toothpicks etc.

Encourage children to round the numbers to the nearest 10. Accept the nearest rounded number.

Find ways to short cut the counting. For example: 50 beans fill one paper cup, so find out how many cupfuls there are.

Objectives:

To develop skill in estimation and number sense

To develop counting strategy
I Have an Area ——Copy Me

Use pages 84 to 90.

Give children several copies of page 90 and have them copy the designs on pages 84 to 89.

Teacher may enlarge these and display on chalkboard, or show them on an overhead projector.

Explain that the distance inside four square dots represents an area of one.

Have them mark the squares and half squares, (triangles) in each figure, add them and find the area for each shape.

\[
\text{\square} = 1 \quad \text{\triangle} = \frac{1}{2}
\]

Variation:

Teacher stimulates children to make and add their own figures.

Example: Make a 5, 3, 2 1/2, or 7 1/2 shape.

Objective:

To understand and find area
It Makes Cents

Activity for small group or entire class.

Supply addition/subtraction flash cards.

Supply play money.

A leader holds up the cards one at a time. The players take turns giving the correct answer. For each correct answer, players are given a play penny. If a child does not know the answer, or gives an incorrect answer, the card is shown to the next player. This continues until a player gives the correct answer and receives his penny. Then another card is shown.

Whenever it is a player's turn, he may make trades with the leader for other coins. If he has 5 pennies he may trade for a nickel, 10 pennies for 2 nickels, 5 pennies and one nickel for a dime, etc.

At the end of a predetermined amount of time, the players count their money. Winner is the player with the most money.

If the players put their money in envelopes, they can be put aside and used another time, giving the players an opportunity to exchange and add larger sums.

Objectives:

To regroup sums of money

To build addition/subtraction skills
Math Waffles

Use page 93.

Have children cut their papers into all different sizes of rectangles.

![legal rectangle](image)

![illegal rectangle](image)

Have children label their rectangles by rows and columns.

![2 x 3 rectangle](image)  
(2 by 3)

![3 x 2 rectangle](image)  
(3 by 2)

Classify rectangles by 2's, 3's, 4's etc. or by any other classification.

Discuss patterns and relationships. Note that a 3 x 2 rectangle is the same size as a 2 x 3 rectangle. A 3 x 3 rectangle has one more row, with 3 squares in it, than a 2 x 3 rectangle.

Objective:

To understand the operation of multiplication
Measure of the Day

Display a piece of yarn that measures some object in the room such as the width of a chair, length of the chalkboard eraser, height of the vase on teacher's desk, etc.

Children take a paper and either write the name, or make a drawing of the object they think the yarn measures. They drop their guess in the answer box.

At the end of the day, take the yarn down and have children prove which object was the measurement of the day.

Objective:

To build skills in estimating linear measure
Mini-Hex

A game for two players.

Use pages 96 or 97.

Each player chooses a different colored crayon.

Players take turns coloring in one of the hexagons.

Winner is the first player to get his color to go all the way across from one side to the opposite side.

Younger children may use the larger hexagons.

Objectives:

To build perception skills

To develop logical thinking
Moving Squares

Use page 93. (Squares or cubes may be used instead.)

Children cut out the squares.

Children take four squares and arrange them some way. To make an arrangement, sides must fully touch.

![Legal and illegal arrangements](image)

The children use the squares to make as many different arrangements as they can using four squares. An arrangement is different if it cannot be turned, rotated or flipped to look like another.

For children who complete this task quickly, let them try the above activity using five squares.

Children may trace their arrangements, cut them out, and make designs with them.

Objective:

To build perception skills
Mr. Machine

Use page 100 to make an overhead transparency.

Children try to guess what the machine does to numbers. A leader makes the machine do something different each time the game is played.

For example:

If a child puts a 1 in the machine, the machine sends out a 2. A 2 goes in, a 3 comes out. This time the machine adds one.

Another time the machine may subtract one, add two, or add zero etc.

Enrichment activity:

Use the number that goes "in" with the number that comes "out" as an ordered pair and plot. (Directions on page 16.)

<table>
<thead>
<tr>
<th>In</th>
<th>Operate</th>
<th>Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+1</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>+1</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>+1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>+1</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Objective:

To find number patterns
My Line Designs

Use pages 102 to 106.

Give children a straight edge and have them connect the dots that have matching numbers.

See if they can discover what makes their designs different. Older children will want to make designs of their own.

Variation:

Designs may be made with colors.

Objectives:

To use a straight edge

To discover the illusion of straight lines
My Number Book

Use pages 108 to 115.

Have children find and fill in the information on these pages.

Put the pages together so that each child has his own Number Book.

Children may compare the information in their books.

Use the information to do the Picture Story activities on page 132.

Note:

For the section "School Time", have children make clock hands to illustrate the time.

Objective:

To relate numbers to the real world
My Number Book by
My name has _____ letters in it.

Today's date is _________

My age is ____________

My birthday is on the ___ day of ________________

I have ___ brothers and sisters.

I have ___ grandparents.

I have ___ pets.

Page 1
My house number
is_____________________

My telephone number
is_____________________

My friend's telephone number
is_____________________

My school's telephone number
is_____________________

My friend's house number
is_____________________
I get up at ____ o'clock on school days.

I go to bed at ____ o'clock on school days.

We have ____ TV channels in our city.

My favorite TV show is on channel _____. 
I am ______ inches tall.

I weigh _____ pounds.

My clothes size is ____.

My shoe size is ____.
School Times
I leave for school at ____ o’clock.

School begins at ____ o’clock.

Recess is at ____ o’clock.
We have lunch at _____ o’clock.

School is out at _____ o’clock.

I get home at _____ o’clock.
My Secret Number

Let a child select a number between 1 and 50. He does not let the class know his number.

Children take turns asking the leader any question that can be answered by either a "yes" or a "no", i.e.:
"Is it greater than 7?"
"Is it less than 20?"

If a child says a number that is not the secret number, he is out of the game and cannot ask any more questions for that game.

The child who correctly guesses the secret number then becomes the leader for the next game.

Objectives:
To reinforce understanding of greater than and less than
To strengthen the order relationship of numbers
Nomograph Families

Use page 118.

Have children use nomograph and straight edge to review addition and subtraction facts up to 20.

Examples:

\[
\begin{array}{cccc}
5 + 4 &= 9 & 7 + 9 &= 16 \\
4 + 5 &= 9 & 9 + 7 &= 16 \\
9 - 4 &= 5 & 16 - 9 &= 7 \\
9 - 5 &= 4 & 16 - 7 &= 9 \\
\end{array}
\]

Objectives:

To understand relationship between addition and subtraction

To reinforce addition and subtraction facts using the number line
Number Relay

Children form teams. Teams line up facing the chalkboard and the teacher calls out a number.

Each team sends its front man up to write another name for that number. Player then goes to the back of the line.

A scorekeeper tallies the team that won. Game is over when each member has had a turn. The teacher may use the same number for the entire game, or she may want to change the number for each turn.

Winning team has the highest score.

Example:

7

4+3
10-3
5+2
2+2+3
17-10
6+1
8-1

Score

11

Objectives:

To reinforce the concept that numbers have many names.
Order of Symmetry

Cut out the shapes on page 121.

Have children choose a shape and trace its outline.

Let them turn their shape around or over, and have them find out in how many positions the shape fits into its own outline.

This is called the Order of Symmetry.

Have them find out the Order of Symmetry for each shape.

Let them discover how a circle differs from the other shapes.

Objectives:

To introduce symmetry

To provide an example of infinity
Paper Cup Toss

Use page 123.

A game for two or more players.

Materials: One paper cup for each group.

Players take turns tossing the cup into the air and letting it land.

If it lands on its side, player gets 1 point.
If it lands on the top, player gets 2 points.
If it lands on the bottom, player gets 3 points.

Player records his score for each turn.

When each player has had 5 turns, players add their scores.
Winner is the player with the highest score.

Variation:

Toss coins, giving heads one point and tails two points.

Objective:

To provide background for understanding probability
Score

1

2

3

4

5

Total
Park the Cars

Use pages 125 and 126.

The garages show numbered spaces.

Page 125 has rows of numbered cars.

Children color cars, cut them out and paste them in proper garages.

Variation:

Cars and garages are cut out, matched, and lined up in counting order.

Objective:

To build skills in recognizing and matching cardinal numbers
Penny Toss

An experiment for small groups of children.

Have the group make 100 tosses of a penny and record whether each toss is a head or a tail.

Have children observe which comes up the most. Let them predict the outcomes for the next few tosses.

Bring up the question, "What are the chances of a toss being a head?" Discuss 50%, 1/2, or the chances are even.

Relate the understanding of making predictions to real life situations:

1- Weather: There is a greater chance of rain if the sky is cloudy.

2- Predict chances of getting a prize in the gum ball or candy machine.

Objectives:

To understand the laws of chance

To make predictions
Use pages 129 to 131.

Write directions for children on chalkboard or on large tag, choosing different colors each time.

Objective:

To recognize geometric shapes
A graph is a picture that gives information.

Have each child make a picture of his favorite animal. 5 1/2 x 8 1/2 paper is suggested.

Use a large piece of butcher paper and paste all the dogs in one row, cats in another, monkeys in another, etc.

Have children interpret the graph they have just made by discussing such questions as:

Which animal is the favorite?

Which animal is the second favorite?

How many more of one kind than another?

How many kinds of animals are there on the graph?

What are some of the animals not included?
Other suggested graph topics:

Favorite:

- T.V. Show
- Sandwich
- Cereal
- Story
- Dessert
- Color
- Holiday
- Toy
- Game

Number of:

- Brothers and sisters
- Blocks I walk to school
- Letters in my name
- Pets in my family
- Birthdays in our room
- Our heights
- Color of our eyes
- Our shoe sizes

The list is inexhaustible and the graphs should be as innovative and creative as the teacher and the children can make them. Always include much interpretation.

Objectives:

To help children see relationships

To read and interpret bar graphs
Rescue the Princess

Use page 135 for the game board.

Use page 136 to make spinner and markers. Color if desired.

Players take turns spinning for a number and move that many spaces.

Children follow directions found in spaces when they land on them.

Winner is the first player to reach the princess.

Objective:

To use the counting order of numbers
Rescue the Princess

Chased by bear. Go 2 spaces.

Go back 4 spaces.

Stop to eat. Lose 1 turn.

Sun out. Go ahead 2 spaces.

Horse drops shoe. Lose 2 turns.

Get new horse. Go ahead 5 spaces.

Fall in pond. Lose 1 turn.
Roman Addition

Teacher writes Roman numerals in empty egg carton sections.

Children take turns standing on designated line and tossing "lagger" into egg carton sections.

Each child has 3 turns. Score keeper records each score. Child returns to seat and adds his total score.

Highest score wins.

Variation:

Game may be played as relay with two teams.

Objectives:

To recognize Roman numerals

To build addition skills
Game for 2 or more players.

Use page 139 to make a spinner, and page 140 to keep score.

Each player has a marker placed on "Start".

Player spins and moves his marker clockwise the number of spaces shown on the spinner. Player then records the number he lands on as his score for that spin.

The player leaves his marker there and that becomes his starting position for the next turn.

Players add their scores after five spins each, and the winner is the one with the highest score.

Variations:

Winner is the player whose last turn lands him on the space with the highest number.

Winner is the player with the lowest score.

Objective:

To use Roman numerals

To use a finite number system
Score

1 ______

2 ______

3 ______

4 ______

5 ______

Total ______
Scamper

Children form a circle with one child in the center. Children in the circle number off.

The game begins as the teacher calls two numbers. The children who represent those numbers try to change places before the center child takes one of their places. The center child takes the number of the child in the circle he replaces, and that child goes to the center.

Objectives:
To build listening skills
To reinforce number recognition
See-Saw Activities

Supply an equal arm pan balance either commercial or teacher made.

1- Show them two objects and ask if they think they would weigh the same, or if one is heavier than the other. Children may feel the objects. Let them test their predictions by placing each object in one of the pans.

2- Give them various objects to put in the pan balance so they can find out which are heavier, which are lighter, and what relationships the objects have to each other.
Examples:

Let them find two things they think will balance and try them.

Find out how many small balls will balance a large ball.

Place a wet sponge and a dry sponge on the balance to see which is heavier.

See what happens to the wet sponge as it dries.

Find out how many cups of rice it takes to balance a cup of beans.

Fill one cup with macaroni and one cup with nuts. Count which has the most objects, then discover which weighs the most.

Count how many paper clips it takes to balance an eraser, pencil, etc.

Weigh various size rocks, boxes, empty plastic bottles etc.

Variation:

Provide tasks on job cards for independent activities.

Extended Activity:

Set up in math lab as a unit on measurement.

Objectives:

To understand weight relationships

To gain skill in estimating weight
**Shape Clues**

A group or class activity.

Use page 121.

Place shapes in a covered box. A leader selects one shape from the box and hides it from the group.

The leader gives one clue as to the shape he has hidden. If the shape is not identified, the leader gives a 2nd clue, then a 3rd clue, 4th clue etc. until the shape is identified. Clues must be accurate and appropriate. The leader tries to stay up as long as possible and gives only one detail for each clue. Child who guesses the shape is the next leader.

Winner of the day is the leader who was able to give the most clues.

Example:

- It has many sides.
- It has many angles.
- It has the same number of sides as it has angles.
- All the angles are the same size.
- It has four sides.
- Two sides are longer than the other two sides.
  (rectangle)

Objectives:

- To recognize the attributes of geometric shapes
- To describe a geometric shape in detail
Six High

Use page 146.

Two or more children may play.

Player tosses 2 dice and writes the larger number in the tens column and the smaller number in the ones column.

Children take turns for any pre-determined number of turns. When the game is over, children add their scores.

Child with largest score wins.

Example:

<table>
<thead>
<tr>
<th>First Player</th>
<th>Second Player</th>
</tr>
</thead>
<tbody>
<tr>
<td>tens</td>
<td>ones</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Total 127

Total 126

Objective:

To understand place value

To reinforce addition facts
Score for Six High

<table>
<thead>
<tr>
<th>Game 1</th>
<th>Game 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>tens</td>
<td>tens</td>
</tr>
<tr>
<td>ones</td>
<td>ones</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>Total</th>
</tr>
</thead>
</table>
Tangrams

Use pages 149 to 156.

Tangrams are a classic. No one knows how long they have been around but they have fascinated children and adults for years.

The story is told that many many years ago Tan, a poor Chinese boy, was delivering a valuable piece of square tile to his emperor. On the way he dropped it.

It broke into the seven pieces known as the Tangram.
While Tan was trying to put it back into its original shape, he discovered that he could make all kinds of interesting designs and shapes with these seven pieces. Children ever since have found hours of enjoyment using Tangrams.

Have the children cut out the original Tangram pieces from page 149 and use them to make the shapes and designs on pages 150 to 156.

Some children will want to make designs of their own, trace them and trade with a friend.

Younger children will use fewer pieces to make designs.

Variation:

Coloring the pieces reinforces visual perception.

Objective:

To build visual perception skills

To develop creative thinking
Three in a Row Addo

Supply flash cards using addition facts to ten.

Players use page 158 and fill in the squares with any number from 1 to 10. Numbers are placed in random order. Each number is used only once.

Game is played like Bingo. A leader selects one of the cards and reads it to the players. If a player has that number on his paper, he crosses it out or covers it with a marker.

Winner is the first player to get three in a row. He becomes the leader for the next game.

Objective:

To reinforce addition facts to sums of ten
Tool Kit Activity

Use page 160.

Children cut on lines around tools and paste on the line on page 161 that matches the length of the cut-out.

Objective: To estimate linear measure
Tools
Tree House

Two to four children may play the game.

Each child colors a footprint on page 163. He cuts it out and uses page 164 to play the Tree House Game.

Flash cards provided by the teacher containing the addition facts are placed face down on the table. Children take turns choosing a card.

If a child gives the correct answer, he moves his footprint marker up the ladder one step.

Child who reaches tree house first wins the game.
What Am I?

Materials:

Pages 166 to 173.

Crayons and scissors (optional).

The What Am I activities are a series of fascinating follow-the-dot pictures.

The children will have fun naming their pictures and coloring them.

Pages may be made into a book, or figures may be cut out and used to build reading skills.

Objective:

To reinforce the counting order of numbers.
I am a
I am
I am a ___
What's My Measure?

Use page 175 to record the results of the following activities.

Have children use their hands to measure their desks or tables.

Be sure they understand that they begin at one edge and measure how many hands it takes to get to the other edge, rounding off at the end.

Children next measure their desks using a book, then a shoe, a pencil, an arm, and last, a ruler.

Let the children compare their measurements and discover the variety of answers when all measure the same desk.

Lead the group into discovering that the ruler gives the same measurement for everyone.

Objective:

To understand the need for a standard unit of measure
My desk measures

_________ hands

_________ books

_________ shoes

_________ pencils

_________ arms
(from elbow to tip of longest finger.)

_________ rulers
Where's My Cage?

Use pages 177 to 179.

Cut out and display the animals and their cages on pages 177 and 178. Place each animal next to a cage.

Give children page 179. They fill each cage with the number that is on the animal next to that cage in the teacher's display.

First player to finish is the winner and he may change the cages for the next game.

For younger children, use only 3 animals and 3 cages with di.to page 180.

Objective:

To understand the rule for substitution
Where Should My Numbers Go?

Use page 182, 183, or 184.

A leader tosses a die and the players put the number showing on the die in any one of the Game 1 spaces he chooses.

The leader tosses again, as many times as there are spaces for that game, and at each toss the players choose any empty place to put the number tossed. When all spaces are filled, the winner is the child whose number reads as the highest number and he is the leader for the next game.

Discuss with the players all possible scores from the numbers tossed.

For example, if a game included the numbers 2, 4, and 6, the possible combinations would be:

- 2, 4, 6
- 2, 6, 4
- 4, 6, 2
- 4, 2, 6
- 6, 4, 2
- 6, 2, 4

Winner would have 6, 4, 2 and read off 642.

Variation:

Winner is the player with the lowest score.

Objectives:

To understand place value
To read numbers
Game 1

Game 2

Game 3

Game 4

Game 5
Word Searching

Use pages 186 to 190

Let children find the mathematical terms.

Words are hidden horizontally, vertically and diagonally only.

Objective:

To build a mathematical vocabulary
Find 3 math words
Find 5 math words

---

---

---

---

---
Find 5 math words
<table>
<thead>
<tr>
<th>T</th>
<th>O</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>I</td>
<td>N</td>
</tr>
<tr>
<td>V</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>N</td>
<td>I</td>
<td>N</td>
</tr>
</tbody>
</table>

Find 5 math words

_____   _____

_____   _____

_____
Find 7 math words

<table>
<thead>
<tr>
<th>M</th>
<th>A</th>
<th>T</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>W</td>
<td>L</td>
<td>E</td>
</tr>
<tr>
<td>D</td>
<td>O</td>
<td>N</td>
<td>S</td>
</tr>
<tr>
<td>F</td>
<td>I</td>
<td>V</td>
<td>E</td>
</tr>
<tr>
<td>S</td>
<td>E</td>
<td>V</td>
<td>E</td>
</tr>
</tbody>
</table>

Find 7 math words: ______________  ______________  ______________  

__________  ______________  ______________  

____________  ______________  ______________  

____________  ______________  ______________  

____________  ______________  ______________
Solutions to Word Searching Activities.

<table>
<thead>
<tr>
<th>Page 186</th>
<th>Page 189</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>Five</td>
</tr>
<tr>
<td>Three</td>
<td>Nine</td>
</tr>
<tr>
<td>Two</td>
<td>One</td>
</tr>
<tr>
<td></td>
<td>Ten</td>
</tr>
<tr>
<td></td>
<td>Two</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Page 187</th>
<th>Page 190</th>
</tr>
</thead>
<tbody>
<tr>
<td>Even</td>
<td>Add</td>
</tr>
<tr>
<td>Five</td>
<td>Five</td>
</tr>
<tr>
<td>Nine</td>
<td>Less</td>
</tr>
<tr>
<td>One</td>
<td>Math</td>
</tr>
<tr>
<td>Ten</td>
<td>One</td>
</tr>
<tr>
<td></td>
<td>Seven</td>
</tr>
<tr>
<td></td>
<td>Six</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Page 188</th>
</tr>
</thead>
<tbody>
<tr>
<td>Even</td>
</tr>
<tr>
<td>Math</td>
</tr>
<tr>
<td>More</td>
</tr>
<tr>
<td>One</td>
</tr>
<tr>
<td>Ten</td>
</tr>
</tbody>
</table>
Please send me

_________ Happy Math at $9.95 ea (add 25¢ for handling)

SHIP TO: __________________________________________

BILL TO: (If accompanied by purchase order)

______________________________________________

______________________________________________

______________________________________________

______________________________________________

Check Enclosed

P. O. Number____________________

NOTE: CALIFORNIA RESIDENTS ADD 5% SALES TAX

Please send me

_________ Happy Math at $9.95/ea (add 25¢ for handling)

SHIP TO: __________________________________________

BILL TO: (If accompanied by purchase order)

______________________________________________

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Check Enclosed

P. O. Number____________________

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Check Enclosed

P. O. Number____________________

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