Setting the Stage-Math

Match the concept with the appropriate definition

Concept		Definition
Mode		A. A unit of measurement that is always the same
Fraction		B. A unit of measurement from the everyday environment that differs
X Axis		C. A grid filled with numbers 1-100, great strategy for place value
Order of Operations		D. The value of the position of a digit in a number.
Rectangle		E. The result of division.
Graph		F. The result of addition.
Y Axis		G. The amount that remains after one quantity is subtracted from another.
Square		H. The result of multiplication.
Weight		I. A number found by dividing the sum of two or more addends by the number of addends. Often referred to as the average.
Sum		J. When the numbers are arranged from least to greatest, the middle number of a set of numbers, or the mean of two middle numbers when the set has two middle numbers.
Standard Unit of Measurement		K. The number that appears most frequently in a set of numbers. There may be one, more than one, or none.
Place Value		L. Rules describing what sequence to use in evaluating expressions: (1) Evaluate within grouping symbols. (2) Do powers or roots. (3) Multiply or divide left to right. (4) Add or Subtract left to right.
Non-Standard Unit of Measurement		M. A way of representing part of a whole or part of a group by telling the number of equal parts in the whole and the number of those parts you are describing.
Median		N. A drawing that shows a relationship between sets of data.
Hundreds Chart		O. On a coordinate grid, the horizontal axis.
Difference		P. On a coordinate grid, the vertical axis.
Mean		Q. A measure of the heaviness of an object.
Product		R. A parallelogram with four congruent sides and four right angles.
Quotient		S. A quadrilateral with two pairs of congruent, parallel sides and four right angles.

ASSESSMENT OF PARAPROFESSIONAL PROFICIENCY
STUDY GUIDE

MATHEMATICS

Place Value:

It is important for students to understand place value in mathematics. This skill is critical to all mathematics functions. In the early stages of number awareness, students learn single digit numbers or those in the "ones" place. Teachers use many manipulatives, or hands-on, activities to help students develop the concept of one-to-one correspondence with numbers. In counting objects, students should touch and push or pull the object as they count. In this way they begin to understand that the number "one" has meaning attached. This is the concrete or lowest level of math comprehension. At this level students will be able to see and touch the object that corresponds to the number symbols they are learning. As students become more advanced they move from counting single digit number to two-digit numbers. They are now moving into the "tens" place. Manipulatives are especially important at this stage of math comprehension because students are learning that 10 single objects, or "ones" are now combined to make one set of ten or the "tens" place. Unifix cubes that may be put together and taken apart are often used to help students with this concept. Below is an example of how a student might use unifix cubes to differentiate between place value of ones and tens.

The symbols above represent one "ten" and three "ones" which would be written as <u>13.</u> As students become more advanced they may begin to use base ten blocks and a hundreds chart to practice the concept of place value.

Place value is also important as students work on the concept of rounding. The easiest way for a student to remember how to round a number is to look at the number in the place to the right of the place to which he is rounding the number. If that number is 5 or less, the number is rounded up, and if the number is less than 5, the number is rounded down. For example a student may be asked to round the following number:

4283
Four thousand, two hundred, eighty-three.
- The 4 is in the thousands place.
- The 2 is in the hundreds place.
- The 8 is in the tens place.
- The 3 is in the ones place.

> ➤ If rounding to the nearest "ten", look at the number to the right of the tens (8) place. Since this number is a 3 (less than 5), the number 3 would be rounded down, or dropped off, to make the number 4280.

> ➤ If this number is rounded to the nearest "hundred", look at the number to the right of the hundreds (2) place. This number (8) is more than 5, so the 5 would be rounded up to the next 10, making the 2 (200) a 3 (300). The number is then rounded to 4300.

> ➤ If this number is rounded to the nearest "thousand", look at the number to the right of the thousands (4) place. This number (2) is less than 5, so the 5 would be rounded down, or dropped off, to make the number 4000.

Mean, Median, and Mode:

In teaching children how to find the **mean** number, the procedure is to add all the numbers and divide by the total amount of number in the group. The mean is the same as the average.

The **median** is found by putting the numbers in order, left to right, from the smallest to the largest. The number that is found right in the middle of the group of number is the median.

The **mode** is the number that occurs most frequently in a group of numbers.

Take a look at the following set of numbers:

Example: **5,9,3,7,6,3,8,1,4**

> ➤ The **mean** would be 46÷9, which is 6.1 or rounded to 6.

> ➤ To find the **median** the number would be listed as follows:
> 1,3,3,4,5,6,7,8,9
> The number in the middle is 5, so it is the median.

> ➤ To find the **mode**, look at any number that is repeated in the list. In this case the number 3 occurs most often, so it is the mode.

Fractions:

In teaching children to work with fractions they must be able to understand the concept of a fraction as well as the vocabulary. Study the example below:

2
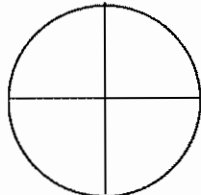
This pie is divided into 4 parts. If we were to write a fraction to describe one piece of the pie, we would write 1/4. The bottom number of the fraction is the total number of parts in the whole. This number is called the denominator. The top number is the part of the whole to which you are referring. The top number is called the numerator. A clue to help remember these terms is that the denominator is always the number on the bottom or "down."

When a student is adding or subtracting fractions, it is always necessary for the fractions to have the same denominator. If they do not, the first step in the process is to find the least common denominator. This is the smallest multiple of the denominators of both fractions.

Example: 2/7 + 3/5

The smallest number that is a multiple of both denominators (7 & 5) is 35. Therefore, the least common denominator for these two fractions is 35. To convert the unlike fractions to like fractions using this denominator, multiply the numerator and denominator by the number that was the least common multiple of the new denominator:
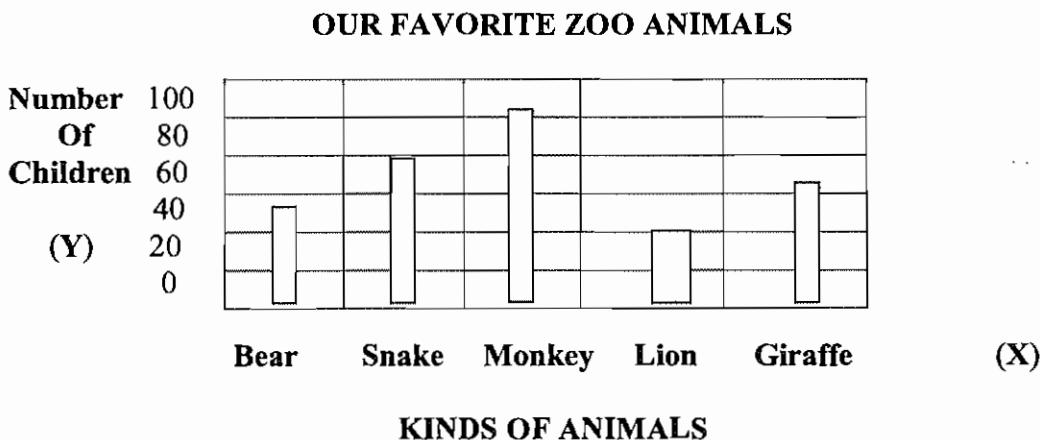
7 is multiplied by 5 to get 35 so 2/7 becomes 10/35
5 is multiplied by 7 to get 35 so 3/5 becomes 21/35
Now you have a new equation: 10/35 + 21/35 = 31/35

Graphs:

Graphs are used to organize information into a concise form. There are many types of graphs. One of the most common graphs is a bar graph. A bar graph has an X axis and a Y axis. The X axis is the horizontal line and the Y axis is the vertical line. A clue to help students remember which axis is which is "you have to run before you can fly," and X comes before Y in the alphabet. Therefore, the horizontal line represents "running" and the vertical line represents "flying."

Example of bar graph: The students in 2nd grade went to the zoo. When they returned the teacher asked them to tell their favorite animal. This graph shows the results.

OUR FAVORITE ZOO ANIMALS

Number	100
Of	80
Children	60
	40
(Y)	20
	0

Bear   Snake   Monkey   Lion   Giraffe   (X)

KINDS OF ANIMALS

3

From this graph we can tell that the monkey was the favorite animal of most children and the lion was the least favorite.

Order of Operations:

When assisting students with longer, more complex equations, it is important that they understand the order of operations. In working such problems, students should first look at any numbers in parenthesis, then any powers or roots. The remainder of the operations follows:

Multiply, divide, add, subtract.

An easy way to help students remember the order of operations is the following sentence: "Please pardon my dear Aunt Sally."

Parenthesis, powers, multiplication, division, addition, subtraction

For younger students simply use "My dear Aunt Sally" since they may not be working more complex equations.

Using the order of operations the following problem would be solved as shown:

$8 + 6 \times 4 - 8 \div 2 =$

$8 + (6 \times 4) - (8 \div 2) =$

    24   4

$8 + 24 - 4 = 28$

TEKS/TAKS:

The Texas Assessment of Knowledge and Skills (**TAKS**) is the test that is administered to determine how well a student has learned the Texas Essential Knowledge and Skills (**TEKS**), which is the standard state curriculum.

The following is a sample of the mathematics TEKS for grades 4

- The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.
  - A student expectation for this objective might be that the student be able to use estimation to find reasonable answers. Below is an example of a **TAKS** question related to this **TEKS**:

While on vacation, Emily went shopping everyday. On Monday she spent $5.34 on a tee shirt. Tuesday she spent $1.92 on postcards. Wednesday she bought a book that cost $3.59. Before leaving for home on Thursday, Emily purchased a coffee mug for her grandmother that cost $2.89. About how much money did Emily spend in all while on vacation?

A $10.00

B $14.00   The correct answer is B.

C $12.00

D $15.00

Standard and Non-Standard Units of Measure:

Students must learn how to use standard and non-standard units of measure. A standard unit of measure is something that will always be the same and is commonly used for measurement. Examples of standard units of measure are rulers, yardsticks, measuring cups, and tape measurers. Non-standard units of measure would be used when a standard unit of measure is not available or practical. For example, if a student were told to use an object in his desk, that is a non-standard unit of measure, to measure the width of the desk, he might use a pencil. He would not use a ruler because it is a standard unit of measure. As with standard units, you should use the most practical non-standard unit of measure for the object being measured. Obviously, it would make more sense to use a broom handle to measure the length of a room than a pencil, although both would be considered non-standard units of measure.

Math Vocabulary:

It is important for students to understand the vocabulary associated with mathematics. Each mathematical operation has a different name for the answer. Below are terms students should know:

> - **Sum**----------The answer to an addition problem
> - **Difference**—The answer to a subtraction problem
> - **Product**-----The answer to a multiplication problem
> - **Quotient**----The answer to a division problem

Setting the Stage-Math

Answers

Term	Letter	Definition
Mode	**K**	A. A unit of measurement that is always the same
Fraction	**M**	B. A unit of measurement from the everyday environment that differs
X Axis	**O**	C. A grid filled with numbers 1-100, great strategy for place value
Order of Operations	**L**	D. The value of the position of a digit in a number.
Rectangle	**S**	E. The result of division.
Graph	**N**	F. The result of addition.
Y Axis	**P**	G. The amount that remains after one quantity is subtracted from another.
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Weight	**Q**	I. A number found by dividing the sum of two or more addends by the number of addends. Often referred to as the average.
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Standard Unit of Measurement	**A**	K. The number that appears most frequently in a set of numbers. There may be one, more than one, or none.
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Non-Standard Unit of Measurement	**B**	M. A way of representing part of a whole or part of a group by telling the number of equal parts in the whole and the number of those parts you are describing.
Median	**J**	N. A drawing that shows a relationship between sets of data.
Hundreds Chart	**C**	O. On a coordinate grid, the horizontal axis.
Difference	**G**	P. On a coordinate grid, the vertical axis.
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Quotient	**E**	S. A quadrilateral with two pairs of congruent, parallel sides and four right angles.

MATH WORD WALL

Add	Subtract	One
Hundred	Fact family	Sum
Difference	Regroup	Odd
Even	Just after	Just before
Greater than	Less than	One less
One more		

Words for Addition

And	In all	All
Both	Altogether	Sum
How many		

Words for Subtraction

Left	Difference	Fewer than
Were still	Have left	Not
Less than	How many less than	Still there

JOURNAL

Respond to the following prompts:

Page 1: What is the importance of math?

Page 2: Describe your experiences in school learning math. Include what you remember about the best teacher you had. Describe the teaching style of the teacher in whose class you had a difficult time.

Page 3: Why is it important to use manipulatives to teach math?

Page 4: What strategies or techniques are most important to remember when working with children on their math skills?

BEST PRACTICE FOR TEACHING MATHEMATICS

:

1. Use various materials to teach skills and concepts.

2. Use different instructional techniques.

3. Have students demonstrate their understanding of the math process by writing an explanation of how they solved the problem.

4. Allow students to see their progress (e.g., records of performance).

5. Teach the language of mathematics (e.g., word walls, flash cards, etc.).

6. Use a variety of cues to check for understanding (e.g., thumbs up, color coded cards, happy face cards, etc.).

7. Include concrete, representational, and abstract activities.

8. Avoid over reliance on workbooks for dictating curriculum; provide practice opportunities.

9. Use instructional approaches that will ensure comprehension and mastery of skills and concepts, such as cooperative learning, graphic organizers, use of manipulatives, etc...

10. Avoid excessive paper-and-pencil drill that serves merely as busy work rather than as a meaningful practice experience.

11. Link new instructional knowledge to present knowledge.

12. Show students, and have students explain how mathematics is part of daily living.

13. Teach mathematical skills and concepts within a problem-solving context.

These best practices are supported by Ashcock, 1986; Basroody, 1987; Bley & Thornton, 1989; Cawley, Miller & Carr, 1989; Mercer & Mercer, 1989.

What is Mathematics?

If you think of mathematics solely as adding, subtracting, multiplying, and dividing numbers, then, you will probably stress computation and perhaps neglect important applications. If you think that mathematics is a set of relationships that enables people to solve everyday problems, you will probably stress applications and avoid problem-solving activities that are not specifically related to everyday problems. If you think it is primarily a set of logically organized deductive systems, you will be tempted to teach topics as they are logically developed and may ignore the fact that psychologically, children cannot always handle the logical development of mathematical ideas. How a teacher views mathematics is important. Definition: The study of numbers and their form, arrangement and associated relationship using rigorously defined literal, numerical and operational symbols.

How Do Children Learn Mathematics?

Research indicates that children must develop higher level thinking abilities in order to interpret certain mathematical concepts. Because the development of some of these abilities is so natural, teachers often fail to consider that children in certain stages of development may not have acquired them. To be an effective teacher you must know when children can be introduced to a given concept and at what level of abstraction they can deal with the concept. Basically there are three levels at which concepts can be represented: concrete, pictorial, and symbolic.

- *Concrete Level.* A concept can be represented by the appropriate manipulation of objects. *Example:* Placing three beans into each of four margarine tubs and finding the total number of beans illustrates that $4 \times 3 = 12$.

- *Pictorial Level.* A concept can be represented by appropriate pictures. *Example:* A picture of four groups of three to illustrate $4 \times 3 = 12$.

- *Symbolic Level.* A concept can be represented by symbols. *Example:* $4 \times 3 = 12$.

The essential difference between the first two levels and the third is that on the first two levels, meaning can be discovered simply by examining the concrete and pictorial representations. The meaning of symbolic representations, however, must be learned.

What Mathematics Should Children Learn?

The concepts which children learn must be useful and entertaining. Educators must carefully examine the kinds of global problems children encounter while growing up and the kinds of mathematical skills they will need as adults.

1. Students will need problem-solving skills and strategies.

2. Students will need efficient computing and estimating skills, even though calculators and computers will revolutionize the way we think about teaching these skills.

3. Children will need measuring skills. The adoptions of the metric system will influence how we represent them.

4. The growing use of both metric concepts and calculators will increase the need to teach decimal notation earlier.

5. Children will also need to develop geometric ideas that enable them to interpret and organize their environment.

6. Students will need an understanding of probability and statistics.

PRE-NUMBER CONCEPTS

Developing Pre-Number Concepts

There are many pre-number concepts that children must acquire before they can use whole number concepts correctly. These pre-number concepts enable children to recognize some significant feature of whole numbers:

♦ With whole numbers, we can determine how many objects are in a set.

♦ With whole numbers, we can compare two sets and find whether one set has as many as, more than, or less than another set.

Classifying

Classification occurs all the time. Children must learn to perform classification tasks early, not only because the ability to do so leads to the development of sound number ideas but also because these abilities are necessary for organizing the environment.

Objects can be classified by designating a general attribute, such as shape, size, color, or type of material, etc. Once an attribute has been designated, the objects can be put into specific attribute classes. Suppose a set of objects is to be classified and the general attribute is color. The objects would then be placed into specific color classes: red, blue, purple, etc. The following are classification tasks that children should learn to perform, listed from simple to more difficult:

♦ Select objects having a specific attribute. For example. the child is given a set of colored objects and is asked to pick those that have a specific color.

♦ Sort objects on the basis of a general attribute. For example. the child is given a set of differently shaped objects and is asked to separate the objects into groups so that all the objects in a group have the same shape.

♦ Duplicate a pattern. For example. the child is given a set of objects grouped in a particular way and is asked to use other objects to make a similar arrangement

♦ Extend a pattern. For example. the child is given a row of objects and asked to find the one that comes next.

Materials for classification activities are easy to collect. Usually discarded objects can be used or inexpensive objects can be purchased.

Finding the Relation Between Two Sets

Learning whole-number concepts is based upon the ability to decide if the objects of two sets can be matched one-to-one; that is, the ability to decide whether a matching can be achieved so that for every object in the first set, there is exactly one object in the second set. The ability of children to make such decisions leads to the formation of three important concepts:

♦ *Conserving Relations*

A one-to-one matching activity to determine whether there are as many objects in one set as in another even when the order is rearranged, this is said to conserve the relation.

♦ *Classifying on the Basis of the As-Many-As-Relations*

Classifying sets on the basis of the as-many-as relations. A collection of sets is sorted into piles so that each set in a pile has the same number of objects.

♦ *Ordering Sets on the Basis of the More- Than or Less- Than Relation*

Classifying sets on the basis of the as-many-as, more-than, or less-than relation leads to ways for ordering sets. Children first find the relation between two given sets. A third set is then presented, and children are required to "put it where it belongs"; between the original sets, to the right of both sets, or to the left of both sets. Finally, children should have experience sorting a collection of sets into categories according to the as-many-as relation and then arranging the categories according to the more-than or less-than relation.

These concepts allow children to compare two sets and determine the relation that exists between them.

♦ When two sets of objects can be matched one-to-one, then one set has as many as the other set (as-many-as relation}.

♦ When two sets of objects cannot be matched one-to-one, then one set has more than the other set (more-than relation), and one set has less than the other set (less-than relation).

Naming A Family of Sets with a Number

When the pre-number tasks can be performed. children are ready to be introduced to the numbers 1 through 10. First they learn to associate a number with a family of sets. They must associate the number 1 with any set having as many as one item. Appropriate association must be made for the numbers 1 through 10. Since children have previously learned to order sets, learning these number associations allow them to grasp concepts involving order relations of numbers.

O

The number 0 is special because it is associated with the family of all sets that have no members. At first this number idea is hard for children to understand, so it is wise to introduce the numbers 1 through 10 before introducing 0.

Once children are accustomed to using these numbers to tell "how many," they can more readily accept that 0 tells "how many" when a set has no members.

Getting Ready to Add and Subtract

Once children can count to ten, related readiness concepts for addition and subtraction should be introduced. Appropriate readiness concepts for addition grow out of experiences requiring children to answer these questions:

- ◆ How many are in each of these sets of objects?
- ◆ How many objects are there in all?

Subtraction is more complex. Appropriate readiness concepts grow out of experiences that require children to answer a variety of questions:

- ◆ How many objects are left in this set when these many objects are removed? **(take away question)**
- ◆ How many more objects must be put with this set to make a set with these many? **(missing addend question)**
- ◆ How many more objects are in this set than in the other? **(comparison question)**

Activities stressing these questions should be very informal. At this time, the addition symbol, the subtraction symbol, and number sentences should not be introduced. Children should describe observations orally or should represent observations by manipulating concrete objects or by indicating numbers.

NUMBER CONCEPT TERMS

:

Algorithms - A computational procedure to follow when operations involve larger numbers.

Natural Numbers - Counting numbers

Whole Numbers - Natural numbers and zero

Integers - Natural numbers, their negatives, and zero

Rational Numbers - Fractions of the form a/b where a and b are integers and b is not 0

Irrational Numbers - Cannot be represented in the form a/b, where a and b are integers. These are numbers with decimal representations are non-terminating and non-repeating numerals.

Real Numbers - Consist of all rational and irrational numbers

Prime Numbers - Having exactly two factors

Composite Numbers - Whole numbers with more than two factors .

Greatest Common Factor - Largest factor that two numbers have in common

Least Common Multiple - Whole number that is the smallest nonzero multiple that two numbers have in common

References:

Wooton. William, and Irving Drooyan. Intermediate Algebra. Belmont: Wadsworth Publishing Company. 1980.

Troutman. Andria and Betty Lichtenberg. Third Edition Mathematics a Good Beginning Strategies for Teaching Children. Monterey: Brooks/Cole Publishing Company. 1987.

Name: _____ Blank Hundreds Chart

Name: _____ Blank Hundreds Chart

Understanding Place Value

Understanding place value is essential if children are to understand regrouping in addition
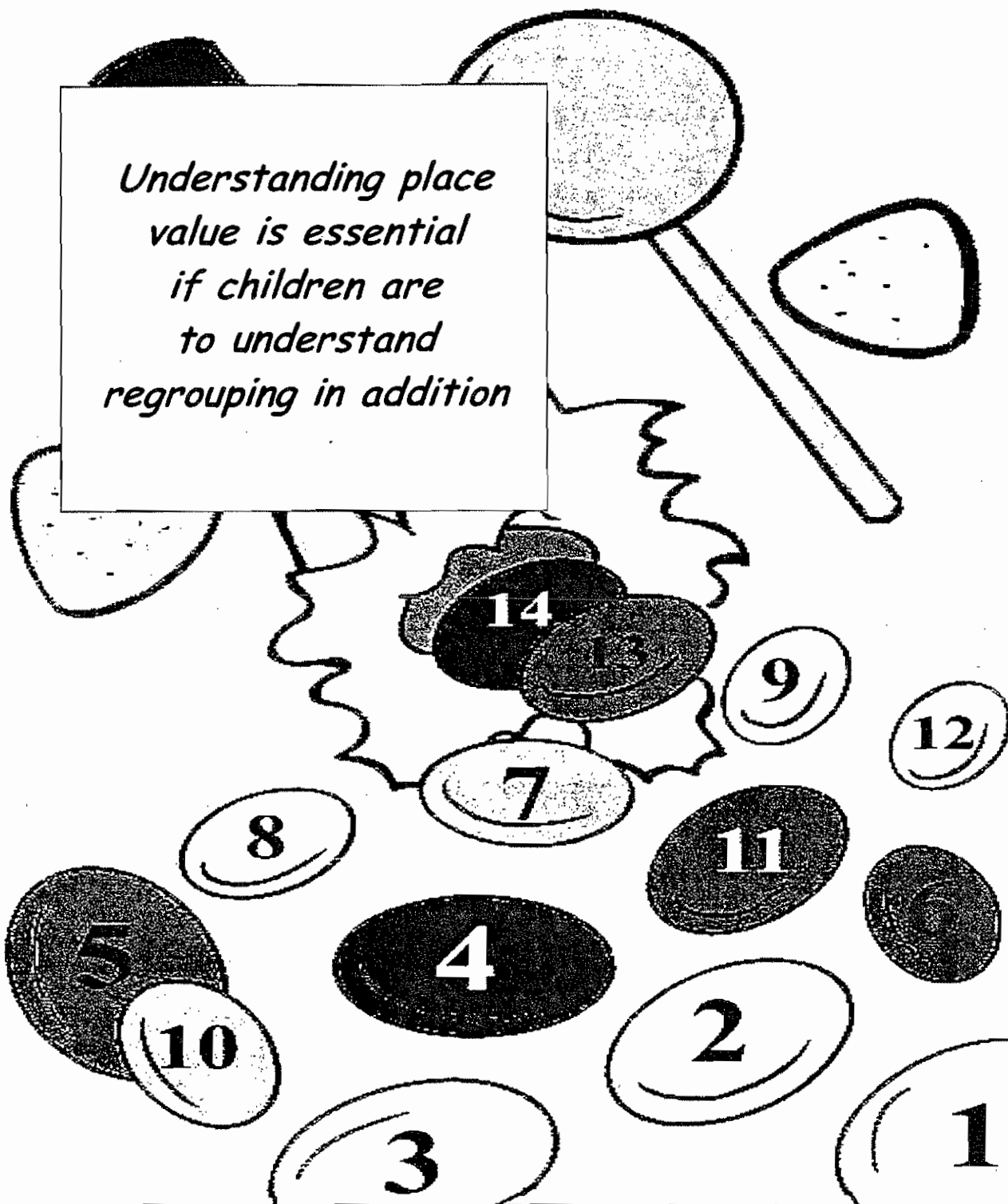
SPECIAL HOW - TO'S

If you ever find yourself trying to remember how to do a math process, do not worry. Simply turn to this section and locate the appropriate "how-to" process.

HOW TO ROUND A NUMBER

To the nearest tens:

> If the ones digit is 5 or more, round to the next highest tens (46 rounds to 50). If the ones digit is less than 5, round to the next lowest tens (43 rounds to 40).

To the nearest hundreds:

> If the tens digit is 5 or more, round to the next highest hundreds (9653 rounds to 700). If the tens digit is less than 5, round to the next lowest hundreds (638 rounds to 600).

To the nearest thousands:

> If the hundreds digit is 5 or more, round to the next highest thousands (4,8004 rounds to 5,000). If the hundreds digit is less than 5, round to the next lowest thousands (4,204 rounds to 4,000).

HOW TO FIND AN AVERAGE

To find the average of several numbers, add them together and then divide the sum by the number of numbers.

$$\text{The average of } 12, 46, 75, 94, 101, \text{ and } 38 =$$

$$(12 + 46 + 75 + 94 + 101 + 38) \div 6$$
$$366 \div 6 = 61$$

HOW TO TELL IF A NUMBER IS DIVISIBLE BY 2, 3, 4, 5, 6, 8, 9, or 10

A number is divisible by 2 if the last digit is 0, 2, 4, 6, or 8.
A number is divisible by 3 if the sum of its digits is divisible by 3.
A number is divisible by 4 if the last two digits are divisible by 4.
A number is divisible by 5 if the last digit is 0 or 5.
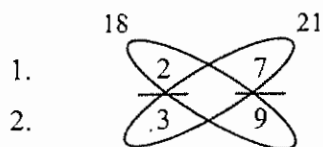A number is divisible by 6 if the number is divisible by both 2 and 3.
A number is divisible by 8 if the last three digits are divisible by 8.
A number is divisible by 9 if the sum of its digits is divisible by 9.
A number is divisible by 10 if the last digit is 0.

How to Tell Which of Two Fractions is Less or Greater

Cross multiple the two fractions:

1.
2.

$$\frac{18}{\substack{2 \\ 3}} \quad\times\quad \frac{21}{\substack{7 \\ 9}}$$

If the first multiplication has the larger product, the first fraction is greater.
If the second multiplication has the larger product, the second fraction is greater.
In this example, 18 is less than 21, therefore, $\frac{2}{3} < \frac{7}{9}$.

How to Tell if Two Fractions are Equivalent

Cross multiply the fractions. If both products are the same, the fractions are equivalent.

$$\frac{5}{6} = \frac{15}{18} \qquad \begin{array}{l} 5 \times 18 = 90 \\ 6 \times 15 = 90 \end{array} \qquad \frac{2}{3} \neq \frac{5}{7} \qquad \begin{array}{l} 2 \times 7 = 14 \\ 3 \times 5 = 15 \end{array}$$

How to Find Prime Factors

Write every factor of a number. Continue finding the factors of each factor until you have only prime numbers. A factor tree will help.

$$\begin{array}{ccc} & 36 & \\ 4 & x & 9 \\ 2 \quad 2 & x & 3 \quad 3 \end{array}$$
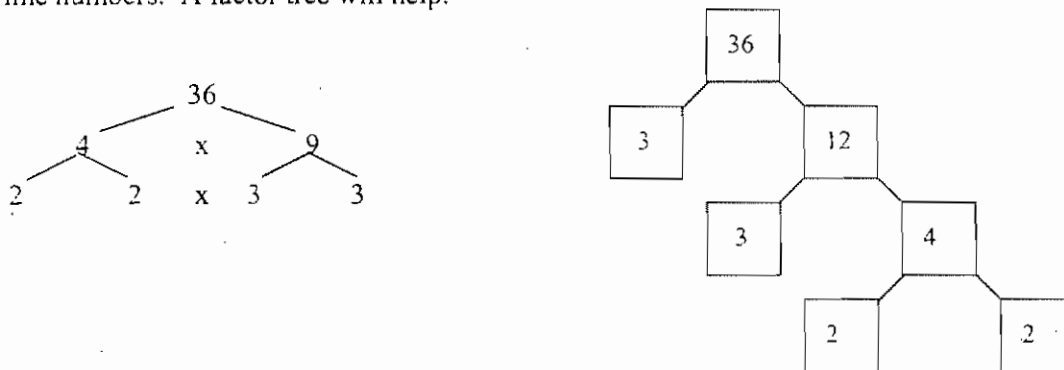
How to Find the Least Common Multiple of Two Numbers

Write several multiples for each number. Look for the smallest number that is common to both numbers.

For 5 and 9   45 is the least common multiple

How to Find the Least Common Denominator of Two Fractions

Find the least common multiple of the two denominators.
For $\frac{7}{8}$ and $\frac{2}{5}$, 40 is the least common denominator.

How to Find the Greatest Common Factor of Two Numbers

Write the factors for each number. Find the greatest factor that is common to both numbers.

The factors of 4 are 1, 2, and 4. The factors of 16 are 1, 2, 4, 8 and 16. 1, 2, and 4 are common factors; 4 is the greatest common factor.

How to Change Unlike Fractions Into Like Fractions

Find the least common multiple of both denominators. Remember the number you multiply each denominator by in order to get the least common multiple. Then, multiply each numerator by that number.

For $\frac{2}{3}$ and $\frac{4}{5}$, 15 is the least common multiple.

For $\frac{2}{3}$, you must multiply the denominator by 5 to get 15. So, multiply both the numerator and denominator of $\frac{2}{3}$ by 5. $(\frac{2}{3} \times \frac{5}{5} = \frac{10}{15})$

For $\frac{4}{5}$, you must multiply the denominator by 3 to get 15. So, multiply both the numerator and denominator of $\frac{4}{5}$ by 3. $(\frac{4}{5} \times \frac{3}{3} = \frac{12}{15})$

How to Add or Subtract Fractions

If the fractions have like denominators, just add or subtract the numerators (denominators stay the same).

If the fractions have unlike denominators, change the fractions into like fractions and then add or subtract.

$$\frac{2}{7} + \frac{1}{2} = \frac{4}{14} + \frac{7}{14} = \frac{11}{14}$$

How to Reduce a Fraction to Lowest Terms

Find the greatest common factor and divide both the numerator and denominator by that number. $\frac{24}{30}$ reduces to $\frac{4}{5}$ when both numerator and denominator are divided by 6.

How to Multiple Fractions

Multiply the numerators to get the numerator of the product and multiply the denominators to get the denominator of the product. $\frac{4}{9} \times \frac{2}{11} = \frac{8}{99}$

How to Divide Fractions

To divide a fraction by another fraction, multiply the fraction by the reciprocal of the divisor.

To divide $\frac{3}{10}$ by $\frac{2}{5}$, simply turn $\frac{2}{5}$ upside down and multiply! $\frac{3}{10} \times \frac{5}{2} = \frac{15}{20} = \frac{3}{4}$

How to Change a Fraction to a Decimal

Divide the numerator by the denominator. $\frac{2}{3} =$

$$\begin{array}{r} .6666 \\ 3 \overline{)\,2.0000} \end{array}$$

GEOMETRY

Geometry & Measurement Formulas

Perimeter – "Distance around a figure/shape"... L + W + L + W

Area – "The number of square units needed to cover the surface of a figure"... L x W

Volume – "The number of cubic units in a solid figure"... L x W x H

Radius – A line segment that begins at the center of the circle to any point on the circle.

Diameter – A line segment that passes through the center of the circle and connects two points.

Circumference – The distance around a circle... $C = 2\pi r = \pi d$

Area of a Circle - πr squared

Geometry Terms

Congruent – "Having the same size and shape"

Symmetry – Both parts/images match exactly.
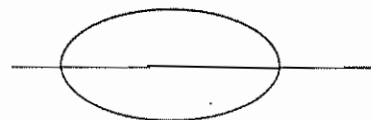
Translations/ Slide – To move a figure in one
direction along a straight line

Rotations/ Turn – " To rotate a figure"
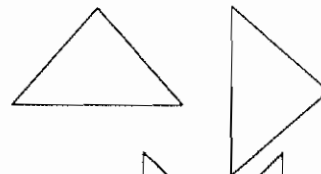
Reflections/ Flip – "To turn a figure over"
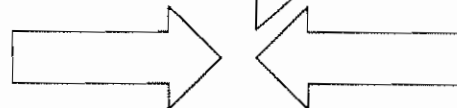
Reference:
Charles, Randall I., et al. Math Texas Teachers Edition Grade 3. Vol. 2. Menlo Park: Scott Foresman – Addison Wesley, 1999.

SYMMETRY

A B C D E F G

H I J K L M N

O P Q R S T U

V W X Y Z

Which letters have horizontal symmetry only? Vertical symmetry only?

Which letters have more than one line of symmetry?

ANALYZING WORD PROBLEMS

Sample Activity

Have students read some verbal problems and supply the information asked for in the following chart:

	What information is needed?	What terms need defining?	What operation is needed?	What is the order operation?	What variables of are given?
Problem 1					
Problem 2					
Problem 3					
Problem 4					

The four activities that follow are also designed to build skills in analyzing word problems.

Sample Activity

Give students word·problems and encourage them to ask as many questions as they can about the problems. Have students use the previous activity as a model in making their own activity.

Sample Activity

Have students read verbal problems and list the operations they must use to solve the problems.

Sample Activity

Select a word problem that requires the student to think in sequence. Each sentence should be written on a separate cardboard strip and put in an envelope. The student can then open the envelope, take out the strips, and arrange them in order. If the teacher writes the numbers on the back of the strips, the students can check their own work. These strips can be made to use with a flannel board, or they can be pinned on a corkboard. If all students in a class are having problems in this area, the teacher can give each one an envelope; when they finish, the envelopes can be exchanged.

Sample Activity

Let students write their own word problems that will use ideas of different operations. For example, word problems can be written that with addition, multiplication, division and subtraction.

Students often experience difficulty in translating written word problems into mathematical sentences.

Key words or phrases can be translated into mathematical symbols to aid in finding the problem solution.

The following activities are designed to help students develop skills in translating word problems.

Sample Activity

List the symbol and the word for each operation.

	Symbol for Operation	Word for Operation
(1) A number less than seven	-	Subtraction
(2) The difference		
(3) A number increased by eight		
(4) 7 Percent of 60		
(5) Twice the amount		
(6) Sum of their ages		
(7) Decreased by		
(8) 80" board cut in half		
(9) Seven hours more than Fred worked		
(10) How many dollars per day?		

Skills

Select strategies to solve problems

Material(s) Needed

Word problems from student, or create your own

Title

Say It Another Way

Directions

Use the sample word problems below or read one from the Students' math book. For example:

Ex: There are 27 apples on our tree and 39 apples on our neighbor's tree. How many more apples are there on our neighbor's tree?

Have a student rephrase the problem using his or her own words to explain what information is to be found.

Ex: "There are apples on two trees and you want me to find out how many more apples there are on your neighbor's tree."

Next have the student explain how to solve the problem without saying any numbers.

Ex: "I'd subtract the number of apples on our tree from the number of apples on your neighbor's tree to find out how many more apples our neighbor has."

After one student has discussed a problem, ask if anyone has a different way to solve the problem. Stress that there may be more than one way to find the answer.

After going over several examples. call on a volunteer to tell a story problem. Identify the problem-solving technique in the same way. The child who answers correctly either tells the next story or calls on another student storyteller.

Ex: 1. Dan had 6 tropical fish. His brother bought 3 fish at the pet store. How many fish do they have now?

2. Kelly is 8 years old and her little sister is 5 years old. How much older is Kelly?

4. Jane has a collection of 14 stuffed animals. Her friend Carol has 23. How many more stuffed animals does Carol have?

4. Rachel has 35 baseball cards. Kevin has 49. How many cards do they have altogether?

QUICK GRAPH TOPICS

- Number of baby teeth lost
- Number of brothers or sisters
- Number of pets
- Number of letters in first name or in last name
- Number of buttons
- Color of eyes
- Color of hair
- Month of birthday
- How they come to school (bus, walk, bike, car)
- Shoe size
- What grade they were in when they started attending present school
- Lunches (bought, brought in a bag, brought in a lunch box, went home)
- Favorite cold cereal
- Favorite recess activity
- Favorite T.V. show on a specific day
- Favorite sports
- Favorite T.V. or sports star

Objective 5: The student will demonstrate an understanding of probability and statistics.

Skills related to collecting, organizing, describing, displaying, and interpreting data are becoming increasingly important in a society based on technology and communication.

At the Grade 3 level, probability and statistics can provide children the opportunities to make mathematical inquiries about their world and other subjects, such as social studies and science.

The assessment requires students to analyze data and to interpret graphs and charts.

Instructional target:
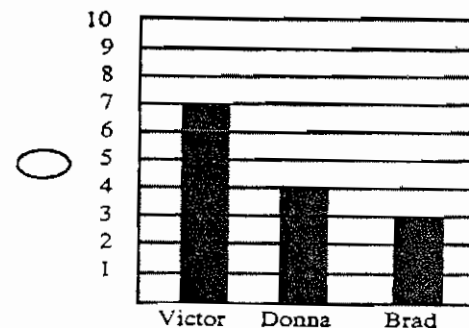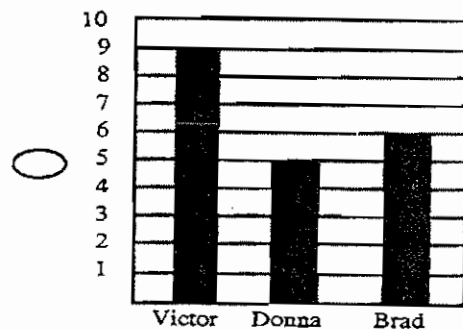
- Interpret and use bar and picture graphs

Example:

- The chart shows the number of books read by 3 students last month

BOOKS READ

Student	Victor	Donna	Brad
Number of Books Read	9	4	6

Which graph matches the facts given in the chart? Mark your answer.
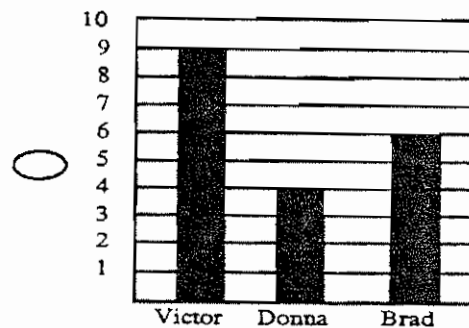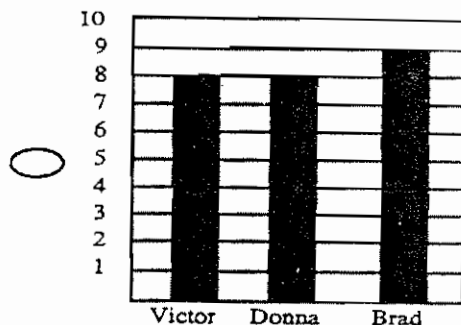
A PROBLEM SOLVED

"With paper and pencil, do it like me,
There's only one way to work it, as you will see."
"Ok, boys and girls, it's time to begin,
There'll be no more talking," Miss May said with no grin.

The problem was read and explained by Miss May
Johnny Smith raised his hand and said,
"I see another way!"
"Do tell," said the teacher, "We all want to see,
Can problems be solved using more than one strategy?"

As pencils and papers were quickly put to rest,
Students studied the data, put their thinking
skills to the test.
"I can make a chart!" said Joey with glee.
"I can use my Unifix cubes," said Mary to Lee.
"We drew a picture!" said two boys in class.
"Megan helped us to get the answer at last!"

Looking at her students, a smile on her face,
Miss May was delighted with what had taken place.
The problem-solving lesson that had always been a chore,
Had developed into something that was
lots of fun and more.
The correct answer is not the only thing
that teachers need to stress
What is equally important is the
student's thought process.

By Dorothy Dissin and Pamela Wilson
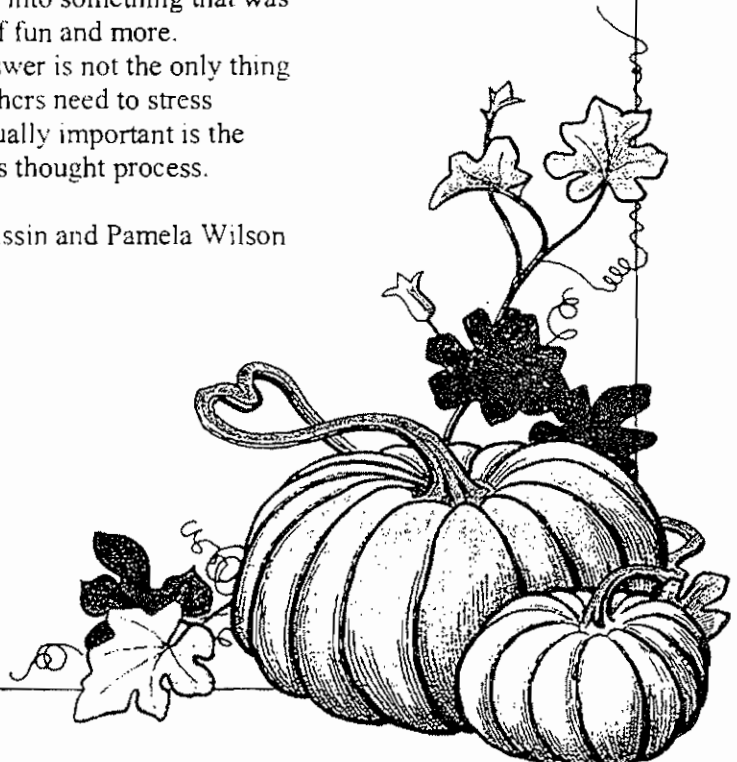
MATHEMATICAL LEARNING AND INSTRUCTION

When teaching mathematics to any age group, we should remember to:

- Build links from prior knowledge to new knowledge

- Encourage our students to communicate their mathematical reasoning

- Motivate students and actively engage them in individual, small-group, and large group settings

- Use a variety of manipulatives to strengthen comprehension

- Model a positive attitude towards mathematics

- Model problem-solving techniques verbally, visually, and tactilely

- Use a variety of questioning strategies to help students analyze and evaluate their mathematical process

- Use instructional strategies that build upon the linguistic, cultural, and socioeconomic diversity of the students

- Integrate writing into math lessons when appropriate

- Connect math activities/projects to the students' lives

- Recognize and correct common math misconceptions and error patterns

- Use technology applications such as:

  Jump Start First Grade - Ages 5-6-Manufacturer: Knowledge Adventure I Love Math!
  Ages 7-11 - Manufacturer: DK Multimedia Blue's 123 Time Activities - Ages 3-6-
  Manufacturer: Humongous Entertainment Math for the Real World, Teacher Edition -
  Ages 9-11- Manufacturer: Knowledge Adventure