Grade 2

CONTENTS

The Learner at This Level

THE SECOND-GRADE CHILD:

- Enjoys games and working with manipulatives.
- Likes working alone and slowly.
- Needs to have closure and complete an assigned task.
- Relies on the teacher for help.

Chip Wood. Yardsticks: Children in the Classroom Ages 4-14. pages 74-75

ALGEBRAIC REASONING

- Explores the pattern in part-whole activities that establishes connections to addition and subtraction.
- Recognizes that the = symbol in equations means a relationship, not just instructions to compute.
- Describes simple ratios in patterns using models or pictures.
- Begins to translate verbal information into algebraic expressions.

NUMERICAL AND PROPORTIONAL REASONING

- Uses base-10 models and pictures to show the quantitative value of a number.
- Begins to see a group of 10 as a single set, named "a ten."
- Needs many experiences with and without models over a long period of time to develop a deep understanding of large numbers.
- Masters basic addition and subtraction facts by using their inverse relationship, efficient strategies and the commutative property (addition only).
- Uses place value charts and models to further develop the written number name and number symbols.
- Uses number patterns, pictures, arrays and other models to explore multiplication and division.
- Begins to estimate using number meanings, models, basic facts, and mental computation, rather than rules for rounding.
- Represents the relationship between the equal-size pieces and the whole or set using models.
- Develops an understanding of fractional parts and the relationship between the numerator and the denominator using models, familiar objects and fraction sentences.
- Uses benchmark numbers to develop patterns to explore estimation strategies.

GEOMETRY AND MEASUREMENT

- Can compose and decompose two-dimensional shapes, e.g., combining a square and a triangle to make a pentagon or finding two congruent triangles in a rectangle.
- Begins to quantify attributes of objects.
- Has the ability to measure length as an iteration of units.
- Recognizes the relationship between the size of the unit and the number of units needed to represent a given length.
- Understands the need for standard units of measure and uses measuring instruments such as rulers, scales and clocks.
- Begins to read an analog clock using the skill of "reading a meter" with a pointer on a numbered scale.

WORKING WITH DATA

- Begins with real or hands-on graphing experiences and moves to representational and symbolic graphing.
- Builds decision making along several dimensions at the same time:

    1. What question are we answering?
    2. What is a good attribute? Why am I choosing this unit?
    3. What is an appropriate procedure?
    4. What instrument is needed to count the units? (Jensen, p. 180)

- Needs ongoing experiences of increasing complexity in organization and summarization through graphing.
- Records information through multiple graphic representations (e.g., two column graph, Venn diagram, pictograph).

Mathematics Background for Teachers

MATHEMATICS BACKGROUND FOR GRADE 2 TEACHERS

ALGEBRAIC REASONING: PATTERNS AND FUNCTIONS

Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies.

Central Understanding: Relationships shown through number patterns extend the understanding of number properties and operations.

Background: Translating the procedures and rules that govern patterns into mathematical expressions establishes the connection of patterns to algebraic representations. Conceptual understanding and procedural fluency are intertwined and equally necessary to support the examination of patterns. The exploration of the structures of our number system leads to the ability to discover relationships and make generalizations. These generalizations make apparent the connections between and among numeric and geometric concepts.

NUMERICAL AND PROPORTIONAL REASONING

Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technologies.

Central Understanding: In the base-10 numeration system, number relationships can be described and represented in a variety of ways to support conceptual understanding and computation.

Background: Base-10 numeration includes counting in units and multiples of ones, tens and hundreds as representation of one quantity or number. Many of the ideas that contribute to computational fluency and flexibility with numbers are extensions of how numbers are related to 10. Decomposing and composing a number leads to efficient ways to think about quantities and computation. When numbers are taken apart and recombined displaying different relationships, basic facts are easier to remember. Similarly, the inverse relationship of addition and subtraction are reinforced.

GEOMETRY AND MEASUREMENT

Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools and technologies.

Central Understanding: Attributes can be compared by applying measurement to an object, situation or event.

Background: Measuring units depends upon and strengthens understanding of number through counting and comparison. Standard units of measurement become common referents for identification and description of objects. Geometric shapes and solids are identified, composed and decomposed based upon attributes and measurement.

WORKING WITH DATA: PROBABILITY AND STATISTICS

Data can be analyzed to make informed decisions using a variety of strategies, tools and technologies.

Central Understanding: The same information can be organized in different ways.

Background: The gathering of data should be based on student-generated questions. The question to be answered must be formulated clearly to direct an investigation. In order to make data collection meaningful, it is necessary to identify an attribute or characteristic that can be measured. Different classifications of the same attributes will produce different organizations of the information or data collected.

Correlated Grade-Level Expectations

Click here to access correlated grade-level expectations for Grade 2 on the State Department of Education Web site.

Sequenced Grade-Level Expectations

GRADE 2 SEQUENCED GLES

Grade-Level Expectations	Fall	Winter	CMT	Spring
ALGEBRAIC REASONING				
1.1 Understand and describe patterns and functional relationships.				
1. Sort, classify and order objects and numbers in more than one way and by one and two attributes and describe the rule used. Use attributes such as size, shape, color, texture, orientation, position and use; and characteristics such as symmetry and congruence.		▨		
2. Recognize, extend, and create repeating, growing, number; e.g., skip counting, odd/even, counting on by 10; and one and two attribute patterns. Describe the pattern and the rule used to make it.				▨
3. Replicate the pattern using a different representation, e.g., letters to numbers.	▨			
4. Use patterns and the rules that describe the patterns to identify a missing object, objects with common or different attributes, and the complement of a set of objects.	▨			
5. Analyze and describe observable changes in patterns using language that describes number characteristics and qualitative characteristics such as attributes, orientation and position.				▨
1.2 Represent and analyze quantitative relationships in a variety of ways.				
6. Model real-life situations that represent the addition and subtraction of whole numbers with objects, pictures, symbols and open sentences.		▨		
1.3 Use operations, properties and algebraic symbols to determine equivalence and solve problems.				
7. Demonstrate an understanding of equivalence or balance of sets using objects, models, diagrams, numbers whole number relationships (operations) and the equals sign, e.g., $2 + 3 = 5$ is the same as $5 = 2 + 3$ and the same as $4 + 1 = 5$.				▨
NUMERICAL AND PROPORTIONAL REASONING				
2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships.				
1. Locate, label, compare, and order whole numbers up to 1,000 using pictures, place value models, number lines, and benchmarks of 0, 10 and 100, including naming the number that is 10 or 100 more or less than a given number.	▨			

Grade-Level Expectations	Fall	Winter	CMT	Spring
2. Represent whole numbers up to 1,000 by modeling and writing numbers in expanded forms, e.g., 37 = (3 x 10) + (7 x 1), and regrouped forms, e.g., (2 x 10) + (17 x 1) = 37, and use the forms to support computational strategies.		▓		
3. Represent multiplication and division (with factors of 1, 2, 5 and 10) using a variety of models and strategies such as arrays, pictures, skip counting, extending number patterns, and repeated addition and subtraction; describe the connection between multiplication and division.				▓
4. Use a variety of models and familiar objects to compare, order and estimate parts of a whole using the unit fractions ½, ⅓, ¼.		▓		
5. Use a variety of models to represent and describe parts of groups as unit fractions ½, through ¹⁄₁₀.	▓			
6. Estimate and determine ½, ⅓, ¼ of a small group of up to 20 objects, such as finding ½, ⅓, ¼ of 12 cookies.				▓
7. Describe ratios in terms of the linear patterns that develop from the relationships between quantities, e.g., In a pattern of green, green, red blocks there are always two green blocks for one red block.	▓			
2.2 Use numbers and their properties to compute flexibly and fluently and to reasonably estimate measures and quantities.				
8. *Count whole numbers to 1,000 and beyond.*		▓		
9. *Count on by tens from a given amount, e.g., 17, 27, 37, etc.*	▓			
10. *Read and write numerals up to 1,000.*		▓		
11. Skip count by twos, fives, tens and hundreds to 1,000 and beyond.	▓			
12. Determine whether a set of objects has an odd or even number of items by pairing objects and creating arrays.		▓		
13. Create word problems and write and solve two- and three-digit number sentences that reflect contextual situations and real-world experiences involving addition and subtraction. Construct and solve open sentences, e.g., □ + 5 = 11. Solve the problems using a variety of methods including models, pictures, pencil and paper, estimation and mental computation, and describe the reasoning or strategies used.				▓
14. Solve problems using addition and subtraction facts involving sums and differences to 20 with flexibility and fluency.		▓		

Grade-Level Expectations	Fall	Winter	CMT	Spring
15. Add two-digit numbers with and without regrouping. Subtract two-digit numbers without regrouping and with regrouping using models.		■		
16. Determine when an estimate for a problem involving two- and three-digit numbers is appropriate or when an exact answer is needed.	■			
17. Use a variety of strategies to estimate solutions and to determine if a solution to a computation or word problem reflecting real-world experiences involving addition and subtraction of two- and three-digit whole numbers is reasonable.				■
18. Determine and compare the value of pennies, nickels, dimes, quarters and half dollars.		■		
19. Count, compare and trade sets of pennies, dimes and dollars up to $10.00	■			
GEOMETRY AND MEASUREMENT				
3.1 Use properties and characteristics of two- and three-dimensional shapes and geometric theorems to describe relationships, communicate ideas and solve problems.				
1. Identify, describe and draw polygons (triangles, quadrilaterals including trapezoids and rhombuses, pentagons and hexagons), solids, and other familiar two- and three- dimensional objects in the environment.	■			
2. Compare and sort familiar polygons, solids, and other two- and three- dimensional objects in the environment.	■			
3. Construct polygons, solids and other two- and three-dimensional objects using a variety of materials and create two-dimensional shapes and designs with one or more lines of reflective symmetry (lines that divide the shape or design into two congruent parts).		■		
3.2 Use spatial reasoning, location and geometric relationships to solve problems.				
4. *Investigate and predict the result of putting together and taking apart two- and three-dimensional shapes in the environment, e.g., use objects to find other shapes that can be made from three triangles or a rectangle and a triangle.*				■
3.3 Develop and apply units, systems, formulas and appropriate tools to estimate and measure.				
5. *Know the months of the year in order and locate dates, days, weeks and months on a calendar. Use the information to write and solve problems involving calendars.*	■			

Grade-Level Expectations	Fall	Winter	CMT	Spring
6. *Solve problems involving telling time, including estimating and measuring the length of time needed to complete a task, to the half-hour using analog and digital clocks.*				
7. Use measurement tools such as thermometers to measure temperature, basic rulers to measure length to the nearest half-inch or centimeter, and balance scales to measure weight /mass in grams.				
8. Use nonstandard referents and standard benchmarks to estimate and measure the following: • length (to the nearest inch, half-inch, foot, yard, centimeter or meter); • area (in square inches); • capacity (in liters and cups); • weight (in grams); • temperature; and • volume (using water or sand).				
9. Describe the strategy used to determine an estimate and determine if the estimate is reasonable.				
10. *Describe the relationships between and centimeter and meter among inch, foot and yard.*				
WORKING WITH DATA				
4.1 Collect, organize and display data using appropriate statistical and graphical methods.				
1. Pose questions that can be used to guide data collection, organization, and representation.				
2. Collect and systematically organize and represent the data that answer the questions using lists, charts and tables, tallies, glyphs (coded pictures), picture graphs and bar graphs.				
4.2 Analyze data sets to form hypotheses and make predictions				
3. Describe data that have been organized and make comparisons using terms such as largest, smallest, most often or least often.				
4. Determine patterns and make predictions from data displayed in tables and graphs.				
4.3 Understand and apply basic concepts of probability				
5. Describe and explain the likelihood of the occurrence of various events. State possibilities, make predictions and test the predictions in practical situations.				
6. Conduct simple probability investigations involving activities of chance and games with number cubes and spinners; record, graph and describe the results of the investigations.				

Correlated GOALS 2000 Criterion Referenced Test

GRADE 2 CORRELATED GOALS 2000 CRT

The Goals 2000 Mathematics Curriculum was written as a companion to the 1998 Mathematics Framework. The Goals 2000 resources cited in this 2008 Model for Mathematics Curriculum are aligned to the 2005 Mathematics Curriculum Framework, 2007 Curriculum Standards and the fourth generation Connecticut Mastery Test.

The Grade 2 Criterion Referenced Test Part A from the Goals 2000 Mathematics Curriculum is aligned to the Grade 2 sequenced GLEs and can be used for pre- and post-assessment.

Please use the link below to access the electronic version of the complete document, which includes other activities, such as opportunities for open-ended and challenge experiences that must be examined for alignment prior to use.

http://www.sde.ct.gov/sde/cwp/view.asp?a=2618&q=321084

GLE 1.1.1

1. Jan lives on the top floor.
   Todd lives 3 floors below Jan.
   Sue lives on the bottom floor.
   John lives 4 floors above Sue.
   Eric lives above Todd.
   Gina lives 2 floors below Eric.
   Gina lives on the second floor.
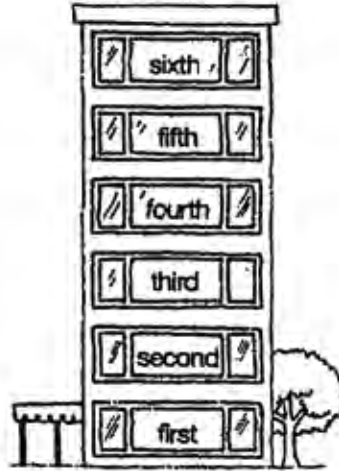
   Draw a picture of the building.
   Write the name of the person who
   lives on each floor.

GLE 2.2.14

2. What two numbers add up to 10 and also have a difference of 6?

   $\square + \triangle = 10$ $\square - \triangle = 6$

   What number Is $\square$?

   What number is $\triangle$?

   Tell how you decided.

3. Copy the story.
   Fill in the shapes with numbers.
   The story must make sense.

Rosa hopped ☐ times on her left foot.
She hopped △ times on her right foot.
She hopped ◯ more times on her right
   foot than her left foot.

Which shape has the greatest number? Why?
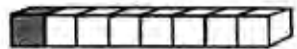
4. Show 2 ways to find the sum of all the numbers in the squares.

| 1 | 2 | 3 | 4 |

| 4 | 3 | 2 | 1 |
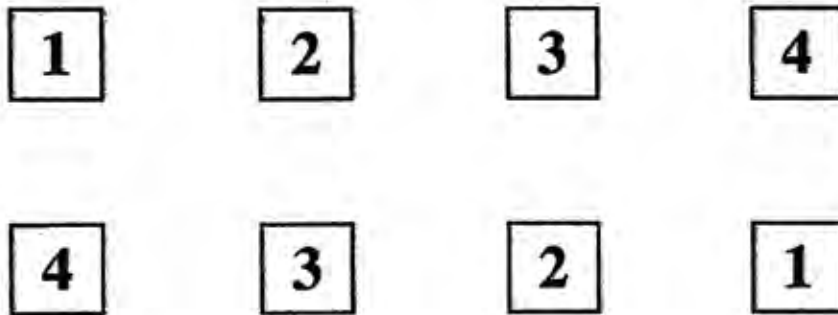
Compare your ways with a classmate.
Tell which way you like best and why.

5. Fact Families. Write the fact families.

1.

$7 \; (+) \; 3 \; (=) \; 10$

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

2.

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

3.

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

4.

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

___ ◯ ___ ◯ ___

6.
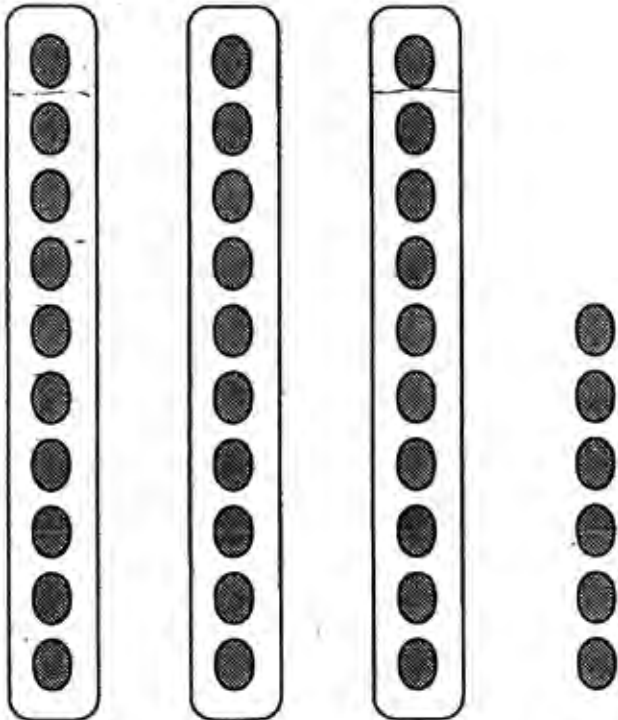
What number is this? _____

Write it in expanded form. _____

If you add ten to the number, what number would you have? _____

Draw a beanstick picture to show the new number.

Write the new number in expanded form. _____

7. Build different models for the number 24.

Use place value ten-rods and ones.

In each box draw a picture to show different ways to make 24.

Then fill in the number sentence to show the expanded form for each picture.

24	24	24
___ + ___ = 24	___ + ___ = 24	___ + ___ = 24

GLEs 1.2.7; 2.2.13; 2.2.14; 2.2.15

8. Choose your own number between 30 and 50.

   My number is _____.

   Use ten-rods and ones to build the number in as many ways as you can.

   Draw a picture for each way and write a number sentence to go with it.

   Record your answers here. Use another piece of paper if needed.

   How do you know that you have shown all the possible ways?

GLE 2.1.1

9. Which is greater, 27 or 72? Explain why.

GLEs 2.1.2; 2.2.15

10. Fill in the blanks to show 3 different ways to solve the same problem 24 + 33.

a. 24 + 33 = _____

b. 24 + 33 = _____

c.   24 = _____
+ 33 = _____

_____ + _____ = _____

GLEs 2.2.15; 2.2.17
Show 2 different ways to do this problem: 32 + 46.

11. Finish this sample problem.

$$54 \longrightarrow 50 + 4$$
$$+37 \longrightarrow 30 + 7$$
$$80 + 11 = \rule{2cm}{0.4pt}$$

Fill in the blanks.

$$46 \longrightarrow \underline{40} + \underline{\quad}$$
$$+28 \longrightarrow \underline{\quad} + \underline{8}$$
$$\rule{3cm}{0.4pt}$$

$$\rule{1cm}{0.4pt} \ \rule{1cm}{0.4pt} = \rule{1cm}{0.4pt}$$
$$36 \longrightarrow \rule{1cm}{0.4pt} + \rule{1cm}{0.4pt}$$
$$+19 \longrightarrow \rule{1cm}{0.4pt} + \rule{1cm}{0.4pt}$$
$$\rule{3cm}{0.4pt}$$

$$\rule{1cm}{0.4pt} \ \rule{1cm}{0.4pt} = \rule{1cm}{0.4pt}$$

12. **Four cats were sitting on the deck.**
Two cats jumped off.
How many cats are on the deck now?

Write the number fact sentence that you would use to solve the problem.

_____

a. **Write your own story problem to go with this number sentence.**

4 + 2 = _____

_____

_____

_____

b. **What is the answer to your problem?**

13. Erik had **27** picture books.
    He gave **12** of the books to Janice.
    How many books will Erik keep?

    Write a number sentence to solve the problem. _____

    a. Complete this number sentence.

       45 – 23 = _____

    b. Write a story problem to match the number sentence in problem 2.

    _____

    _____

    _____

    _____

14. Alexis has **32** gummy fish.
Jed has **14** of them.
How many more gummy fish does Alexis have?

Write a number sentence to solve the problem. _____

a. Solve the equation.

$51 - 19 =$ _____

b. Write a story problem to match the number sentence in problem a.

_____

_____

_____

_____

15. Which sticker doll costs the most?
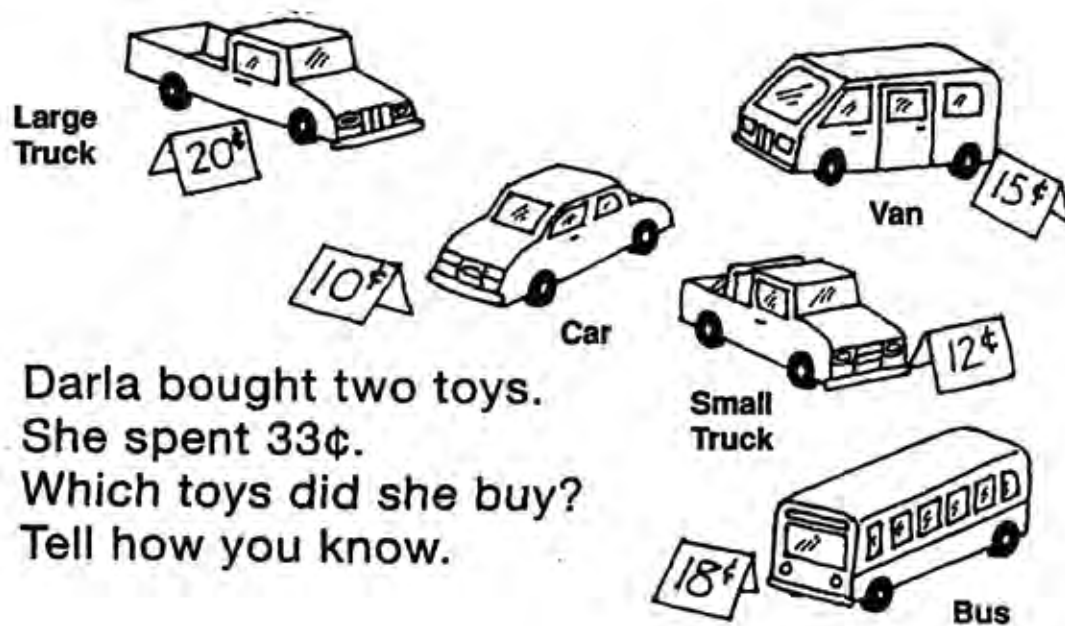   Cost of shape stickers:

◯ 1¢   △ 2¢   ☐ 5¢   ▭ 10¢
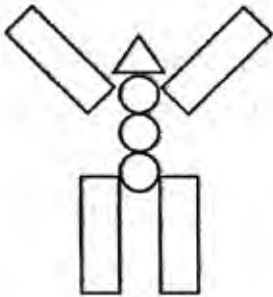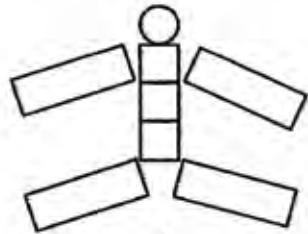
A   B   C

Tell how you know.

16.

Large Truck — 20¢

Car — 10¢

Van — 15¢

Small Truck — 12¢

Bus — 18¢
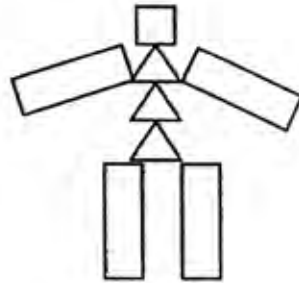
Darla bought two toys.
She spent 33¢.
Which toys did she buy?
Tell how you know.

17. Chris had

Chris bought two things.
Now Chris has

What do you think Chris bought? _____

KITES
5¢ each

BALLS
2¢ each

HATS
3¢ each

If Chris had bought three things, what could he have bought?

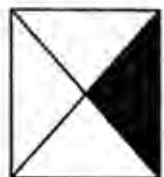## GLE 2.2.18

18. Fred has 8 nickels.
    Ted has 7 dimes.
    If Ted trades Fred for all the nickels, how many dimes should Ted give Fred?

    Explain your thinking.

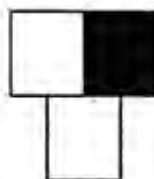**19. Draw lines to match each shaded part with its fraction name.**

$$\frac{1}{3}$$

$$\frac{1}{2}$$

$$\frac{1}{4}$$

20. Is the shaded part ½ ?

Explain. _____

a. Label each part of the shape with its fraction name.
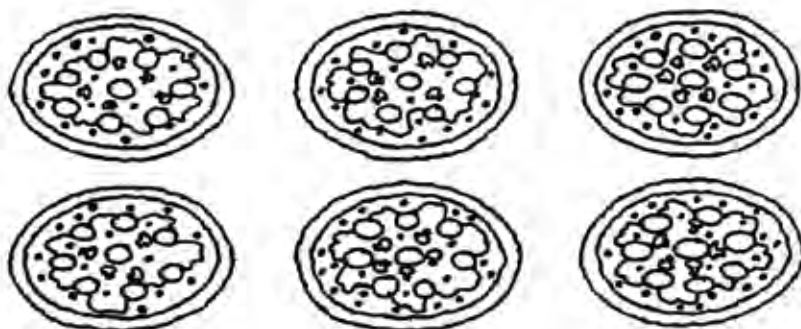   **Write the matching fraction sentence.**

_____ + _____ + _____ = 1

b. You have 8 balloons.
   Half of the balloons pop!
   How many balloons are left? _____

   Draw a picture and use it to solve the problem.

21. Four people want to share these six pizzas.
    Give each person the same amount.
    Show and tell how you would do this.

    Could you do this problem in another way?
    Draw 6 more pizzas and show and tell how.

GLE 2.1.5

22. Would you rather have one-half of the melon or one-third of the melon? Why?

      Why would someone make a different choice?

GLEs 1.1.4; 2.1.7

23. Mr. King bought more than one fruit basket like this one.
He got 8 apples in all.
How many oranges, pears, and grapes did he get?
Tell me how you know.

FRUIT BASKET
1 ORANGE 3 PEARS
2 APPLES 10 GRAPES

24. How many x's are in Row 5?
    Tell how you decided.

Row 1	x x x
Row 2	x x x x x x
Row 3	x x x x x x x x x
Row 4	x x x x x x x x x x
Row 5	x x x x x x

GLE 2.1.3

25. Fill in the blanks.

a.

___ + ___ + ___ = ___

3 groups of ___ = ___

3 x ___ = ___

---

b.
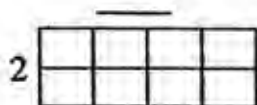
$2\overline{)10}$ **2 x** ___ = ___

GLE 2.1.3

26. Brad put cookie dough on a baking sheet.
    He made 4 rows of cookies.
    Each row had 5 cookies.
    How many cookies did he put on the baking sheet?

    Draw a picture of the cookie sheet and use it to solve the problem.

27. Jane made a bread chain.
    There are 20 beads in her chain.
    Look for her pattern.

    How many ⬭ are in her bead chain?

    Tell how you know.

⬭   beads cost 2¢ each.

○   beads cost 5¢ each.
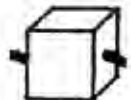
▱   beads cost 10¢ each.

How much will Jane spend to make her 20-bead chain?

28. Count and write a number in each empty square.

1	2	3	4
5	6		
9			
13			

a. Describe a pattern going across ⟶ .

_____

_____

b. Describe a pattern going down↓.

_____

_____

GLEs 1.1.2; 1.1.5

29. Fill in the blanks to extend the pattern.

0,   3,   6,   9,   ____,   ____,   ____

Write the rule for the pattern. _____

_____

GLEs 1.1.4; 1.1.5; 2.1.7
Fill in the T-table.

Dogs	Legs
1	4
2	8
3	12
4	___
___	___
___	___

Describe the rules, or patterns, in the T-table.

_____

_____

30. Look for the pattern. Fill in the blanks.

Use the rule to make up your own.

4	14	13
7	17	16
3	13	12
6	—	15
1	11	—
—	18	17
24	34	33
53	63	—
35	—	44
20	—	—

GLE 3.1.3

31. Cover the shapes with Pattern Blocks. Build the other half.
    Use the line of symmetry. Trace each shape. Color.
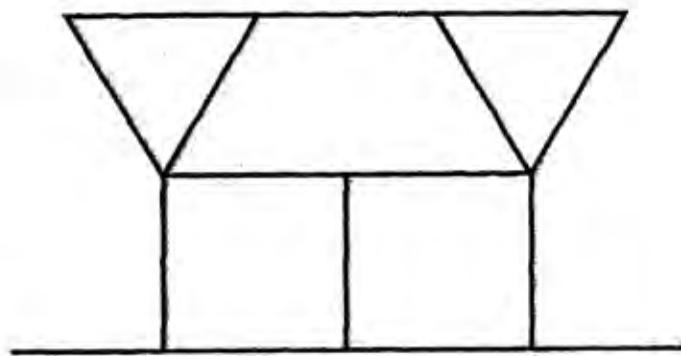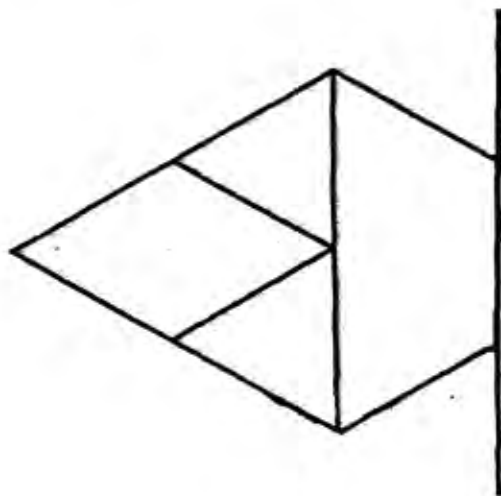
32. Draw a smaller square inside the square.
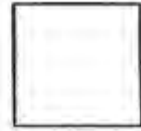
    a. Draw a triangle inside the circle.

    b. Draw a rectangle.

    c. Draw one or more lines of symmetry inside each shape.
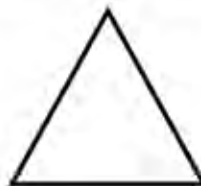
    d. Draw a shape congruent to this one.
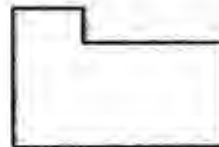
33.
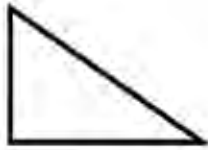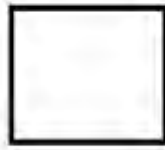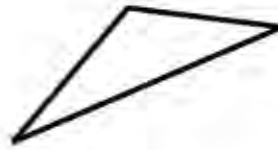
A   B   C

a. Andy says that Shapes A and C belong together. Why?

b. Brianna says that shapes A and B belong together.
   Explain why she also is correct.

34.

If you measured the feather with centimeters and also measured it with inches, would the measurements be the same, or different?

Explain. _____

_____

Estimate about how many beans long is the feather.   ____

Tell how you made your estimate. _____

_____

About how many beans would fit inside to cover the rectangle? ____

35.
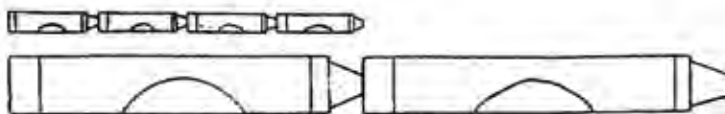
How many small crayons make one big crayon? _____

How many small crayons make two big crayons_____

Explain how you found the answer.

Estimate how many small crayons will make three big crayons. _____

Estimate how many small crayons will make four big crayons. _____

36.

6¢

3¢

2¢

1¢
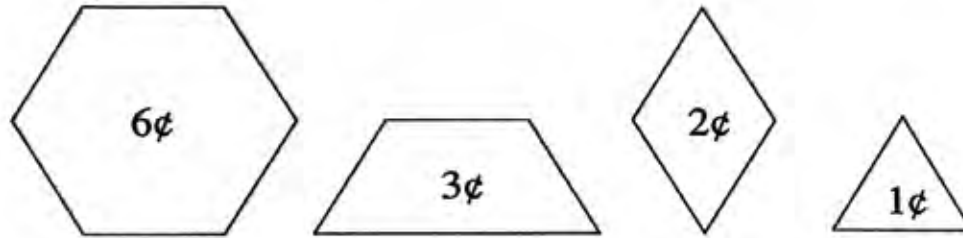
Notice that each
pattern block shape has a value.
Explore filling this shape with
pattern blocks.
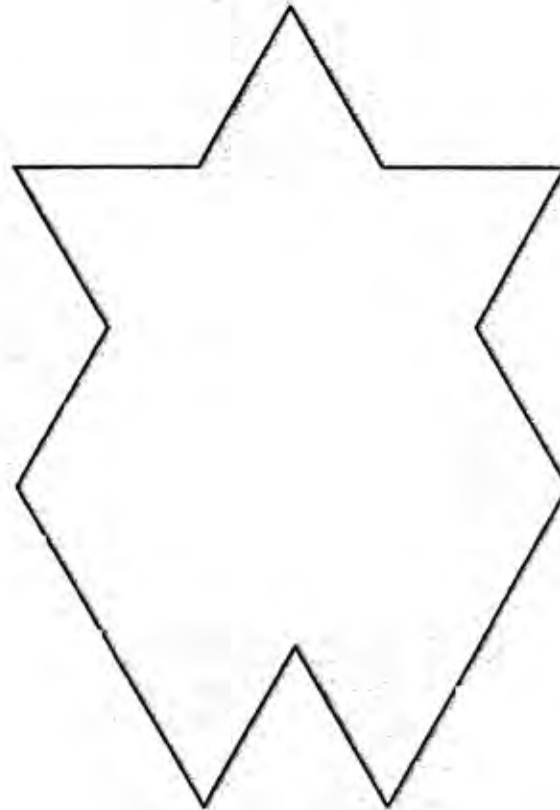
Now find out how much it costs to fill the design.
Show the set with the fewest coins that you would need to pay for the shape.
Use drawings like these coins to tell about the amount.

(P) (N) (D) (Q)
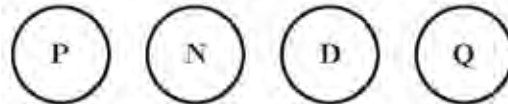
37.
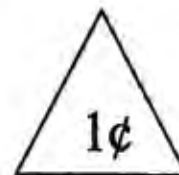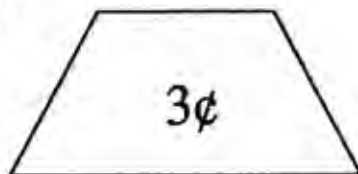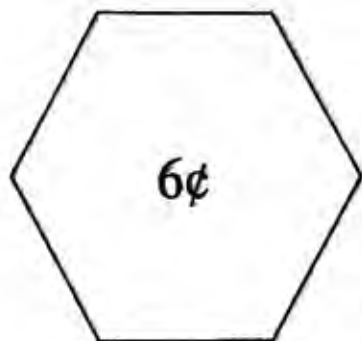
Design your own shape.
It must cost exactly 25¢. Use real pattern blocks to plan your design.
Then use the pattern blocks to record your design.

Tell how you would convince someone that your shape costs 25¢._____

_____

38. Eldridge walked around the perimeter of the swimming and diving pool. How far did he walk?
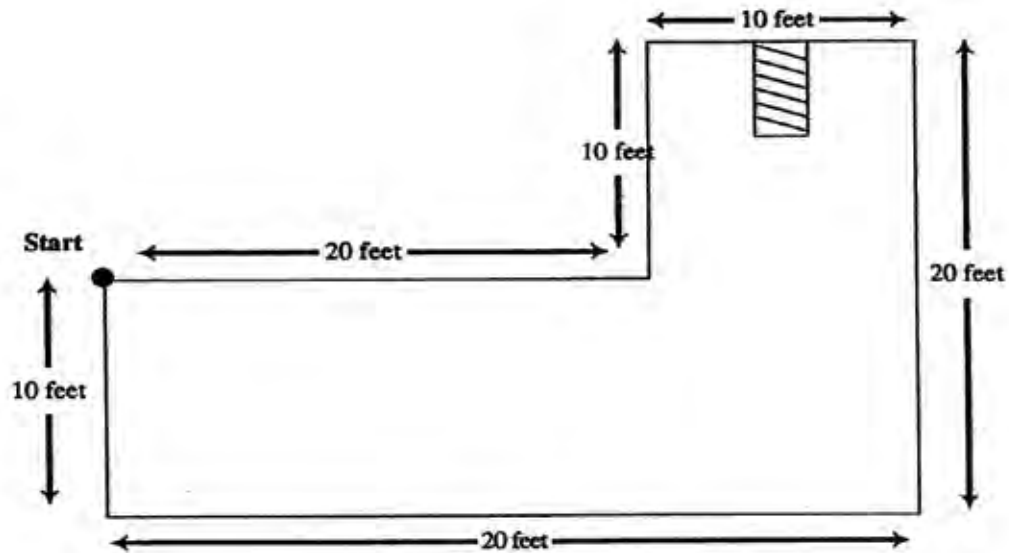
39. Match each clock face to the time.

8:00

3:30

11:00

Draw on the clock face to show the time.
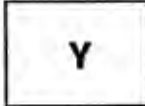
5:00
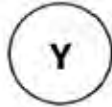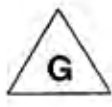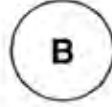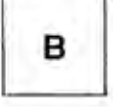
7:30

40. Draw the missing shapes and label them.

R (circle)		B (circle)	G (circle)
R (triangle)	Y (triangle)		G (triangle)
R (square)	Y (square)	B (square)	

Draw the missing shapes and label them.

Y (star)	Y (circle)	Y (triangle)	
G (star)		G (triangle)	G (square)
B (star)	B (circle)		B (square)

41. Colors of Jelly Beans in one bag.

Red	~~HHH~~ ////
Green	////
Pink	~~HHH~~ /
Yellow	~~HHH~~ ///

Tally Marks:	/ equals one jelly bean.
	~~HHH~~ equals five jelly beans.

a. Use the data in the table to complete a bar graph below.

Red												
Green												
Pink												
Yellow												

Use the graph to answer the questions.
b. Which color is the most? _____ Which color is the least? _____
c. How many more pink than green jelly beans are in the bag? _____
d. Write something else about the graph. _____

42. You have a choice of Spinner A or Spinner B.
    To win, you must land on a 10.
    Which spinner would you choose?
    Explain why.
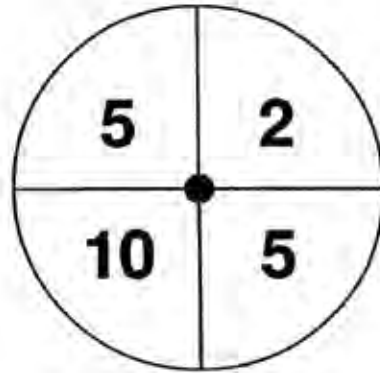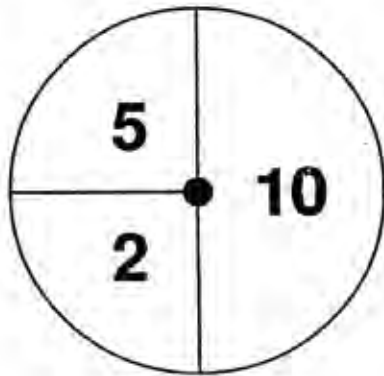
43. Use the picture below to answer the questions that follow.
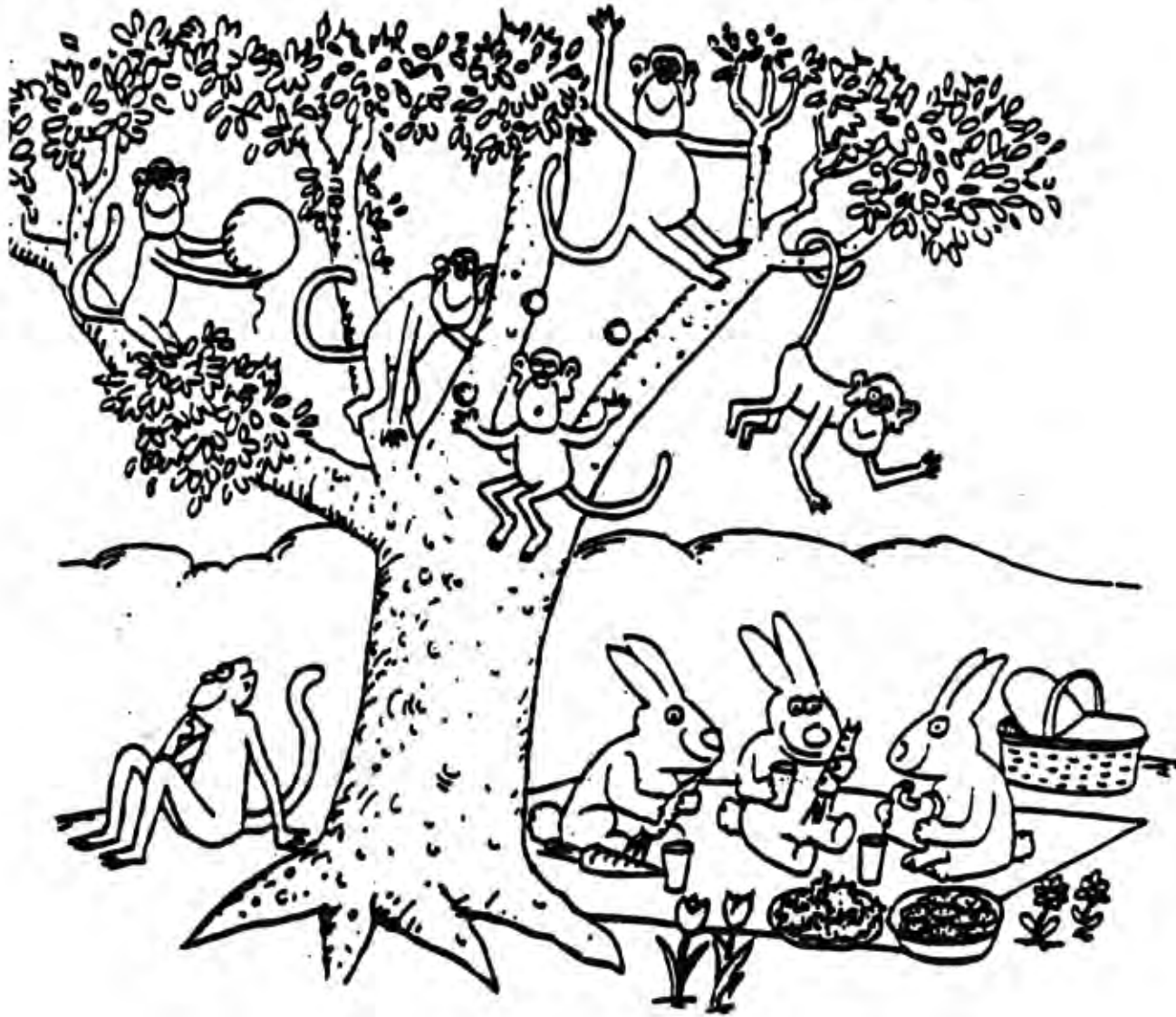
a. Circle each monkey. Write how many there are. _____

b. How many monkeys and bunnies are there? _____

c. How many more monkeys than bunnies are there? _____

d. How many bunny ears are there? Write a number sentence to show how you got your answer.

_____

_____

_____

GLE 2.1.1; 4.2.3

44. Use the graph below to answer the following questions.
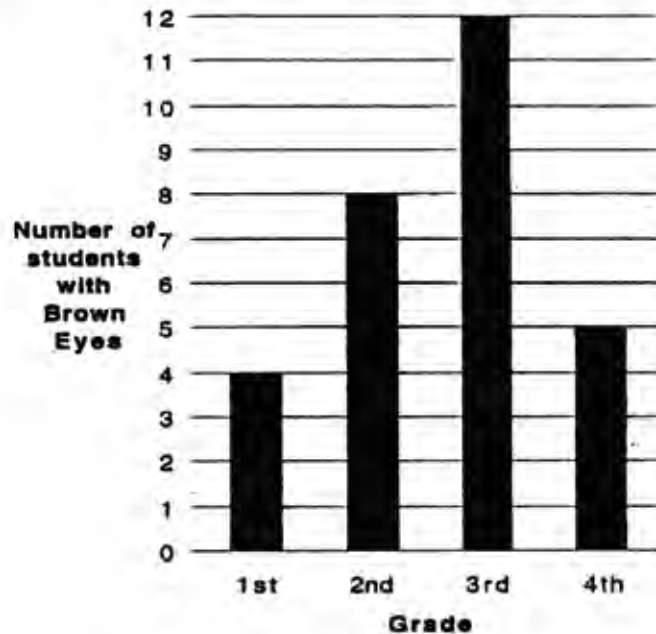
a. How many 1st graders have brown eyes? _____

b. What grade has the least number of students with brown eyes? ____

c. How many more 3rd graders have brown eyes than 2nd graders? ____

d. If the 1st and the 4th grades are combined, do they have more children with brown eyes than the 2nd grade? _____

Write how you know. _____

_____

e. **Write another question that could be answered by the graph.** _____

_____

GLEs 1.1.2; 1.1.4

45. Write the missing number in the blank.

43, 53, _____, 73

a. **How did you find the missing number?** _____

_____

b. **Write the missing numbers in the blanks.**

55, 50, 45, 40, _____, _____, _____

How did you find the missing numbers?_____

_____

46. Look at the shapes.

a. Show how you would sort them into three groups.
    Write what the shapes in each group have in common.
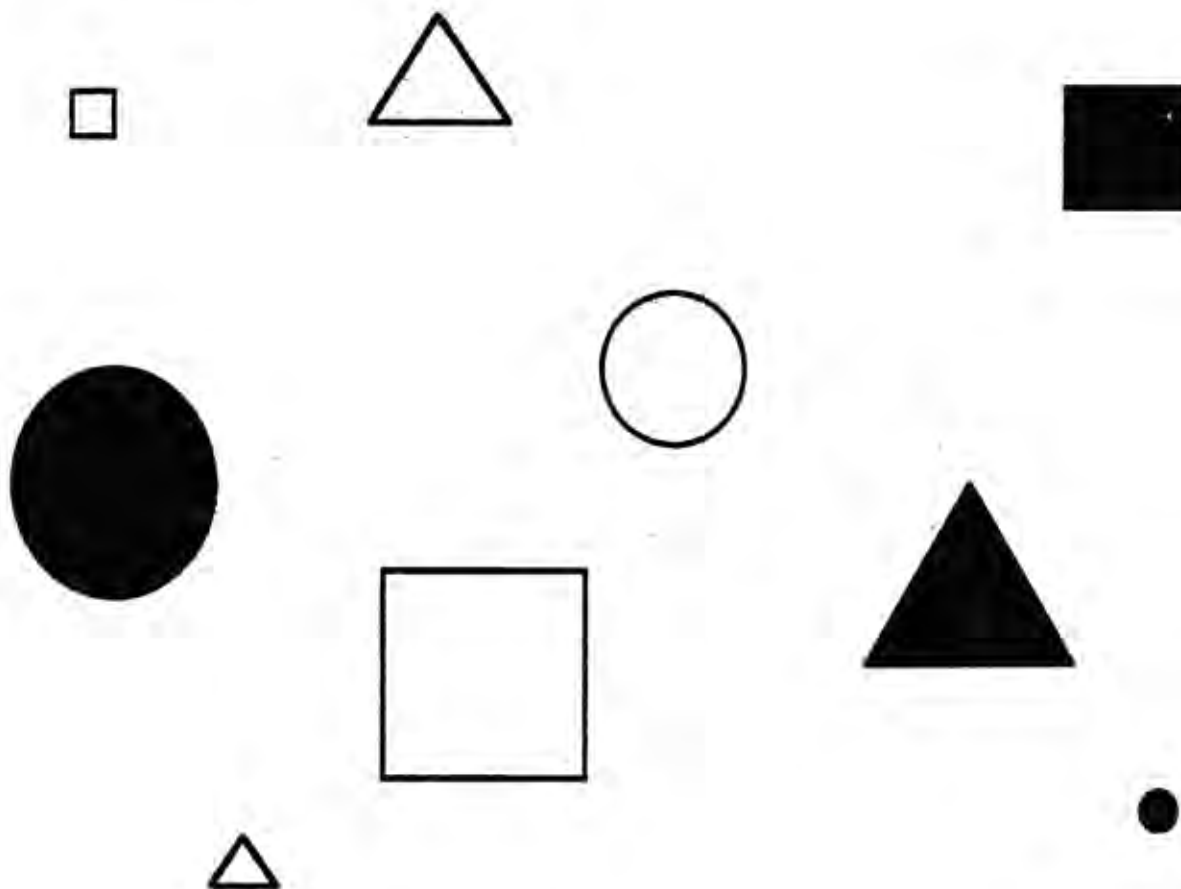
GLE 1.1.2

47. Mac got a new plant.
    In April he counted 5 leaves.
    In May there were 10 leaves.
    In June he counted 15 leaves.
    In July there were 20 leaves.

    a. How many leaves do you think there were in August? _____

    b. Why do you think that? _____

    _____

GLEs 2.1.1; 2.2.17

48. Sandy picked 38 carrots. Did she pick about 30 or about 40 carrots?
    Write how you know.

    30 31 32 33 34 35 36 37 38 39 40

    _____

    _____
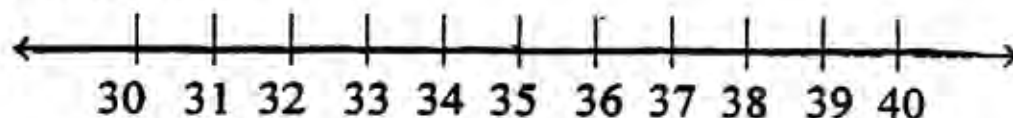
49. Larry picked 53 tomatoes. Did he pick about 50 or about 60 tomatoes? Write how you know.

```
   ←——+——+——+——+——+——+——+——+——+——+——→
      50  51  52  53  54  55  56  57  58  59  60
```

_____

_____
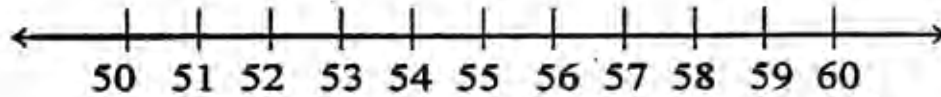
50. Suppose you spin the spinner 20 times and record the color, black or white, that comes up each time.
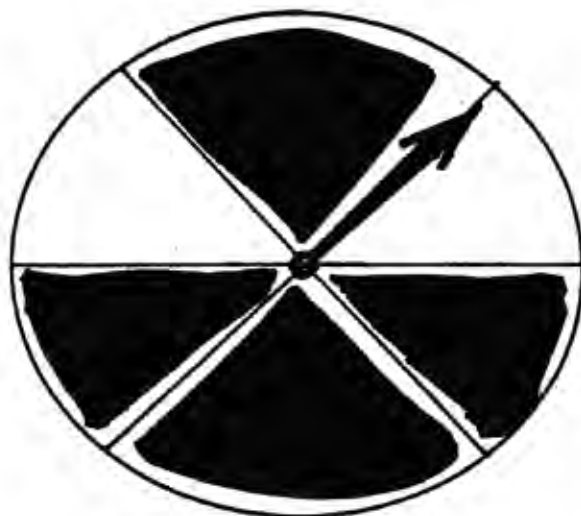
a. Which color do you think comes up most often, black or white?

_____

b. Write how you decide. _____

_____

51. Calvin needs 36¢. He already has 2 dimes and 1 penny. Put an "X" on each coin he could <u>add</u> to get to 36¢.

GLEs 2.2.15; 2.2.18; 2.2.19

52. You are the clerk at the school store.
    Prices for the store are shown on the sign below.

School Store
Pencils	5¢ each
Pens	8¢ each
Erasers	10¢ each

a. Complete the following order for a customer.

SCHOOL STORE ORDER FORM

Number	Item	Cost
1	Pencil	_____ ¢
5	Pens	_____ ¢
2	Erasers	_____ ¢
	Total	_____ ¢

b. Mike buys 1 pencil, 3 pens, and 1 eraser. How much does he spend? _____

_____

c. Mike pays with 2 quarters. How much change should he get?

d. What coins could you give him to make the change? Put an "x" on the coins you would use.

e. Show two ways a friend of yours could spend exactly 30¢ in the store. What did your friend buy?

First Way   _____

              _____

Second Way _____

              _____

f. Show two ways you could spend exactly 26¢ in the store. List what you would buy.

First Way   _____

_____

Second Way _____

_____

g. The store also sells crayons. Your teacher sends you to the store to buy 5 boxes of crayons. What else do you need to know to find out how much 5 boxes will cost?

_____

_____

GLE 2.2.13

53.

ICED TEA

Dawn wanted to earn some money to buy a bathing suit. She made ice tea to sell. Her friend Carl came to buy some. Carl paid 10 cents for his first glass of ice tea and 5 cents for each glass of ice tea after that. Carl drank a total of 15 glasses of ice tea. How much money did Carl pay Dawn for all of the iced tea he drank? Show your work.

54. Eric and Sue have bunnies for pets. The veterinarian told them that each bunny should have one-fourth cup of water and 2 ½ carrots for dinner.

   Eric and Sue have a large barrel of water, but when they looked at the carrot bin they found only 15 carrots. They were able to feed all their pets. How many bunnies do they have?

GLEs 1.1.2; 2.2.15

55. My mother likes to keep track of how much my baby brother grows from one birthday to the next. He was 26 inches tall on his first birthday. On his second birthday Mom measured him and found he had grown 2 more inches from when he was measured on his first birthday. On his third birthday he had grown 1 inch. On his fourth birthday he had grown 2 more inches. If this continues how many inches will my baby brother have grown by his eighth birthday?

Curriculum Standards Connections

ALGEBRAIC REASONING: PATTERNS AND FUNCTIONS. Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies.

〜 *COMPONENT STATEMENT: 1.1. UNDERSTAND AND DESCRIBE PATTERNS AND FUNCTIONAL RELATIONSHIPS*

Grade-Level Expectations *(Italics indicate links not evident in 2005 framework)*

1. Sort, classify and order objects and numbers in more than one way and by one and two attributes and describe the rule used. Use attributes and describe the rule used. Use attributes such as size, shape, color, texture, orientation, position and use; and characteristics such as symmetry and congruence.

2. Recognize, extend and create repeating, growing, number; e.g., skip counting, odd/even, counting on by 10; and one and two attribute patterns. Describe the patterns and the rule used to make it.

    • Construct geometric patterns and describe the core elements e.g., triangle, square, triangle in a math journal

    • Create patterns based on more than one attribute e.g., big and red, big and blue, small and red, etc.

    • Produce kinesthetic patterns for a partner to copy, follow, mirror or extend in gym or music class.

3. *Replicate the pattern using a different representation e.g., letters to numbers ABBA to 1221.*

4. Use patterns and the rules that describe the patterns to identify a missing object, objects with common or different attributes, and the complement of a set of objects. (See also **GLE1.1.5**)

    • Present patterns with missing components to identify and share strategies for finding and writing solutions, e.g., 2, 4, _, 8, 10.

5. **Analyze and describe observable changes in patterns using language that describes number characteristics and qualitative characteristics such as attributes, orientation and position. (See also GLE 1.1.4.)**

- Give children varied opportunities to analyze patterns in function machines, rotating figures or shapes, and number. See below.

In	Out
26	29
47	50
118	121
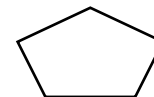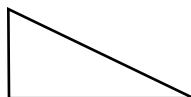
∽ *COMPONENT STATEMENT: 1.2. REPRESENT AND ANALYZE QUANTITATIVE RELATIONSHIPS IN A VARIETY OF WAYS.*

Grade-Level Expectations

6. **Model real-life situations that represent the addition and subtraction of whole numbers with objects, pictures, symbols and open sentences.**

- Have children act out situations such as: Liz has five oranges and Joanne has three apples. What would have to happen for Liz and Joanne to have an equal number of pieces of fruit? Possible responses include Liz could give Joanne an orange or Joanne could get two more apples or Liz could give oranges to two friends.

∼ *COMPONENT STATEMENT: 1.3. USE OPERATIONS, PROPERTIES AND ALGEBRAIC SYMBOLS TO DETERMINE EQUIVALENCE AND SOLVE PROBLEMS*

Grade-Level Expectations

7. Demonstrate an understanding of equivalence or balance of sets using objects, models, diagrams, numbers, whole number relationships (operations) and the equals sign, e.g., $2 + 3 = 5$ is the same as $5 = 2 + 3$ and the same as $4 + 1 = 5$. (See also GLE 1.2.6.)

SAMPLE INTEGRATED LESSON – PATTERN OBSERVATION OF SNOWFLAKES

Context: Water can be in the form of a solid, liquid or gas. The Wilson A. Bentley Science Center studies a solid form of water known as snowflakes. In science, we investigate observable properties of objects or materials. Mr. Bentley was one of the first people to closely observe the properties of snowflakes and found they had many shapes and patterns. He discovered patterns in snowflakes. Read and investigate the patterns that naturally occur in snowflakes.

GLEs: 1.1.2, 2.1.4, 2.2.8, 3.1.1, 3.1.2, 3.1.3

Time: Multiple instructional periods

Objective: Children will make predictions based on observations. Children will create and predict patterns formed when making paper snowflakes and recognize that snowflakes have reflective symmetry. Children will put together shapes that form repeating sequences or patterns. Children will create number patterns that match attributes of snowflakes (e.g., one snowflake has six sides, two snowflakes have 12 sides, etc.).

Materials: Pictures of snowflakes – there are printable images at the Wilson A. Bentley Web site (see electronic resources); string, 6-8 inches in length; paper cut in squares; pre-cut snowflakes.

For teachers: A Guide to Snowflakes: http://www.its.caltech.edu/~atomic/snowcrystals/class/class.htm

For teachers and students: Snow and Ice, http://britton.disted.camosun.bc.ca/snow/snowbook.pdf

Procedure:

1. Read aloud *Snowflake Bentley*.

2. Distribute pictures of snowflakes and ask questions such as:

   What shapes do you see?

   - Describe the shapes that you see in the snowflake.

   - Do any of the shapes repeat? Explain.

   - Describe any patterns that you see.

3. Hand out a piece of string to each pair of children. Have the children lay the string on a snowflake to show a line of reflective symmetry through the center of the snowflake. Ask questions such as:

- Why did you place the string where you did?

- Compare the two sides of your snowflake. How are they alike or different?

- Do you see any patterns?

4. Distribute square pieces of thin paper. The children should make two folds and cut shapes from the folded and non-folded parts of the paper, being careful not to cut through the fold. Have the children make predictions about what will happen as they cut the paper, how many shapes they will see, and if any of the shapes will repeat in a pattern. They open the snowflakes to verify their predictions.

5. Give the children another piece of the square paper to fold to make a six-sided snowflake. As they make each fold, ask them what shape they will see. Discuss the shapes. Snowflake templates can be found at http://www.papersnowflakes.com. Use the basic shapes templates, including the hexagon.

6. Guide the children to cut shapes out of the paper to make a snowflake. Remind them to make sure not to cut completely along a side where there is a fold and cut out different shapes. They should keep the snowflake folded after cutting is complete and ask questions such as:

- What shapes have you cut into your snowflake?

- Do you think they will be the same shape when you unfold the paper? Why or why not?

- Do you think you will see the shape one time or more than once? Why?

7. Have the children unfold two folds and ask questions such as:

a. What happened to the shapes you cut along the fold?

b. Is it the beginning of a pattern?

c. Do you think the shape will repeat more? Why or why not?

d. Are you able to predict the pattern of the whole snowflake?

8. The children will then sketch what they think they will see when they unfold the snowflakes. They unfold one more fold and revise the snowflake sketches and then unfold the snowflakes completely. You can use Explore Learning Web site that electronically allows children to sketch snowflakes and then print them for cutting: http://www.explorelearning.com/index.cfm?method=cResource.dspView&ResourceID=45

9. Ask questions such as:

    - How is the snowflake like your drawing? How is the snowflake different from your drawing?

    - What shapes do you see?

    - Can you see a pattern?

    - Is there more than one pattern in the snowflake?

    - How is your snowflake like your partner's? How is it different from your partner's?

10. Direct the children to pick one pattern on the snowflake and tell what would be the next three shapes that you would see if the pattern continued. Compare your pattern to your neighbor's and discuss:

    - How do your snowflakes compare to what you expected? Explain the differences and similarities.

    - How quickly were you able to see a pattern in your snowflakes?

    - Can your neighbor continue the pattern in your snowflake for the next three shapes?

    - Write in your journal what you noticed or observed about patterns and shapes by cutting snowflakes.

❖ **Possible Assessment Opportunities**

    ❖ Divide students into groups of four. Hand out a pre-cut six-sided snowflake to each group. One member of the group cuts the snowflake in half. Collect the halves. Each group should find the match to its snowflake half. Discuss with the children how

they knew that each of their snowflake halves were matches. Have the children describe the patterns that helped them identify their half.

Intervention: Allow the placement of the group's half on top of the other halves to locate a match.

Challenge: Provided with precut 12-sided snowflakes, have children identify the repeating pattern in the snowflake and identify the line of symmetry and explain how they know.

11. Using pictures of snowflakes from previous activities ask the children to explore ways to make number patterns that go with their collection of snowflakes (e.g., using six-sided snowflakes one snowflake has six sides, two snowflakes have 12 sides, etc.). Have the students explain how they developed their number pattern that matches their snowflake collection.

Note: There are a variety of number patterns that can be identified within snowflakes, the number of shapes is consistent with a snowflake. For example, a triangular crystal could have patterns of two columns on each side and children could identify a pattern of two, four, six, eight, 10, 12 and then explain how they identified the pattern.

Interdisciplinary Framework Connections				
Science	**English/Language Arts**	**Social Studies**	**Visual and Performing Arts**	**Physical Education**
AINQ.3 Make predictions based on observed patterns. **A.18** Describe differences in physical properties of solids and liquids.	**1.2a** Students will generate and respond to questions. **1.3d** Students will develop vocabulary through listening, speaking, reading and writing.	• Students will explain the patterns, distributions and relocations of people. • Students will explain ways in which humans use and interact with environments.	• Students will observe and describe the movement elements (action, space, dynamics) in a brief movement study. • Students will demonstrate the following partner skills: copying, leading and following, and mirroring.	• Work cooperatively and productively with partners or in small groups to complete assigned tasks.

Vocabulary: add, subtract, equal, odd, even, ratio, core element, repeat, mirror, sort, classify, extend, analyze, equity symbol, relationships, pattern, growing pattern, equivalence, properties

Resources:

Electronic Resources:

Wilson A. Bentley: http://snowflakebentley.com/index.htm

Cool Math for Kids http://www.coolmath4kids.com/

Internet 4 Classrooms http://www.internet4classrooms.com/skills_2nd.htm#math

Score Mathematics http://score.kings.k12.ca.us/number.sense.html

Math Forum http://mathforum.org/paths/fractions/e.fraclessons.html

Apples for the Teacher http://www.apples4theteacher.com/math.html

National Library of Virtual Manipulatives http://nlvm.usu.edu/en/nav/grade_g_1.html

Illuminations http://illuminations.nctm.org/

One-Difference Train – Goals 2000

Problem Solving – Goals 2000

Teacher References:

Algebra in the PreK-2 Curriculum? Teaching Children Mathematics NCTM Sept. 2005

Navigating through Algebra – Pre-k – 2, NCTM

Children's Literature:

The 329th Friend, by Marjorie Weinman-Sharmat

Snowflake Bentley, by Jacqueline Briggs Martin

Sam Johnson and the Blue Ribbon Quilt, by Lisa Campbell Ernst

The Doorbell Rang, by Pat Hutchins

A Remainder of One, by Elinor J. Pinczes

How Many Feet in the Bed?, by Diane Johnston Hamm

One Hundred Ways to Get to 100, by Jerry Pallotta

Two Ways to Count to Ten, by Ruby Dee

How the Second Grade Got $8,205.50, by Nathan Zenelman

Gator Pie, by Louise Mathews

Only One, by Marc Harshman

Arctic Fives Arrive, by Elinor J. Pinczes

One Less Fish, by Kim Tong

From One to One Hundred, by Terri Sloat

Two of Everything, by Lily Toy Hong

100 Days of Cool, by Stuart Murphy

One Hundred Hungry Ants, by Elinor J. Pinczes

Notes:

NUMERICAL AND PROPORTIONAL REASONING. Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technologies.

∿ *COMPONENT STATEMENT: 2.1. UNDERSTAND THAT A VARIETY OF NUMERICAL REPRESENTATIONS CAN BE USED TO DESCRIBE QUANTITATIVE RELATIONSHIPS*

Grade-Level Expectations

1. **Locate, label, compare, and order whole numbers up to 1,000 using pictures, place value models, number lines, and benchmarks of 0, 10 and 100, including naming the number that is 10 or 100 more or less than a given number.**

   - Have children circle numbers on a hundreds chart as you give clues such as: Circle the number that means a dozen or two tens and five ones or the number of days in this month.

   - Arrange benchmarks by 10s to 100 along a number line. Give children cards with numbers to place on the number line. Repeat activity using number lines of 100-200, 400-500, 900-1,000. When children have progressed, use number lines from 0-1,000 with benchmarks of 100s. There should be numerous whole class and individual opportunities for these activities.

   - Use a meter stick or draw a line about 100 centimeters long and mark each end. Label equidistant tens (decimeters) on the line. Locate a point and mark it with an arrow. Have children identify the number indicated by the arrow and identify the number that is ten more and ten less. Repeat with hundreds when appropriate. (Can also be used for GLE 2.2.11.)

2. **Represent whole numbers up to 1,000 by modeling and writing numbers in expanded forms, e.g., 37 = (3 x 10) + (7 x 1), and regrouped forms, e.g., (2 x 10) + (17 x 1) = 37, and use the forms to support computational strategies.**

   - Count big groups of objects by putting 10 of each in a cup until only ones are left. Build that two-digit number in different ways using interlocking cubes. Write about the number of objects in sentences using different ways to describe the quantity.

Example: There were four tens and 16 ones of kidney beans in the cups. Jeff counted five tens and six ones kidney beans.

❖ **Possible Assessment Opportunities**

    ❖ Prepare bags of 20 to 99 objects to count, one for each child. The children count the objects by making groups of tens and ones. Record the amount as tens and ones, and then write the number in standard form. Trade bags and repeat.

    Intervention: Begin with objects and have the child use 10-frame cards to organize the groups of 10.

    Challenge: Use multiple bags of objects to record numbers greater than 100.

- Have children represent large whole numbers in three different ways: (1) Show the number made with base-10 blocks (2) written as hundreds, tens and ones, and (3) written with numerals and label each place value.

    Intervention: Begin by building a two-digit number with Unifix or other interlocking cubes. Record the number using pictures, labeled as tens and ones and standard notation.

    Challenge: Create a game to match different forms of a three-digit number.

3. **Represent multiplication and division (with factors of 1, 2, 5 and 10) using a variety of models and strategies such as arrays, pictures, skip counting, extending number patterns, and repeated addition and subtraction; describe the connection between multiplication and division.**

- Children can cover their desks and other familiar flat surfaces with many of the same small objects or index cards and use counting to determine area and introduce the concept of multiplication and division through rectangular arrays.

4. **Use a variety of models and familiar objects to compare, order and estimate parts of a whole using the unit fractions ½, ⅓, ¼.**

- Give children a collection of equal sized pieces of an object or model. Have them decide if the pieces are more than a whole, close to a whole or less than a whole. Have them justify their answers.

    Intervention: Give the child halves or thirds. Make a model of a whole. Ask the child to compare the pieces with the model of the whole to determine if the amount is more than a whole, close to a whole, or less than a whole

and explain why.

Challenge: Have the child choose groups of pieces (they may be different sized) that are close to: one half, two wholes or more. Explain how the pieces were chosen.

5. **Use a variety of models to represent and describe parts of groups as unit fractions ½, through ¹⁄₁₀.**

  • Provide extensive opportunities for students to identify equal parts of objects, such as partitioned rectangles, paper plates, or oranges as unit fractions up to tenths. Ask questions such as:

  1. How many pieces or parts do we have?

  2. What is one of those pieces or parts called?

  3. How many of these pieces or parts does it take to make one whole?

6. **Estimate and determine ½, ⅓, ¼ of a small group of up to 20 objects, such as finding ½, ⅓, ¼ of 12 cookies.**

  • Have the children represent a one- or two-digit number using interlocking cubes and determine if the cubes can be separated into two, three or four equal groups to make equal sized parts called ½, ⅓ or ¼.

7. **Describe ratios in terms of the linear patterns that develop from the relationships between quantities. For example: In a pattern of green, green, red blocks there are always two green blocks for one red block.**

~ *COMPONENT STATEMENT: 2.2. USE NUMBERS AND THEIR PROPERTIES TO COMPUTE FLEXIBLY AND FLUENTLY AND TO REASONABLY ESTIMATE MEASURES AND QUANTITIES*

Grade-Level Expectations *(Italics indicate links not evident in 2005 Framework)*

8. *Count whole numbers to 1,000 and beyond.*

9. *Count on by tens from a given amount, e.g., 17, 27, 37, etc.*

- Count groups of tens and singles, with singles up to nine. Expand to groups of 10 and singles more than nine to provide opportunities to move from counting by adding the singles one at a time to counting by making another group of tens.

- Have children build a number such as 23, with Unifix or interlocking cubes. Ask the children to add an additional 10 cubes, count them and record the number. Continue adding, counting and recording until the child can explain the pattern that happens when 10 is added to a number.

10. *Read and write numerals up to 1,000.*

11. **Skip count by twos, fives, tens and hundreds to 1,000 and beyond. (See also GLE 2.1.1 and 1.1.2)**

- Skip count using human or paper number lines. As children count by ones, the target number is said with emphasis, and that child steps forward or that number is circled on the paper. Once every second, fifth or 10th number is identified, children can count using only the children who have stepped forward or the circled numbers.

- Use calculators to count by twos, fives, and tens and hundreds. Children should record the numbers from the display in a T-table and explain the patterns they see. These activities should make connections to multiplication clear. Example:

Key Stroke	Display
1	5
2	10
3	15

12. **Determine whether a set of objects has an odd or even number of items by pairing objects and creating arrays.**

13. **Create word problems and write and solve two- and three-digit number sentences that reflect contextual situations and real-world experiences involving addition and subtraction. Construct and solve open sentences, e.g., $\square + 5 = 11$. Solve the problems using a variety of methods including models, pictures, pencil and paper, estimation and mental computation, and describe the reasoning or strategies used.**

14. **Solve problems using addition and subtraction facts involving sums and differences to 20 with flexibility and fluency.**

- Use the hundreds chart and graphs to discover patterns in addition and subtraction facts.

- Use different colored objects to show the part-whole relationship (three yellow and four red equals seven).

❖ **Possible Assessment Opportunities**

    ❖ Have the children create as many ways as possible to construct a number using sums and differences. (16 is 8 + 8, 5 + 5 + 6, 6 + 6 + 4, 20 - 4, etc). Have children record the fact families they have created and explain why fact families are an efficient way to compute (16 = 8 + 8, 16 - 8 = 8, 9 + 7 = 16, 7 + 9 = 16, 16 - 9 = 7, 16 - 7 = 9, 16 = 12 + 4…)

Intervention: Begin by providing two-sided color counters equal to the sum, to use in finding the combinations (e.g., 15 red + 1 yellow, 14 red + 2 yellow).

Challenge: Ask the children to organize the different ways to determine if there is a pattern. Explore different numbers to see if the same patterns exist. Explain why or why not.

15. **Add two-digit numbers with and without regrouping. Subtract two-digit numbers without regrouping and with regrouping using models.**

16. **Determine when an estimate for a problem involving two- and three-digit numbers is appropriate or when an exact answer is needed.**

17. **Use a variety of strategies to estimate solutions and to determine if a solution to a computation or word problem reflecting real-world experiences involving addition and subtraction of two- and three-digit whole numbers is reasonable.**

18. *Determine and compare the value of pennies, nickels, dimes, quarters and half dollars.*

19. **Count, compare and trade sets of pennies, dimes and dollars up to $10.00**

SAMPLE INTEGRATED LESSON – AN APPLE A DAY

Context: Many schools in Connecticut receive apples from local farmers for their lunch programs. Jim loves Gala apples and has one for lunch as often as he can. This week the lunchroom only had Empire apples, which he does not like. He asked when the Gala apples would be available again. The cafeteria workers weren't sure but told him there were lots of other good varieties of apples he could try. Chris has noticed that most of the children eat apples during lunch. Help Chris find out how many kinds of apples are grown in Connecticut and when he might be able to have a particular kind of apple for lunch.

Grade-Level Expectations: 2.1.1, 2.2.8, 2.2.10, 2.2.13, 3.3.5, 4.1.2, 4.2.3

Time: Multiple instructional periods

Objectives: Children will be able to:

- identify and write two digit numbers,

- solve real-world problems using addition, and

- represent data in different forms

Materials: Access to computers, paper and pencil, 11 x 18 paper, markers, poster board, counters or connecting cubes, calculators

Procedure:

1. Read the story *Apple Picking Time* by Michelle Slawson.

2. Working in small groups, have the children find the different varieties of apples grown in Connecticut and when they are harvested. Use the following Web sites as sources of information for the children lists can be printed from each Web site and given to each group. http://www.ctapples.com/growrdir.pdf , Connecticut Apples: http://www.ctapples.com/ , Connecticut orchards list: http://www.allaboutapples.com/orchard/ct01.htm.

3. Children should record the information using any method they choose. Each group should share their findings with the class.

4. As a class, make a master list of the varieties of Connecticut apples, eliminating all duplicates, and determine the total number of apple varieties.

5. Discuss when the apples are harvested and have each group decide on a way to record and display that information.

6. When the groups have completed and shared their displays, refine the class master list to include when the varieties are available.

7. Each group should create an availability timeline that coincides with the months that school is in session.

❖ **Possible Assessment Opportunities**

    ❖ Working independently, each child should use the timeline, the information about the different varieties of apples and the number of students in the school to help the cafeteria manager make decisions about the number of each variety of apple to order and when. More than one variety may be ordered. Children may choose to write letters, produce graphs or create calendar posters.

Intervention: Make a picture timeline or line plot using pictures of the apple varieties harvested in two months such as August and September.

Challenge: Investigate the variety of apples grown and harvested in another state. Make a timeline for that state's harvest. Compare the two timelines to describe the similarities and differences and possible reasons for the variations.

Using the Web site All About Apples (http://www.allaboutapples.com/) estimate and then determine how many apple varieties are on this list http://www.allaboutapples.com/varieties/index.htm. Explain to the class how you figured out the actual number of apple varieties.

Interdisciplinary Connections			
Science	**English/Language Arts**	**Social Studies**	**Visual and Performing Arts**
A INQ 5 Seek information in books, magazines and pictures. **A INQ 9** Count, order and sort objects by their properties.	• Students interpret, analyze and evaluate text in order to extend understanding and appreciation. • Students prepare, publish and/ or present work appropriate to audience, purpose, and task.	• Explain ways humans use and interact with the environment. • Define scarcity and abundance.	**Visual Arts** • Use the elements of art and principles of design to communicate ideas.

Vocabulary: same, equal, digit, odd, even, compare, skip counting, grouping, regroup, trade, 10-frame, place value, hundreds, tens, ones, singles, a ten, a hundred, more than, less than, 10 more, 10 less, hundred more, hundred less, close to, closer to, about , almost, referent, shorter, longer, taller, inch, ruler, centimeter, meter stick, unit, part-whole, add, subtract, sum, difference, fraction, equivalent, unit fraction, fractional part, reasonable, estimate, basic fact, multiplication, array, division, divide, split, equal sized groups, half hour, quarter hour, timeline

Resources:

Electronic Resources:

Apples and More: http://www.urbanext.uiuc.edu/apples/index.html

Michigan Apples: http://www.michiganapples.com/index.asp?Loc=2&Loc2=5

Best Apples: http://www.bestapples.com/varieties/index.shtml

Electronic Abacus http://illuminations.nctm.org/ActivityDetail.aspx?ID=8

Ten Frame http://illuminations.nctm.org/ActivityDetail.aspx?ID=75

Comparing Connecting Cubes http://illuminations.nctm.org/LessonDetail.aspx?id=U41

In On the Ground Floor http://www.creativille.org/groundfloor/index.htm

A counting lesson for two digit numbers http://www.sasked.gov.sk.ca/docs/elemath/gr2lessp.html

Different Ways – Goals 2000

Going to the Fair – Goals 2000

Amazing Equations – Goals 2000

How Many Blocks – Goals 2000

In Only a Minute – Goals 2000   How Much Money – Goals 2000

Teacher References:

Research Ideas for the Classroom; Early Childhood Mathematics, edited by Robert J. Jenson

Elementary and Middle School Mathematics, Teaching Developmentally, by John Van de Walle, 4th and 5th editions

Children's Mathematics: Cognitively Guided Instruction, by T. P. Carpenter, E. Fennema, M. L. Franke, L. Levi, and S. Empson

Problem-Solving Lessons, Grades 1-6, by Marilyn Burns

Children's Literature:

Annie's One to Ten, by Annie Owen

One Watermelon Seed, by Celia Barker Lottridge

Twelve Ways to Get to Eleven, by Eve Merriam

Six Dinner Sid, by Inga Moore

Domino Addition, by Lynette Long, Ph.D.

The King's Commissioners, by Aileen Friedman

A Chair for My Mother, by Vera B. Williams

The Coin Counting Book, by Rozanne Lanczak

One Tortoise, Ten Wallabies: A Wildlife Counting Book, by Jakki Wood

Math Potatoes, by Greg Tang

Annno's Counting House, by Mitsumasa Anno

The Doorbell Rang, by Pat Hutchins

Each Orange Had 8 Slices, by Paul Giganti

My Little Sister Ate One Hare, by Bill Grossman

Ten for Dinner, by Jo Ellen Bogart

100th Day Worries, by Margery Cuyler

My First 1,2,3 Book, by Sebastian Conrad

Classroom Materials: items from science or social studies in groups from 10 to 200, collections, base-ten blocks, inter connecting blocks, pattern blocks, coins, calendars, hundreds chart, number lines, number cards, small cups or containers, place value mats, place value charts, small 10-frame cards

Notes:

> **GEOMETRY AND MEASUREMENT.** Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools and technologies.

∼ *COMPONENT STATEMENT: 3.1. USE PROPERTIES AND CHARACTERISTICS OF TWO- AND THREE-DIMEN-SIONAL SHAPES AND GEOMETRIC THEOREMS TO DESCRIBE RELATIONSHIPS, COMMUNICATE IDEAS AND SOLVE PROBLEMS.*

Grade-Level Expectations

1. **Identify, describe and draw polygons (triangles, quadrilaterals including trapezoids and rhombuses, pentagons, and hexagons), solids, and other familiar two- and three- dimensional objects in the environment. (See also GLE 3.1.3.)**

   - Place several familiar objects (e. g., ball, pencil, etc.) on a table. Have children view the objects for a limited time. Cover. Play "20 Questions," with the teacher choosing an object and the children asking geometry questions, (e.g., Does the figure have six faces?), to identify the object.

   - Provide pieces of rope to small groups of two to three children to create polygons. Have the children verbally describe the polygon they created to another group of children and ask that group to name the shape. Repeat until all groups have had a chance to create and explain a variety of polygons.

   - Have the children draw a polygon and write the name on a page in their math journals. The children should then find pictures of objects that closely resemble the polygons they have drawn and named, and paste the pictures on the appropriate page of the journal. Children should explain the reason for pasting the picture on that page in writing. Magazines can be used to find pictures, such as stop signs that are octagons or rectangular candy bars.

2. **Compare and sort familiar polygons, solids, and other two- and three- dimensional objects in the environment. (See also GLE 3.1.3.)**

- Have the children sort a set of pattern blocks, storage containers or geometric solids and explain the reason for the sort. For example: I separated the sphere from all the other solids because the sphere is round and the other shapes have straight, flat sides. Ask the children to find more than one way to sort the figures.

3. **Construct polygons, solids and other two- and three-dimensional objects using a variety of materials and create two-dimensional shapes and designs with one or more lines of reflective symmetry (lines that divide the shape or design into two congruent parts). (See also GLE 3.1.2.)**

- Have children work in pairs with a set of building materials, e.g., small pieces of pipe cleaner inserted in the ends of the straws, to create three dimensional objects or solids.

- Have children look for examples of congruent figures in the environment. Have children copy shapes on geoboards and then subdivide the shapes into two symmetrical pieces or congruent parts if possible. Children can then sort shapes and objects by whether they have symmetry and/or congruence.

- Children can explore letters of the alphabet and numerals to find lines of symmetry. They can fold paper in half and cut out symmetrical designs or identify symmetry in wallpaper or gift wrap designs.

∿ COMPONENT STATEMENT: 3.2. USE SPATIAL REASONING, LOCATION AND GEOMETRIC RELATIONSHIPS TO SOLVE PROBLEMS

Grade-Level Expectations

4. **Investigate and predict the result of putting together and taking apart two- and three-dimensional shapes in the environment, e.g., use objects to find other shapes that can be made from three triangles or a rectangle and a triangle.**

- Children can investigate which pattern block shapes can be formed from the equilateral triangles, recording their results using pictures or words in a chart.

- Give the children an outline of an irregular shape, which can be constructed from pattern block or tangram templates, and

have them fill in the outline using actual pattern block or tangram pieces.

- Have the children look at the world around them for examples of three-dimensional structures in which they can see familiar solids such as rectangular prisms and cylinders.

❖ **Possible Assessment Opportunities**

    ❖ Provide children with hexagon, trapezoid, blue rhombus and triangle pattern blocks and have them create hexagons and trapezoids by using the other shapes.

    Ask questions such as:

    1. Can you use the triangles to make a hexagon?

    2. What other shapes could you use to make the hexagon?

    3. Can you make the red trapezoid with any of the other shapes?"

Intervention: Provide hexagon and trapezoid templates for the child to fill, with internal lines drawn if necessary.

Challenge: Have the children draw and color the shapes on triangular grid paper and discuss how the various shapes are related

- Give children the opportunity to play a geometry game that is set up and played like Battleship in pairs. Make blank tic-tac-toe game boards for each child. One child secretly places four different pattern blocks in four different squares on her game board. Using direction and position words the child guides her partner to place pattern block pieces in the corresponding squares on his game board. The children check to see if the partner has placed all the pattern blocks in the correct location and direction and then the children switch roles.

✐ COMPONENT STATEMENT: 3.3. DEVELOP AND APPLY UNITS, SYSTEMS, FORMULAS AND APPROPRIATE TOOLS TO ESTIMATE AND MEASURE.

Grade-Level Expectations *(Italics indicate links not evident in 2005 framework)*

5.   *Know the months of the year in order and locate dates, days, weeks and months on a calendar. Use the information to write and solve problems involving calendars.*

  •   The children can write and solve problems such as:

      1.   What was yesterday's date?

      2.   October 31ˢᵗ is on what day of the week is on this year?

      3.   What is the date of the third Monday of this month?

  •   Read aloud *When This Box Is Full* by Patricia Lillie, a story about a little boy who places items in a box for each month of the year. After the story is read, have the children work in small groups of five to six children to brainstorm what they do for each month of the year. Each child should write and illustrate what they do for each month on 4 x 6 index cards. Place the cards in the center of the work area so that the children can organize the cards in by month.

6.   *Solve problems involving telling time, including estimating and measuring the length of time needed to complete a task, to the half-hour using analog and digital clocks.*

  •   The children create a journal entry describing their day at school. Stamp a clock face on the journal page and write a time underneath that has been written on the board. Each child should draw hands on the clock face to show the time correctly. When the actual time of day on the classroom clock matches the time on the journal page, students record what they are doing in pictures and words next to the correct clock face.

  •   Have the children conduct experiments such as the following, using timers: How many times can you bounce a ball in three minutes? How many times can you clap your hands before the sand runs out of the timer? How many times can you blink your eyes before the second hand goes all the way around the clock?

- After establishing a referent such as 10 seconds, 30 seconds or 1 minute, have children estimate the length of time it takes to complete a task such as read pages or passages in a book, write a sentence or walk to the lunchroom.

7. **Use measurement tools such as thermometers to measure temperature, basic rulers to measure length to the nearest half-inch or centimeter, and balance scales to measure weight/mass in grams.** (See also **GLE 3.3.8.**)

8. **Use nonstandard referents and standard benchmarks to estimate and measure the following** (ee also **GLEs 3.3.7, 3.3.9 and 3.3.10.**):

   - **length (to the nearest inch, half-inch, foot, yard, centimeter or meter)**

     - Have the children discover common referents in everyday objects by comparing them with measuring tools, such as small paper clip is about one gram, width of a finger about 1 centimeter, height from the floor to the knob on the door about 1 meter.

     - Read and discuss with the children *How Big Is a Foot?* by Rolf Myllar. The children use their own feet to measure the width or length of the hallway and compare their results. Finally, they measure the hallway using meter sticks and discuss the difference in their results.

     - Conduct a classroom hunt where the children locate items that are about the size of a centimeter, foot, meter, gram, etc. Have the children explain how they estimated that the object was equivalent to the measurement.

   - **area (in square inches)**

     - Give the children numerous opportunities to estimate the number of square tiles or Unifix cubes that it will take to cover different sized rectangles such as books, writing paper or construction paper.

   - **capacity (in liters and cups)**

     - Provide a collection of labeled containers. Mark one container as the target and have the children sort the rest of the collection into those that hold more than, less than or about the same amount as the target container. Provide an organizer for the children to record their results. Next, have the children verify their choices by providing a filler, such as rice or beans. Avoid giving explicit instructions or directions, but later discuss the children's ideas and actions for proving which containers were more, less or about the same as the target container.

- Give each group of three to four children a measuring cup and several containers of different sizes, plain white paper, some uncooked rice, and 1-inch graph paper. Each group should determine the number of cups of rice that fit in each container and then record the results on the graph paper in a bar graph. After completing the graphs, the class agrees on how to arrange the containers in order from largest to smallest.

- **weight (in grams)**

   - Provide a variety of experiences weighing objects. Use balances to compare weights and understand equality, such as find out how many pennies balance a small familiar object.

   - Use balances or scales with gram weight to assign a numerical value to the weight of an object.

- **temperature**

   - Have the children estimate the temperature and check the estimates by reading the temperature on a thermometer and recording the results.

   - As part of the morning routine, the children check each of two thermometers, one Fahrenheit and one Celsius, and make daily recordings of the outside temperature. They record the temperatures in a chart and look for interesting patterns.

- **volume (using water or sand).**

   - Use two identical sheets of paper 8 ½ x 11. Roll one sheet into a short cylinder and the other into a tall cylinder. Set them both on a flat surface and ask the children, does one hold more than the other. Place the taller one inside the shorter one. Fill the taller one with sand and then remove it form the shorter cylinder. Which holds more?

9. **Describe the strategy used to determine an estimate and determine if the estimate is reasonable. (See also GLEs 3.3.7 and 3.3.8.)**

10. *Describe the relationships between centimeter and meter and among inch, foot and yard.* **(See also GLE 3.3.8.)**

SAMPLE INTEGRATED LESSON – OLYMPIC GAMES

Context: The physical education teacher in your school wants to hold Olympic Games. He needs officials to help to measure the performance of the Olympians. The measurements will be used to award the gold, silver, and bronze and other medals.

Grade-Level Expectations: 3.3.7, 3.3.8, 4.1.2, 4.2.3

Time: Multiple instructional periods during the general and physical education classes

Objective: The children will demonstrate the use of units, systems, and processes of measurement and organization of data.

Materials: Gym equipment. The classroom and the physical education teacher design events for all ability levels. Events should also include activities from other cultures that have a measurement component.

Procedure:

1. Share information with the students about the Olympic activities that require the use of measurement.

2. Have the physical education teacher describe your school's Olympic events.

3. The children need to determine an appropriate measuring tool for the event (e.g., stop watches or timers, yardsticks or tape measures, measuring cups to measure water transported in a relay race.)

4. There also needs to be a master time keeper for the events who will signal when participants must switch events.

5. The children need to decide on a way to record all the data.

6. For each event, each child will write an estimate of how he thinks he will perform and then record the actual results.

7. The children will display all the data for each event in a table to determine the medalists in the events.

Interdisciplinary Framework Connections			
Science	**English/Language Arts**	**Social Studies**	**Healthy and Balanced Living**
A.INQ.2 Use senses and simple measuring tools to collect data. **A.INQ.7** Use standard tools to measure and describe physical properties such as weight, length and temperature.	• Use content vocabulary appropriately and accurately (math, music, science, social studies, etc.). • Use oral language with clarity and voice to communicate a message. • Determine purpose and choose an appropriate written, oral or visual format. • Publish and/or present final products in a myriad of ways, including the use of the arts and technology. • Use appropriate language as related to audience.	• Understand elements of culture.	**Standard 9** Demonstrate competency in motor skills and movement patterns needed to perform a variety of physical activities **Standard 11** Participate regularly in physical activity **Standard 13** Exhibit responsible personal and social behavior that respects self and others in physical activity settings **Standard 14** Value physical activity for health, enjoyment, challenge, self-expression and/ or social interaction

Vocabulary: measure, minutes, hours, days, week, month, calendar, clock, digital, analog, data, length, area, weight, capacity, volume, estimate, ruler, thermometer, scale, inches, centimeters, foot, tally marks, the months of the year

Resources:

Electronic Resources:

Tour of Measurement: http://www.mathforum.org

Can You Measure Up? http://artsedge.kennedy-center.org/content/3801

The Shape of Sand: http://web.archive.org/web/20041019125446/www.galaxy.net/~k12/structure/sand.shtml

Measuring Our Classroom – Goals 2000

Two- and Three- Dimensional Riddles – Goals 2000

Is It 15? – Goals 2000

Teacher References:

NCTM Measurement Standards K-2

Engaging Young Children in Mathematics, by Douglas H. Clements

Adding It Up, by National Research Council

Elementary and Middle School Mathematics, by John Van De Walle

Dumpling Soup: Exploring Kitchens, Cultures, and Mathematics, by N.L. Smith "Teaching Children Mathematics" 1999 Vol.6

Children's Literature:

How Big is A Foot?, by Rolf Myller

Cubes, Cones, Cylinders, and Spheres, by Tana Hoban

Inch by Inch, by Leo Lionni

Great Graph Contest, by Loreen Leedy

Super Sand Castle Saturday, by Stuart Murphy

Clocks and More Clocks, by Pat Hutchins

A Drop of Water, by Walter Wick

Is the Blue Whale the Biggest Thing? by Robert E. Wells

Notes:

WORKING WITH DATA: PROBABILITY AND STATISTICS. Data can be analyzed to make informed decision using a variety of strategies, tools and technologies.

∼ *COMPONENT STATEMENT: 4.1. COLLECT, ORGANIZE AND DISPLAY DATA USING APPROPRIATE STATISTICAL AND GRAPHICAL METHODS.*

<u>Grade-Level Expectations</u>

1. **Pose questions that can be used to guide data collection, organization and representation.**

   - Children can pose questions based on real life experiences to determine the favorite books, movies, snacks or bedtime of classmates, schoolmates or adults.

2. **Collect and systematically organize and represent the data that answer the questions using lists, charts and tables, tallies, glyphs (coded pictures) picture graphs, and bar graphs.**

   - Provide opportunities to measure, sort, gather and analyze data about objects from their natural environment.

   Ask questions such as:

     - What question could we ask to learn something about each other (e.g., the foods we like, shoe sizes, types of pets)?

     - How do you measure a particular attribute?

     - Can you find more than one way to measure and chart the data about the identified attribute (e.g., tally marks, counting, weighing)?

     - What would be your estimate of the results of the data collection?

- Sort tasks by required completion time and objects by size or weight then record the results of the sort.

- Create vertical and horizontal bar and picture graphs with children. Have children discuss whether a bar or picture graph provides a better representation of the data collected.

∼ COMPONENT STATEMENT: 4.2. ANALYZE DATA SETS TO FORM HYPOTHESES AND MAKE PREDICATIONS

Grade-Level Expectations

3. **Describe data that have been organized and make comparisons using terms such as largest, smallest, most often, or least often. (See also GLE 3.1.3.)**

   - Provide children with published graphs, from sources such as children's magazines, social studies and science materials. Have children analyze the information in the graph and ask each other questions that can be answered with the information in the graph.

4. **Determine patterns and make predictions from data displayed in tables and graphs. (See also GLE 4.2.3.)**

   - Give each child an individual box of raisins. Use at least two different brands of raisins. Have children estimate the number of raisins in each box before counting, and then compare the actual counts to their estimates. Lead the class in the discussion and creation of a graph using the raisin boxes. Are all boxes of raisins created equal? Which brand should your family purchase?

   - Have children examine data in the class attendance chart, weather chart or calendar to describe any noticeable patterns and make predictions.

   - Have the children collect data for eye color in the class and create a bar graph. The children will also collect and organize the data for hair color in the class. Find a buddy class and have those children collect the same data from that class and organize the data into two new graphs. Have the children compare the graphs for eye color and hair color to determine any patterns and to make predictions about eye color and hair color in the second grade.

- If most children in the class have the same eye or hair color, data can be collected and organized about different information such as the total number of siblings, the number of older or younger siblings, aunts, uncles, cousins or pets. Predictions should then be made about other classes, schools.

❖ **Possible Assessment Opportunities**

    ❖ Provide opportunities for the children to graph and analyze data that is important to them and discuss what information the graph conveys about the topic chosen. Examples of questions the children might generate are: What ice cream flavors are favorites? How many birthdays are in each month? What hot lunches are most popular?

Intervention: Keep the children's question simple and connected to their life experience and have them collect data from a specific number of respondents.

Challenge: Investigate if children in other communities or countries have similar interests and responses. Display the information in alternate ways.

∿ *COMPONENT STATEMENT: 4.3. UNDERSTAND AND APPLY BASIC CONCEPTS OF PROBABILITY*

Grade-Level Expectations

5. **Describe and explain the likelihood of the occurrence of various events. State possibilities, make predictions and test the predictions in practical situations.**

- Have the children discuss the likelihood of events such as:

  - It will rain tomorrow.

  - George will go to bed late tonight.

  - I am going on vacation tomorrow.

- Have the children describe or make up events that are likely and unlikely to occur and justify their thinking.

6. **Conduct simple probability investigations involving activities of chance and games with number cubes and spinners; record, graph and describe the results of the investigations.**

- Create a spinner that is one-half yellow, one-fourth red, and one-fourth blue. Have the children predict which color would be landed on most frequently and why. Working in pairs, each child should spin the spinner ten times and use tally marks to record the results. Class discussion should focus on comparison of the predictions and actual results. Ask questions such as:

    - How did your prediction compare with your results?

    - Explain why your prediction was correct or incorrect.

    - How do the results for yellow compare with the results for blue? How do the results for red compare with blue and why?

- Children predict how often heads and tales come up when a coin is tossed 10 times. Have two children toss a coin 10 times each. Record the results with tallies for the number of heads and tails. How do the number of heads and tails compare? Recruit three more volunteers and then five more to repeat the process. Discuss the results after each group has completed the tosses. Combine the tallies and compare the volunteers' results with individual predictions.

SAMPLE INTEGRATED LESSON – HEALTHY HABITS

Context: The school nurse needs to tell the principal about the eating habits in each class. You need to complete a graph that will show how much of each of the food groups you and your classmates are eating.

Grade-Level Expectations: 1.1.1, 2.2.8, 2.2.9, 3.3.5, 4.1.1, 4.1.2, 4.1.3

Time: multiple instructional periods

Objective: Children will use problem solving, data collection and measuring skills to analyze eating habits and to prepare healthy snacks for the class.

Materials: A variety of foods, measuring tools and kitchen supplies

Procedure:

1. Review the basic food groups and classify snacks students eat in those food groups.

2. Discuss healthy eating habits

3. The children can evaluate their eating habits by completing the nutrition tracker from the electronic resource, *Nutrition Explorations* http://www.nutritionexplorations.org./

❖ **Possible Assessment Opportunities**

  ❖ Have the children complete a bar graph representing the amount of food they eat in the various food groups from the nutrition tracker and explain how the graph is representative of that data.

  Intervention: Focus on the three main food groups and/or provide parts of the graph.

  Challenge: Research how the eating habits of your class compare to those of another class in your school by comparing the graphs you created.

  Extension: Children from different cultures may eat different types of foods.

Pose this question: Can we have a healthy snack time that might be enjoyed by people from different countries?

Lead the discussion with questions such as:

- How can we answer the question?

- What do we need to do to plan this special snack time?

Continue the guided discovery. Identify the different types of foods and make picture graphs to represent the types of foods and the cultures or countries they are from. Plan the special snack and create a schedule with the class planning for, preparing and serving the special snack. Include opportunities for students to make some of the snacks that require weighing and measuring to complete the recipe.

Interdisciplinary Framework Connections			
Science	**English/Language Arts**	**Social Studies**	**Visual and Performing Arts**
A.INQ.2 Use senses and simple measuring tools to collect data. **A.INQ.7** Use standard tools to measure and describe physical properties such as weight, length and temperature. **A.INQ.8**. Use nonstandard measures to estimate and compare the sizes of objects. **A.INQ.10** Represent information in bar graphs. **A.19**. Describe the life cycles of flowering plants as they grow from seeds, proceed through maturation and produce new seeds. **A.23** Identify the sources of common foods and classify them by their basic food groups. **A.24** Describe how people in different cultures use different food sources to meet their nutritional needs.	• Organize information in proper sequence to use in a summary and/or retelling. • Generate and respond to questions. • Use content vocabulary appropriately and accurately (math, music, science, social studies, etc.). • Use oral language with clarity and voice to communicate a message. • Determine purpose and choose an appropriate written, oral or visual format. • Publish and/or present final products in a myriad of ways, including the use of the arts and technology. • Use appropriate language as related to audience.	**Humans and Environment Interaction** • Create timelines that sequence events and peoples, using days, weeks, months, years, decades and centuries; demonstrate a familiarity with peoples, events and places from a broad spectrum of human experience through selected study from historical periods and from the various regions (e.g., East Asia, Europe, the Americas, Africa, South Asia, etc).	**Art** • Use different media techniques and processes to communicate ideas, feelings, experiences and stories. • Use elements of art and principles of design to communicate ideas. • Select and use subject matter symbols and ideas to communicate meaning.

Vocabulary: measure, data, length, area, weight, graph, chart, table, picture graph, bar graph, estimate, scale, inches, centimeters, foot, tally marks, chance, likelihood, predict

Resources:

Electronic Resources:

Eye to Eye: http://illuminations.nctm.org/LessonDetail.aspx?ID=L169

Dealing with Data: http://illuminations.nctm.org/LessonDetail.aspx?id=L297

Nutrition Explorations: http://www.nutritionexplorations.org

What's the Weather? http://illuminations.nctm.org/LessonDetail.aspx?ID=L196

Teacher References:

NCTM Measurement Standards K-2

Engaging Young Children in Mathematics, by Douglas H. Clements

Adding It Up, by National Research Council

Elementary and Middle School Mathematics, by John Van De Walle

Dumpling Soup: Exploring Kitchens, Cultures, and Mathematics, by N.L. Smith "Teaching Children Mathematics" 1999 Vol.6

Making Sense of Data, in the *Addenda Series,* by Mary Lindquist.

Children's Literature:

The Mouse Who Owned the Sun, by Sally Derby

A Drop of Water, by Walter Wick

Probability, by Charles F. Linn

Jump, Frog, Jump!, by Robert Kalan

Is the Blue Whale the Biggest Thing? by Robert E. Wells

Cloudy with a Chance of Meatballs, by Judi Barrett

Notes: