Welcome to the First Edition of the Boeckman Creek Primary School *Math Handbook!*

For the past two years, the School Site Council, consisting of parents, teachers, and classified employees, have been discussing ways we can further communicate to families the concepts and strategies that children are encountering in the context of mathematics. It is our goal that this handbook will assist parents in supporting their children at home. Included are some examples that demonstrate how concepts in the different math strands are addressed. While there is the understanding that there are many different ways to teach mathematical concepts, the purpose here is to give an overview of the variety of math techniques and strategies you may see, both in class work and homework, during your child's years at Boeckman Creek. We have created this handbook based on questions that parents have asked. We have also used the *Teaching and Learning to Standards* document from the Oregon Department of Education and the *Principles and Standards for School Mathematics* published by the National Council of Teachers of Mathematics to guide us in this endeavor. We hope that you will find a safe spot in your home to keep this handbook for quick and easy reference.

Math looks different in classrooms today than it has in the past. Schools have found new ways to help children learn, understand and demonstrate their knowledge in all areas of the curriculum. This is especially true in mathematics. Students with number sense naturally break numbers down into meaningful translations that make sense to them. Students work towards a deeper understanding of mathematics through an understanding of particular numbers as reference points, by solving problems using relationships among different operations, among numbers, and through the use of their own knowledge and understanding of number systems. The foundation of becoming a thoughtful, interested and involved mathematician is grounded in the student's ability to estimate reasonable solutions and relationships and the ability to make sense of numbers, problems and results in a variety of contexts and situations.

As you read through this handbook, you will notice a few items that are in place to make the handbook more manageable.

1) In each section you will find examples that demonstrate different techniques that children may use to solve problems. Accompanying these examples are text boxes that contain explanations of each example.

2) You will notice that there are key words in bold throughout the handbook. These are words that are defined in the glossary section at the back of the handbook. These are vocabulary words that are commonly used in math instruction across the grade levels.

3) The seven most common mathematical strands are:

- Number Theory
- Calculation and Estimation
- Algebraic Relationships
- Measurement
- Geometry
- Statistics and Probability
- Problem Solving

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Parent Questions

1. I want to help my child with school. Where do I start?

Provide a quiet space for your child to study at home.
Set a daily time for homework.
Sit with your child when he/she needs support.
Ask your child to share what he/she is learning in math at school.

2. How can I help my child if I don't understand what is being taught?

Be positive about math.
Discuss ways math is used everyday.
Offer encouragement.
Inform yourself by asking the teacher.
Get a curriculum guide specific to your child's grade level from their teacher.

3. What kind of math is being taught in school?

In addition to the basic computation skills, children are taught sorting, measurement, estimation, probability, problem solving, statistics, geometry, and algebra. All of these are strands within mathematics. This booklet was developed to represent a variety of ways to solve problems and then to apply this learning to real world problems.

4. Why is math important?

Take a moment to think about your day. As we think about our everyday lives, math is a central theme. For example, think of shopping, balancing a checkbook, cooking and following a recipe, doing laundry, and calculating the distance and time used in driving.

5. What if I do not understand the math vocabulary terms?

There is a glossary of math terms in the back of this handbook. Also, frequently used math vocabulary is in bold throughout this handbook. You could also ask your child's teacher for help with definitions.

6. What kinds of jobs require math skill?

Math is important in all jobs. For example, scientists, engineers, pharmacists, homemakers, store managers, carpenters, cashiers, computer programmers, and architects use math in their daily activities.

7. Should I encourage my child to use a calculator?

Calculators are useful tools for doing arithmetic and looking at patterns and relationships. They do not replace the need to learn basic facts. Mental arithmetic is important for checking computations. Calculators, however, are very helpful in solving tedious problems.

8. My child says that math is too hard, or that he/she is bored. What should I do about it?

The best thing to do in this situation is to talk to your child's teacher. Your child's teacher will be able to explain the math program and how the needs of your child are being met.

9. What are some of the math activities that I can practice with my child?

Be creative. Use this booklet to give you some ideas. Allow your child to practice throughout the day as opportunities arise. For example, estimate the number of gallons of gas your car will take, how much the groceries will cost, or how far it is to your destination. Have children help with cooking, etc.

10. Is there a "right" way to learn math?

There is often more than one way to solve a math problem. No one method is more correct than another, but some methods are more efficient. Encourage your child to use different methods, and ask them to explain how he/she solved the problem.

11. Why doesn't my child have math homework?

Often your child has homework, but found time to finish it at school. It is all right to ask your child to show you what they have been working on in school. On days that your child has no homework, you can do some fun math activities, such as playing card games, looking at shopping ads, measuring things in your home, etc.

12. My child does not like math. What can I do about it?

When your child expresses his/her aversion to math, extra assistance may be needed. It could be as simple as not understanding how to do a specific problem. After talking with your child, you may want to discuss this with your child's teacher. If math was difficult for you, be positive about learning math and the importance of it in daily life.

Number Theory, Sense and Operations

The *Principles and Standards for School Mathematics Overview* published by the National Council of Teachers of Mathematics states the following key concepts are crucial for children to understand the building blocks of mathematics:
Children need to:

> "understand numbers, ways of representing numbers, relationships among numbers, and number systems,"
>
> "understand meanings of operations and how they relate to one another,"
>
> "compute fluently and make reasonable estimates."

Number theory, number sense and a thorough understanding of basic mathematical operations are the foundation to understanding the intricacies of mathematics. The following examples give a brief overview of how this area is addressed in the classroom.

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6 is an even number because each dot has a partner. ⁘

9 is odd because after each dot is partnered, there is one left over. ⁙.

Even number + Even number = Even number	**2 + 2 = 4** **6 + 6 = 12**
Even number + Odd number = Odd number	**2 + 3 = 5** **3 + 4 = 7**
Odd number + Odd number = Even number	**7 + 7 = 14** **5 + 5 = 10**

Prime Factoring Tree is one strategy that can be used to identify the factors (multiples) of any given number.

24

6 4

2 3 2 2

2 x 3 x 2 x 2 = 24
6 x 4 = 24

24

8 3

2 4 3
2 2 2 3

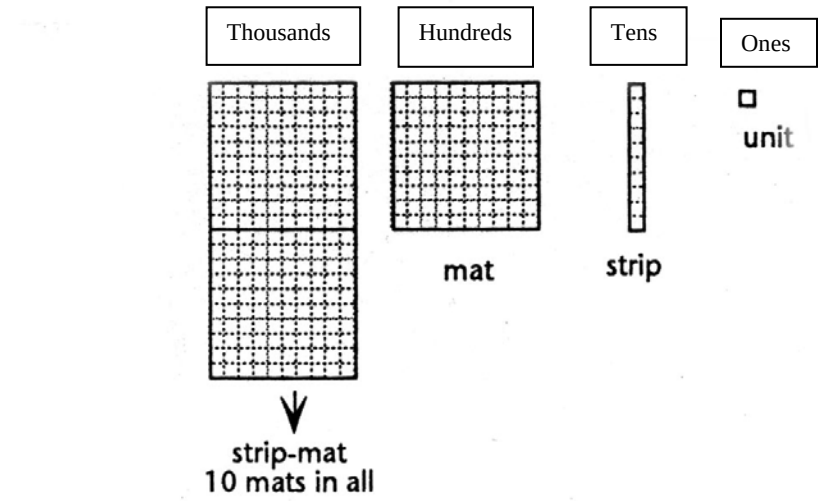
2 x 2 x 2 x 3 = 24
2 x 4 x 3 = 24
8 x 3 = 24

Calculation and Estimation

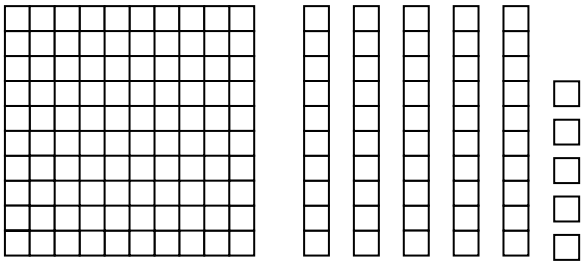
Calculation can be thought of as the basic operations of adding, subtracting, multiplying, and dividing.

Estimation is giving a reasonable answer without actually calculating or counting. Estimating is important in the development of a child's number sense and mathematical thinking.

Computation Examples: **Units, strips, mats, and strip mats** are used for computations.



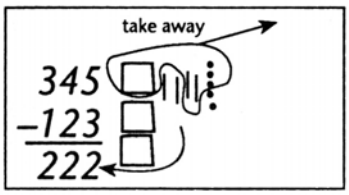
These **strips**, **mats** and **units** are examples of **manipulatives** that students use to help conceptualize and visualize the process of computation.



100 + 50 + 5 = 155

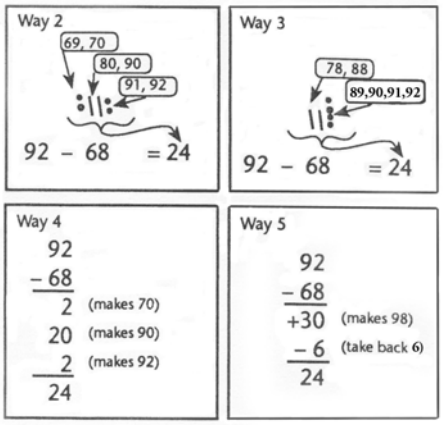
This example of expanded notation demonstrates how **manipulatives** can be used to demonstrate the concept of place value. Understanding place value is extremely important and necessary for a child to be able to develop a conceptual understanding of the operations of addition, subtraction, multiplication and division.

Peter's method



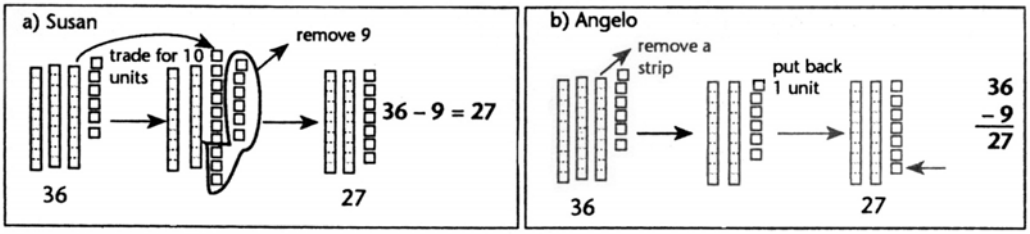
Peter's method represents an example of a child using **manipulatives** to solve a subtraction problem. While solving the problem, the child is demonstrating subtracting by actively "taking away" units to find the answer. This physical act of "taking away" allows the child to see borrowing in action.

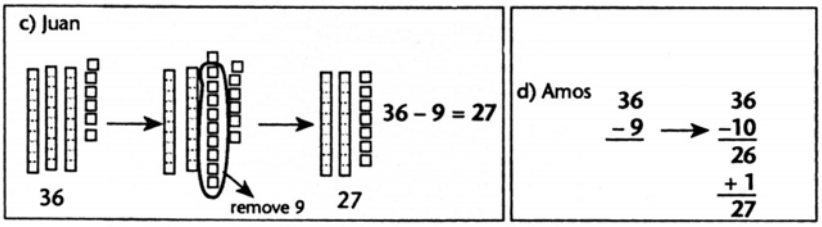
:



These examples show another demonstration of how **manipulatives** could be used to solve a subtraction problem. **Ways 2 and 3** show a child finding the total number of units it takes to get from 68 to 92. By adding to the smaller number, the child is able to come up with the difference between the two numbers. By finding the difference, the child is able to visually present the answer.

Ways 4 and 5 show how a child might think through the same problem using mental math, meaning in his/her head, without the use of **manipulatives**.





Examples A and C give another demonstration of how a child can use **manipulatives** to represent the concept of borrowing in the problem 36 - 9.
Example D shows how the child in example B solved the same subtraction problem using a hands-on approach.

Examples in this section are from *Opening Eyes*, Vol. I and II.

An **array** is the arrangement of **units** into rows and columns. By using **array**s, children can visually represent a multiplication or division problem.

Example A demonstrates how an **array** can be used to visualize a multiplication problem. By putting together six rows of 5, a child can visually demonstrate the concept of 6 groups of 5 (6x5) or 5 groups of 6 (5x6). This allows the child to count how many units there are in a variety of ways to come up with the answer of 30.

Example B demonstrates how an **array** can be used to demonstrate a division problem. Example B shows the reverse of example A. By giving the student 30 units and asking him/her to organize them into groups of 5, a child can visually demonstrate dividing 30 into 6 groups of 5, or 30 divided by 5.

This is an example of how **manipulatives** can be used to assist a child with understanding addition. By putting the total number of **strips** and **units** together (A) a child can visually calculate the sum. Part B demonstrates how **manipulatives** can be used to show carrying.

Base 5

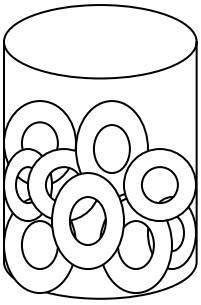
Base 5 is also used as a way to help children with the understanding of our base ten system. Children who are exposed to base 5 tend to learn money, time telling, problem solving and their multiplication of 5's more easily than if they were not exposed to base 5. Teaching children another number system forces them to think in more open ended and logical ways about mathematics. The base 5 system is so much a part of our money system, that it is a concept that children can grasp.

Estimation:

These are some examples of different types of **estimation** activities. Developing **estimation** skills is an important component of building number sense and logical reasoning skills.

1) How many rings are in this container?

This type of activity can be done 2 dimensionally, as shown here, or in a hands-on approach. Both ways stimulate a child's higher level thinking processes.



2) If you have $4.00, do you have enough to buy one of each of the following treats?

The example shows how rounding can help a child with their number sense.

Bubblegum at $.49 each
Candy Bar at $.78 each
Soda at $1.25 each

This type of problem helps a child to strengthen their mental math and reasoning skills.

$.49 = $.50
$.78 = $1.00
$1.25 = $1.00

$.50 + $1.00 + $1.00 =$ 2.50

Yes, there is enough money to buy all three items.

3) Are the following reasonable answers? Why or why not?

2435 + 162 = 2200 No. This answer is not reasonable because the answer is smaller than the largest number being added.

23 x 31 = 900 No. This answer is not reasonable. Rounding each number to the nearest ten before multiplying would give a more accurate estimate.

20 x 30 = 600

Asking children to explain their thinking gives the opportunity to assess a child's knowledge and understanding of mathematical concepts. It also causes children to have to think through their own reasoning in a way that is understandable to both themselves and others.

ALGEBRAIC RELATIONSHIPS

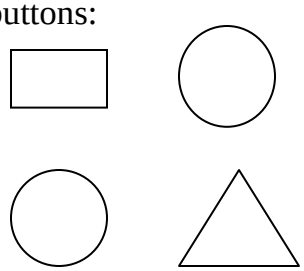
A way to define **algebra** is the use of variables to express general rules about numbers, number relationships and operations. In elementary schools, algebraic relationships are explored using a variety of concepts and ideas. Some examples of these are:

- Looking for and creating **patterns**
- Explaining relationships
- Representations of mathematical relationships
- **Sorting**

The following examples are meant to show a variety of problems that your child may encounter.

Sorting

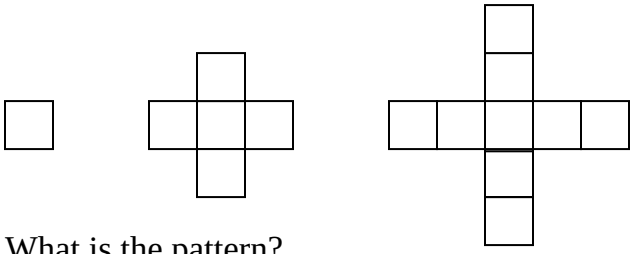
Collection of buttons:



Which ones do you think go together?
Why did you put them together?
What would you name this group?

Sorting and **classifying** activities allow children to use their reasoning skills to find patterns, create relationships, identify attributes, and form logical groupings. These skills are the building blocks to higher level mathematical problem solving, helping them understand and handle a variety of complex situations and ideas.

Patterning



What is the pattern?
What will the 20th arrangement look like?

At the core of math concepts, one finds patterns. Patterning activities, like sorting, build a strong foundation for children to be able to explore and understand numerical relationships and patterns in all areas of mathematics.

1 4 7 10 . . . .

What is the pattern? What would the next 5 numbers be?

This is an example of a problem that asks children to think about math in abstract ways. This type of problem also allows children to see that there can be multiple ways to solve a problem. Like **estimating**, giving children the opportunity to predict and prove their hypothesis helps create higher-level math skills.

Expressions & Equations

From:

$\square + 2 = 6$ What number should go in the box?

To:

$x + 2 = 6$ What does **x** equal?

This type of example shows the range of how elementary children are introduced to "traditional" **algebraic** concepts.

IN	OUT
3	10
6	19
8	25
10	?

Students are given problems where they need to determine outcomes based on some rule or equation. This type of example goes back to patterning and how children see and understand numerical relationships.

To find the outcome, multiply any number from the IN column by 3 and add 1.

Measurement

Measurement skills include selecting and using appropriate **units** and tools to measure. Measurement concepts help with a child's understanding of spatial relationships and their logical reasoning, which in turn helps them transfer these concepts to a wide variety of real world applications.

Units and Tools: A wide range of **units** and tools are taught over the course of the elementary years. These range from metric and standard measurement, to time and **area**/**perimeter** skills. These tools also include non-standard tools of measurement such as unifix cubes, paper clips, etc.

The following examples show some of the different types of problems that students are challenged with in the area of measurement.

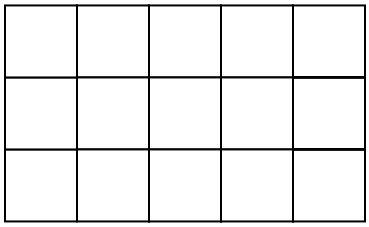
- Which would you use to measure the length of a football field?
  - Grams
  - Meters
  - Kilometers
  - Liters

- Measure the length of your desktop using unifix cubes. Compare it with the width of the door.

- What is the **perimeter** and the **area** of the following shape?

5 cm

3 cm



The **perimeter** is 16 cm; **area** is 15 square cm.

This type of **area** and **perimeter** problem gives children a visual and/or hands-on understanding of **area** and **perimeter**. Students move from problems like this to more abstract and involved tasks.

Measurement also involves using calendars and clocks. Types of questions in this area might look like the following:

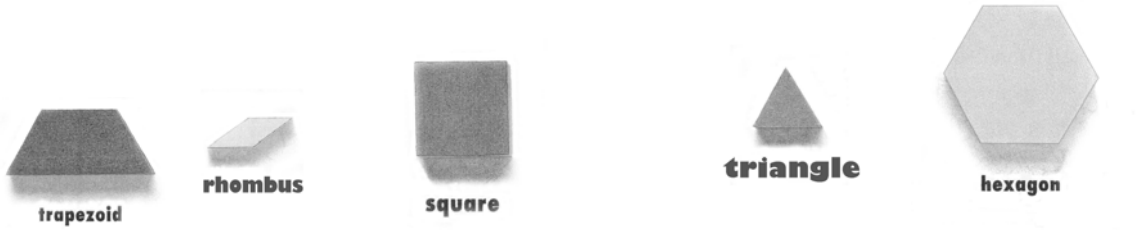
- What date is the third Wednesday in November?
- What time is the clock showing?
- What time will it be twenty minutes from now?

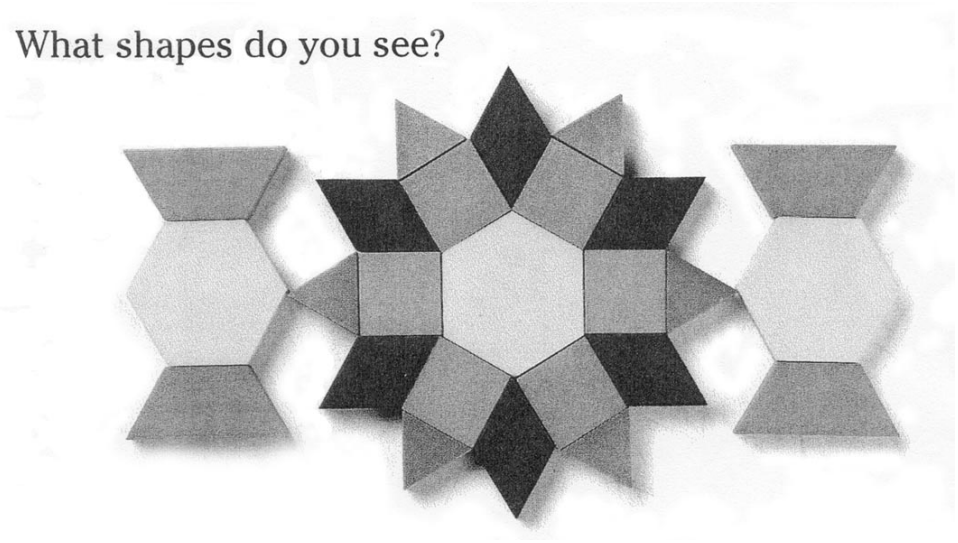
Geometry

Geometry is the study of shapes and their properties, using models, graphs, diagrams and movement.

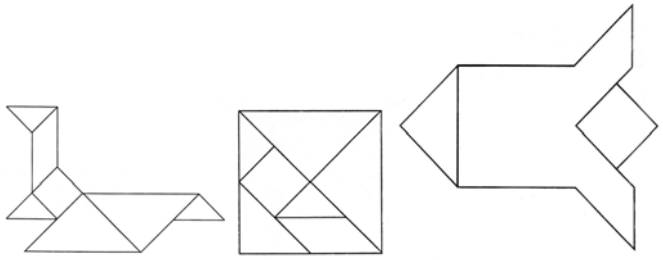
Concepts, Properties, and Relationships

Pattern blocks: These are used Kindergarten through 5th grade to model angles, **polygons**, **patterns**, and relationships. **Pattern blocks** allow students to handle and manipulate shapes, which aid in both the identification and study of geometric objects.





Tangrams: Use **tangrams** to make some of these figures.



Tangrams allow children to expand their ability to perceive spatial understanding, while also working on higher level problem solving skills.

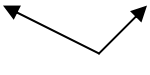
Solid Shapes:


Rectangular Prism


Cube

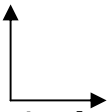

Triangular Prism

Parts of Geometric Figures:

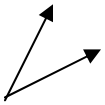

Obtuse Angle


Ray

Segment

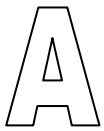

Right Angle

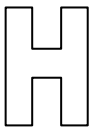
Point


Acute Angle

Line

Symmetry: Draw the lines of symmetry. **Symmetry** is the understanding of the concept of mirror image of shapes. This means that when you fold a figure in half all the parts match.


Symmetrical


Symmetrical


Symmetrical

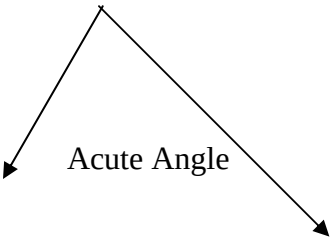

Not Symmetrical

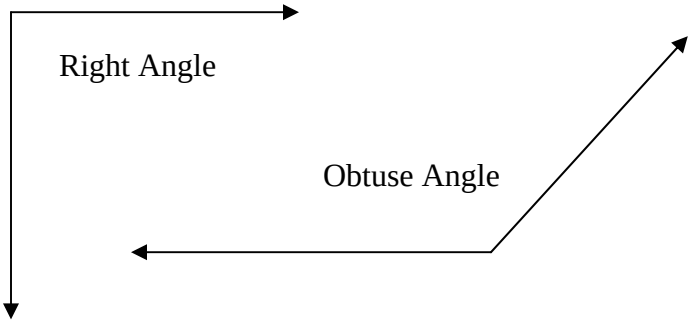

Not Symmetrical


Symmetrical

Angles:

Children are taught to measure, recognize and draw a variety of different angles. They then use their knowledge in real world applications.

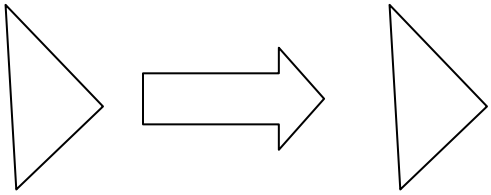

Acute Angle


Right Angle

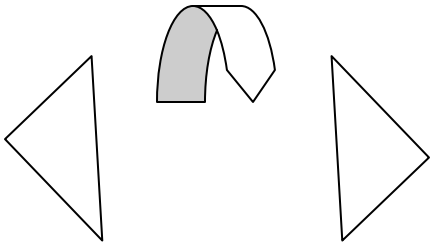
Obtuse Angle

Motion

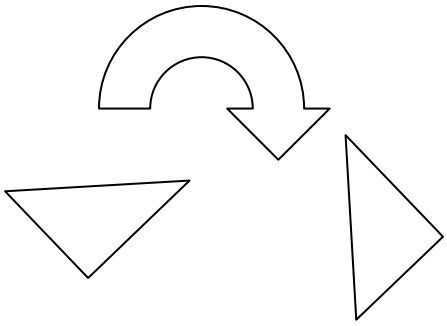
These examples show some of the different type of concepts that are taught to stretch a child's creative and logical thinking skills using spatial conceptualization.



Slide Translation



Flip Reflection



Turn or Rotate

Statistics and Probability

The study of **statistics** and **probability** is an important part of a child's development of critical thinking skills. **Statistics** and **probability** allow for students to search for the understanding of variables, attain consistency in their thinking and to justify their thoughts and ideas through mathematical reasoning and information.

Statistics is the collection of information and making sense of it.

Probability is the likelihood of occurrence.

The main areas of study are:

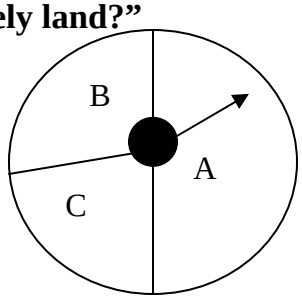
- Collecting data
- Sampling
- Organizing and representing data
- Interpreting data
- Making inferences

The following are examples of different types of **statistic** and **probability** problems:

1) Your last five math scores were: 90, 80, 90, 100, and 75. What are the mean, median, and mode?

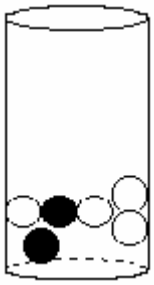
Answer:
Mode: 90 (number that occurs most)
Median: 90 (number that is in the middle place when numbers are listed from lowest to highest: 75, 85, **90**, 90, 100.)
Mean: 88 (a number or quantity that summarizes a set of data – the mean is the number that results when you divide the sum of all the numbers by how many numbers you added, or $\frac{90 + 80 + 90 + 100 + 75}{5} = \frac{440}{5} = 88$)

2) Draw a spinner with unequal parts. Ask: "On which number would the spinner most likely land?"



Answer:
Section A because it is the largest area.

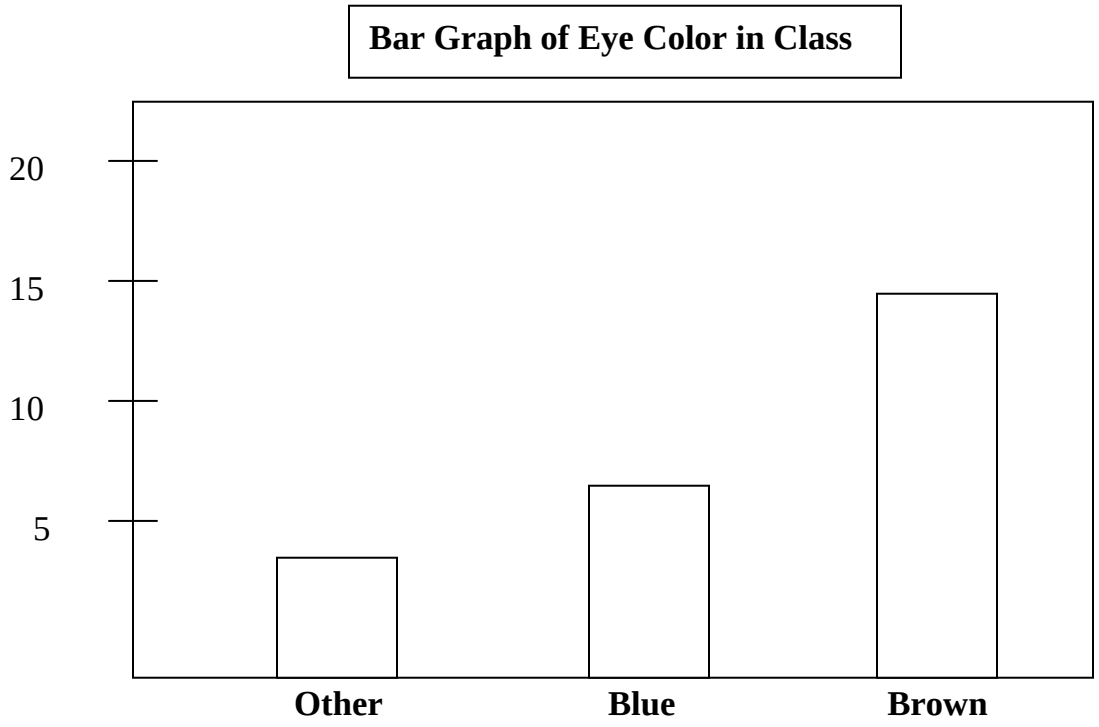
3) Draw a jar with two black beans and 4 white beans. Ask: *"What is the probability of picking a black bean out of the jar?"*



Answer: 2/6 (two out of six) or 1/3 (one out of three).

Collection and Interpretation of Data is the collection, demonstration and interpretation of information.

Draw a bar graph showing data for eye color. This shows that more children have brown eyes than blue eyes.



Problem Solving

This area of mathematics has children focusing on different strategies to solve "real world" problems. Children are taught and encouraged to use a variety of techniques and strategies.

Children are given problems to solve from each mathematical strand. In this section there are many examples to show both a variety of strategies and problems from each strand. There are examples from both Benchmark 1 (3rd Grade) and Benchmark 2 (5th Grade). However, at all levels, children are given similar problems to solve and taught a variety of strategies to use.

Some of the common strategies taught to aid in children's problem solving are:

- Draw a diagram
- Find a pattern
- Guess and check
- Make/Organize a list
- Act it out
- Make a model
- Make a table
- Use an equation
- Use a graph
- Work backwards
- Use **manipulatives**

The state-scoring guide for problem solving contains five areas. Each child's problem solving work is scored in each area. The five areas are:

- **Conceptual Understanding (CU)** – "Showing an understanding of the mathematical concepts related to the task (the what)"

- **Process and Strategies (PS)** – "Choosing strategies that can work, and then carrying out the strategies chosen (the how)"

- **Verification (V)** – "Reviewing the work and defending the solution in relation to the task (the defense)." In this area, children are encouraged to solve the problem another way.

- **Communication (C)** – "Using diagrams, symbols, and/or vocabulary to convey the path to the identified solution

- **Accuracy (ACC)** – There are three categories in this area that rate a child's accuracy. The three areas are:

  Precisely Correct - This is given a score of 5.
  Essentially Correct – This is given a score of 4 and means there may be some small error, but that no additional teaching is required.
  Not Correct - This is given a score of 1, and means that the solution given does not reflect a viable answer to the problem.

On the next page there is a scoring guide that is used in classrooms. The scoring guide included is the "Young Reader" version. This is an adaptation of the state level-scoring guide. It is meant to be a guide that children can use and understand readily. At the 3rd grade level, there is not an official math problem-solving test. At the 5th grade level, a student needs to get 4's in each area of the scoring guide in order to meet the benchmark.

Also included in this section is an example of the format children use in class when working in the area of problem solving.

How can I help my child with problem solving?
On the following pages there are many examples of the types of problems children are given. There are examples from each of the different mathematical strands. Besides simply looking over them to see the types of expectations at the different benchmark levels, you can also use the examples to help your child in the following ways:

- There are many different formats that can be followed to help your child get started;
- To help with the verification part, suggest that your child look over the common strategy list for ideas to help show their solution in a different way;
- Each example in this section has the benchmark level (3rd grade or 5th grade) the problem is geared towards, as well as the scores that each problem was given in all five areas.

All problems included in this section are from the Oregon Department of Education.

What to do when your child says, "I don't get it."

You can…..

- Help them restate the problem.
- Help them look for important information.
- Ask them what they did in math that day/week that may be connected to the assignment.
- Ask them what they do know about the problem.
- Build on what they already know.
- Encourage them to record questions for the next day.
- Encourage them to make an attempt by recording some beginning thoughts.
- Ask if a model was used in class that might help their thinking.
- Ask your child to compare previous knowledge to new learning.
- Ask your child to explain with reasoning their thinking about the problem.
- Share with your child something you might know about the problem, but be careful not to rob them of the opportunity to think it through them self. Remember, it is important that they think through the problem and make an attempt before being given a method to solve it.
- Ask them what notes they might have from the day's activity that might help them.

Most importantly, let them work through the problem as much as possible before you step in. The more you do for them, the less they learn.

GLOSSARY OF TERMS

Algebra: the use of variables to express general rules about numbers, number relationship, and operations

Algorithm: a step-by-step method for computing

Angles (acute, right, obtuse): an acute angle is an angle less than 90 degrees, a right angle is 90 degrees, and an obtuse angle is an angle that is more than 90 degrees but less than 180 degrees

Area: the amount of space a flat or 2-D figure or shape occupies

Arrays: an arrangement of objects in rows and columns

Attributes: the identifying qualities of an object (i.e., a square has 4 equal angles, 4 sides, and 4 vertices.)

Average: is a quantity that summarizes a set of data – can thought of as the center or pivot point of a balance scale

Bar Graph: a graph that uses the height or length of rectangles to compare data

Base 10: a number system in which each place has ten times the value of the next place to its right

Borrowing: regrouping from one place value to a lower place value in order to subtract

Carrying: regrouping from one place value to a higher place value in order to add

Classification: a fundamental building block of logical thought involving relationships and organizational thinking

Collections: mathematical materials that children use to develop classification structures

Concept Development: understanding of mathematical concepts at a fundamental level. Children need to develop conceptually before being able to work with symbolic representations of number concepts.

Cone: a 3-dimensional figure with one curved surface, one flat surface, one curved edge, and one vertex

Congruent: having the exact same size and shape

Corner: the point where two lines intersect, creating an angle

Cube: a regular solid with six congruent square faces

Cylinder: a 3-dimensional figure with two circular bases that are parallel and congruent

Difference: the amount that remains after one quantity is subtracted from another

Dividend: a number that is divided by another number

Division: the operation of making equal groups

Divisor: the quantity(number) by which another quantity(the dividend) is to be divided

Edge: the line segment where two faces of a solid figure meet

Estimation: to find a number close to an exact amount (about how many or about how much)

Even Number: a whole number that has 2 as a factor

Faces: the flat sides or surfaces of a 3-D shape

Factor: when you multiply two whole numbers to get a given number, then the two whole numbers are factors of the given number.

Flip: a mirror image of a figure on the opposite side of a line, also called a reflection

Geometry: a strand in math that looks at properties and relationships of points, lines, surfaces, and solids

Hexagon: six-sided polygon

Integers: positive and negative whole numbers, as well as 0

Line: an infinite set of points forming a straight path going in opposite directions

Line Graph: graph that measures change over time using a line

Line of Symmetry: a shape has a line of symmetry if one or more straight lines can be drawn that will separate the figure into parts that are mirror images of each other

Line Segment: a part of a line that has two endpoints

Manipulatives: objects that can be used to compute, organize, classify etc. These can be things such as unifix cubes, beans, counters, chips, tiles, etc.

Mat: a manipulative(10 x 10 square) representing 100

Mean: a number found by dividing the sum of two or more addends by the number of addends (commonly know as the average)

Median: when 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.

Metric: a measurement system based on tens

Mode: the number that appears most frequently within a set of numbers

Multiple: the product of a given whole number and any other whole number

Multiplication: the operation of repeated addition of the same number

Non-Standard Unit: unit of measurement that is not precise from one event to another (i.e. length of finger, foot, stride)

Odd: a whole number that cannot be evenly divided by 2

Parallelogram: a quadrilateral with opposite sides that are parallel and equal

Pattern: a sequence of objects, numbers, etc., that repeat in a predictable manner

Pattern Blocks: collection of six shapes in six colors - green triangles, orange squares, blue parallelograms, tan rhombuses, red trapezoids, and yellow hexagons

Perimeter: distance around a figure

Picture Graph: a graph that uses pictures or symbols to show data

Pie Graph: a graph that uses a circle to show percentages of a whole to compare data.

Place Value: the position or place of a digit in a number tells the value of that digit

Point: a single exact location represented by a dot

Polygon: closed shape made by line segments

Prime Factoring Tree: a strategy to find all of the factors for a given number

Prime Number: a number that has only two factors, itself and one

Probability: a study of chance, how often something is likely to occur

Problem Solving: using various strategies and steps to solve a problem

Product: answer to a multiplication problem

Properties: specific characteristics or attributes. Rules about numbers that are always true

Pyramid: has one base in the shape of a polygon – it has triangular faces which meet in a point at the top (called the apex)

Quadrilateral: polygon with four sides

Quotient: answer to a division problem

Rays: a part of a line that has one end point

Real Graph: a graph using actual objects placed on the graph to represent data

Rectangular Prism: 3-D rectangle

Re-Group: the action of grouping a set of 10 to make one set of the next larger unit (10 ones can be regrouped to be one unit of ten.)

Rhombus: a quadrilateral with opposite sides parallel and all sides equal

Rotation: turned, as in a shape has been turned

Rounding: a form of estimation, using easily manageable numbers to come to an answer that is close to the actual answer

Sorting: the act of organizing objects into groups or sets with respect to specific attributes

Sphere: a 3-D figure that has the shape of a round ball

Standard Units: an exact measurement that is fixed, a unit that is used throughout the world (feet, hours, months, liters, grams, etc.)

Statistics: analyzing data using mean, median, and mode

Strip: a manipulative that represents the unit 10

Sum: the answer to an addition problem

Tangrams: a seven-piece puzzle made of polygons that can be used to create a square or other shapes. (The puzzle always has one square, two large triangles, two small triangles, one medium triangle, and one parallelogram.)

Trading: the action of grouping units to make a set of ten and then exchanging them for a group of ten (i.e., ten one units can be traded to form one group of a ten unit)

Trapezoid: a quadrilateral with only two parallel sides

Unit: an amount or quantity used as a standard of measurement (i.e., feet, pounds, milliliters, hours)

Verification: checking the answer to a problem by solving the problem using a different or second strategy

Vertex: a point where two lines meet