

# Sample Problems for Grades 1-5

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## Introduction

The following are samples of the three types of problems that are presented in the curriculum guide. Because problem solving is a process it is actually difficult to assign grade levels. Feel free to adapt any of the problems for your grade level. Please provide calculators and have students work in pairs or in small groups to encourage interaction and communication.

When planning to use a problem for assessment it is important to decide what you are assessing:

- Does the child display understanding of the problem?
- Can the child plan a procedure and execute the plan to solve the problem?
- Does the child reflect upon his/her work? Can he/she apply knowledge to create or solve similar problems?

All three objectives can be assessed with one problem; however, problems can be chosen that lend themselves better for the assessment of any of the above objectives. One must not assume that if the child has a correct answer that each of the following objectives have been met. There are many resources available for problem solving. The activities suggested in the curriculum guide are most helpful in helping teachers develop problems.

## GRADE ONE

### Translation

Grandfather dropped four dollars in Mei Lin's piggy bank for her birthday. Mei Lin emptied her piggy bank and counted all her dollars. If she counts 13, how many dollars did Mei Lin have before her birthday?

Pat donated five dollars to the Wildlife Fund. Now he has just eight dollars left in his bank. How much money did he have before he gave away the five dollars?

If I cover half a domino, you will see only 4 dots. Altogether the domino has 10 dots. Which domino am I thinking about? How do you know?

### Process

Use the balance scale to find two things that look very different but that have the same mass.

Show the keys you must press on a calculator to skip count by 5's. Copy each number in order onto this adding machine tape (50 cm long). Stop when the tape is full. Talk about any patterns you find in your numbers.

Use the dominoes in one double-six set. Can you find two dominoes whose dots equal 16? Can you find three dominoes whose dots total 16? ....Four dominoes?... What will be the most dominoes you can use to make a total of 16 dots?

Here is a collection of pattern blocks, two of each shape and color. Tell me one rule you might use to sort the blocks into exactly two groups. Sort the blocks by your rule. Are there any blocks that don't fit your rule?

How do you know? Find two other ways to sort the blocks.

## **Realistic**

How many hand claps do you think it will take for you to complete tying a bow in your shoelace? Check your estimates. Did you need more or fewer hand claps?

Write a story to match this number expression: How much is  $9 + 6$ ?

Do your classmates like vanilla, chocolate or some other flavour of ice cream best? Survey each of your classmates and record the answer on a class list. Use blocks on the graphing mat to show what you have learned. What are three things that your graph shows about ice cream flavours? Make up a question you might ask a friend about your graph.

## **GRADE TWO**

### **Translation**

Estimate the number of unit cubes in the jar. Count to check your guess. How close was your estimate? Use the other base-ten blocks to show your number in two different ways. Draw a simple mathematical sketch of your number, using the fewest blocks possible. Write symbols to match your different representations.

Tony went shopping with his father. They bought three packages of paper towels and two packages of crayons. Each package of paper towels contains six rolls. Each package of crayons contains eight crayons.

a. Use counters to show:

-how many rolls of paper towels in all

-how many crayons altogether

b. Tony's father shares the paper towels fairly between the kitchen and the garage. Use your counters to show how many paper towels were placed in each area.

c. Look through flyers, newspaper and other sources to find other things that are sold in sets. Make a display. (You can make a poster if you wish).

### **Process**

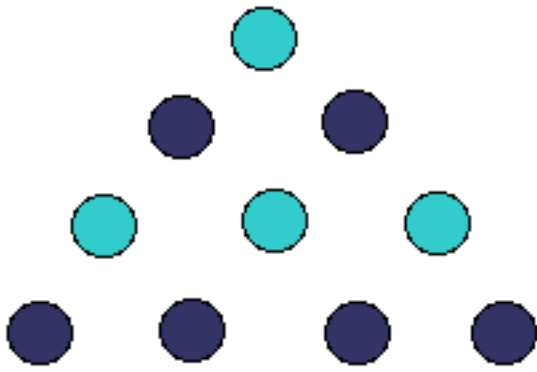
Construct a rectangle on a geoboard. How many ways can you find to divide your rectangle in half? Record each solution on dot paper. Build another rectangle you can divide into thirds, and one where you can divide it into fourths. Remember to record your solutions.

Draw a picture to show how you imagine this story. Kayla has 17 nickels. Darcy knows that if she saves 8 more nickels, she will have the same number as Kayla. How many nickels must Darcy have now?

Use the counters to show how many legs there are on three tables. Is there only one answer for this problem? Explain.

Sort attribute blocks. Record in your journal and tell why you sorted them that way. Sort the blocks another way. Record and tell why in your journal.

Dana is using two color counters to build a pattern that "grows and grows".



- What is the name of the shape Dana is making?
- What will Dana do next to continue this pattern?
- Build Dana's shape and continue the pattern for three more rows.
- What do we call the numbers in each dark colored row?
- What do we call the numbers in each light colored row?
- What other patterns can you see in this arrangement?

Estimate your height in unifix cubes. Work with a partner to build a train of cubes to match your height. Build your train so you can quickly count the cubes.

### **Realistic**

Estimate the number of minutes needed to watch your favourite video.

Explain how to check your estimate.

Estimate and then measure the number of drops of water you can fit on at least three different coins.

### **GRADE THREE**

#### **Translation**

Travis has a five dollar bill and eleven quarters. He starts at 500 and skip-counts by 25's to find the total value of his money. What numbers will he say as he counts? What is his total?

You wish to purchase a hamburger for \$2.35, a drink for 95cents and a cone for \$1.75. You have a five dollar bill. Will it be enough? Should you use estimation, a calculator or manipulatives? Explain your choice.

#### **Process**

Brenda is using any five pieces, other than the large cube (1000's) from the base 10 set, to build numbers. Her results are recorded in the chart below. Has she found all the possible numbers?

H	T	O	number
<input type="text"/>	<input type="text" value="5"/>	<input type="text"/>	<input type="text" value="50"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="5"/>	<input type="text" value="5"/>
<input type="text"/>	<input type="text" value="3"/>	<input type="text" value="2"/>	<input type="text" value="32"/>

Show how you would use any five pieces to make all possible numbers. Record your results in a chart. List the numbers from greatest to least.

Which is greatest: the 40th even number, the 10th number that ends in five, or the 20th number with at least one two in it? Orally explain your decision.

Use the numbers 1 through 9, once only, to make a correct addition statement. Is there more than one solution?

$$\begin{array}{r}
 \text{A} \quad \text{B} \quad \text{C} \\
 + \text{D} \quad \text{E} \quad \text{F} \\
 \hline
 \text{G} \quad \text{H} \quad \text{J}
 \end{array}$$

How many ways can 40 cents be made without using pennies?

Use as many geometry words and ideas as you can think of to describe a table in your classroom. How is a table like the classroom door? How is it different? Choose two other objects to compare and contrast.

### Realistic

Suppose the students in your class have a painting lesson. Some students are working in the classroom while others are working in the art room. If you want to cover the floors in both rooms with one layer of newspaper, how many sheets of paper will you need?

I have more than a dollar in coins in my pocket, but I can't make change for a dollar. Which coins do I have in my pocket? Look for multiple solutions.

Let the front of the room be North. The student "turtle" always starts facing north. Plan a program to move the student "turtle" from your desk to the classroom door, using directions and number of paces. Test your program. Does it work?

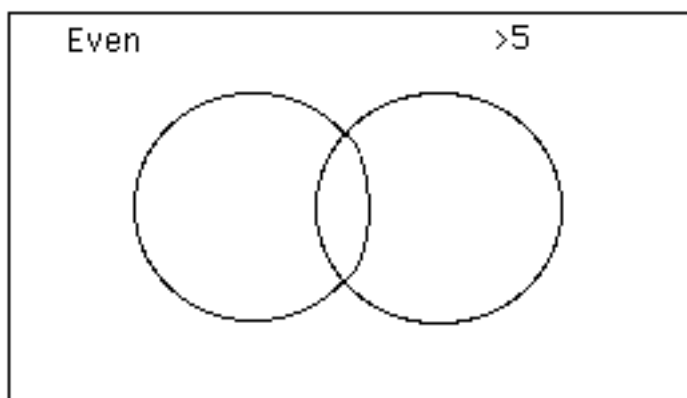
### GRADE FOUR

back to our town is one hundred thirty-four kilometres.

- a. Use base 10 blocks to show how you could represent the number of kilometres the mail truck travels each week.
- b. Show how you might use numbers to calculate the total number of kilometres travelled in one week.

### Process

Write the numbers from 1 to 12 on separate pieces of paper. Place each number in the Venn diagrams according to the rules shown. When your work is complete, write each number on the diagram.



Cliff, Emile and Azima each have a different favorite sport; basketball, sky diving and figure skating. Cliff and Emile do not like basketball, Emile is afraid of heights. What is the favorite sport of each person?

Use all seven pieces of a tangram puzzle to create a square.

Troy found there are 12 different nets that fold to make a cube. He concluded that a 3-D object will have twice as many nets as it has faces. Choose one pyramid and one prism. Find all possible nets for each. Is Troy correct? Explain.

Write the directions for going from your school to your home. Write directions to go from your home to your school. How are they the same? How are they different?

Lorna and Dave put 5 tiles in a bag - 4 yellow and 1 green. Lorna makes up a game. She says she gets one point for every yellow tile, and Dave gets twice as many points for every green tile they pull from the bag.

- a. Will the game be fair? Why?
- b. Conduct an experiment to see if the game is fair. Stop each game when one color has gained 10 points. Is the game fair? If not, how would you change it to make it fair?
- c. Dave says the game would be better, if there were 10 green and 40 yellow tiles in the bag. Would this change the game? Explain your answer.

### Realistic

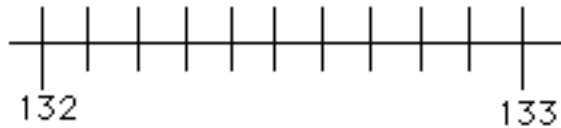
How many kidney beans (or dry peas) can you put in an empty one litre milk carton? How many milk cartons would you need to hold one million beans?

How many trees are used to produce one week's issue of your local newspaper? (Extension: extend this to one month...one year).

## GRADE FIVE

### Translation

Locate 132.5 on the number line below and label the point Z.



Put  $<$ ,  $>$ , or  $=$  in the boxes to show how the numbers or expressions are related.

$$\frac{1}{4} \square 0.2$$

$$0.61 \square 0.16$$

$$0.75 \square 8/10$$

You have this amount of change: 2 dollar coins (loonies), 5 quarters, 13 dimes, 6 nickels and 14 pennies.

These items are for sale:

pen	\$1.95
note pad (large)	\$1.89
note pad (small)	\$1.19
pencil	\$0.59

Use this information to make up a problem.

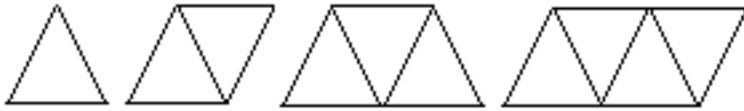
### Process

Your friend want to know how many 2s you write down in order to write all the numbers from 1 to 100. How could you figure out the answer without writing all the numbers and counting them?

Use fraction blocks to make figures that show that

- a. one half is equivalent to three sixths
- b. one fifth is equivalent to two tenths
- c. six eighths is equivalent to three fourths

Use stir sticks to copy these triangular shapes. Build the next three shapes. How many stir sticks are needed to build five triangles?



Copy this chart. Complete the chart to record the number of triangles and the matching number of stir sticks in your constructions. Predict the number of stir sticks needed to make 75 triangles. Explain how you arrived at your solution.

**Realistic**

Tell how you would determine how many people you could place in your classroom sardine style.

number of triangles	1	2	3								10		75
number of sticks													

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Obtained from Math Central

<http://MathCentral.uregina.ca/>