

Name:

Date:

Number Concepts: Thinking Skills Lesson 1

Student Activity

## Classification: A Trip to Numberland

- STEPS:**
1. Identify the items you want to classify.
  2. Look for common features and group items that are alike.
  3. State the rule that determines membership in the group.
  4. Place items in the group. If necessary, repeat steps 2 and 3 to form new groups until all items are classified.

*Here is the problem that appeared in the lesson:*

Your job in Numberland was to put numbers together that belong to the same family. This lesson taught you how to use classification skills to organize each number family.

**Directions:** If you were in another region of Numberland, you might see these numbers gathered together. Look for common features among the numbers. Decide on rules for classification. Then pick the numbers that belong together, according to your rules. Draw Venn Fences to show your classification.

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

50%

0.25

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

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

$$\frac{3}{12}$$

25%

**Write Idea:** Libraries often use numbers to classify books. Imagine that you have a job at the library. Part of your job is to return books to the shelves. How would you use your classification skills to help you do this? Write two paragraphs.

Name:

Date:

Number Concepts: Thinking Skills Lesson 2

Student Activity

## Induction: A Treasure Hunt

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- STEPS:**
1. Examine the available information.
  2. Look for patterns in the information you examined.
  3. Make a general statement or conclusion that explains patterns you observed.
  4. Make more observations to see if your conclusion holds up.

In this lesson, you used induction to apply number properties to clues. The clues helped you unlock hidden treasures.

**Directions:** Use your inductive thinking skills to solve this number puzzle.

1. Examine the first few equations.
2. Find a pattern to the equations.
3. Find the missing numbers.
4. Use the pattern to show at least four more equations at the end of the series.
5. Do you think the pattern you observe will be repeated indefinitely?
6. Create a general statement that describes the pattern in these statements.

$$\begin{array}{rcl} 1 & = & 1 \times 1 \\ 1 + 3 & = & 2 \times 2 \\ 1 + 3 + 5 & = & 3 \times 3 \\ 1 + 3 + 5 + 7 & = & \# \times \# \\ 1 + 3 + 5 + 7 + \# & = & \# \times \# \end{array}$$

**Write Idea:** You just used induction to apply number properties to clues. Mathematicians use induction to discover mathematical properties. Choose one of the properties that you just learned about: commutative, associative, distributive, or inverse operations. Think about the steps of induction. Write a paragraph about how a mathematician might have used induction to discover that property.

Name:

Date:

Computation: Thinking Skills Lesson 1

Student Activity

## Comparison: Renting a Car

- STEPS:**
1. Identify the items you will compare.
  2. List features of the items you are comparing.
  3. Decide how the items are similar or different for each feature.
  4. Summarize what you have learned. State your decision about the items compared.

*Here is the problem that appeared in the lesson:*

You need to rent cars for two trips. In order to get the best rates, you compare the rates from Agency A with those from Agency B. To make your comparison, you look at each agency's mileage charges, plus its daily rental fee.

**Directions:** Add Agency C to your comparison. Complete the Agency C column in the table below using the following information:

Agency C offers a daily rate of \$19.95 and charges \$0.15 a mile for every mile above 100. (If you drive 100 miles or fewer there is no mileage charge.)

Trip 1: You will be driving a total of 450 miles and will need a car for three days.

Trip 2: You need a car for a one-day meeting in a town just 24 miles away.

Features	Agency A	Agency B	Agency C
Daily rental fee	\$16.95	\$27.95	
Fee per mile	\$ 0.17	\$ 0.00	

Among the three agencies, which should you now use for each of your two trips? Provide statements to support your decisions.

**Write Idea:** You probably have been in situations where you had to make a choice between two or more things. Maybe you had to choose which class to take or which jacket to buy. Think of a situation where you have to make a choice between two or more things. Build a table to compare their features. Then state your decision about them.

Name:

Date:

Computation: Thinking Skills Lesson 2

Student Activity

## Problem Solving: Planning a Pizza Party

- STEPS:**
1. Identify your goal.
  2. Identify limiting conditions.
  3. Identify ways to meet the limiting conditions.
  4. Identify and try possible solutions.
  5. Evaluate your possible solutions.

*Here is the problem that appeared in the lesson:*

You've decided to have a party. Eleven people will be coming, so you look through the cookbook for a recipe. The recipe you find is for two large pizzas that serve eight people. In order to serve twelve people, you need three pizzas. In the lesson, you revised the quantities in the recipe so that you could serve pizza to twelve people.

**Directions:** In addition to pizza, you have decided to make a cake for dessert. The recipe is for 10 servings. Use the following chart to modify the recipe and identify what you need to buy at the store. Remember that you want to serve 12 people.

Ingredients	Original Recipe	Revised Amount	Have in Kitchen	Need to Buy
flour	$3\frac{1}{2}$ cups		3 cups	
baking powder	1 tablespoon		none	
eggs	4 medium		6 medium	
milk	$\frac{1}{4}$ cup		1 cup	
chocolate	3 squares		2 squares	
sugar	$\frac{1}{2}$ cup		2 cups	
butter	$\frac{1}{4}$ stick		$\frac{1}{3}$ stick	

**Write Idea:** Think of a project you've been wanting to start. It could be painting a room, building a shelf, or working on a science experiment. What limiting conditions does your project have? Write three possible solutions. Explain the steps you would use to solve the problem.

**Name:**

**Date:**

**Computation: Thinking Skills Lesson 3**

**Student Activity**

## Decision Making: A Job at the Ballpark

- STEPS:**
1. Identify the decision to be made.
  2. Identify the choices available to you.
  3. Identify the important information that you must consider when making your decision.
  4. Determine the outcome of each choice.
  5. Evaluate your choices and summarize what you have learned. Then, make your decision.

*Here is the problem that appeared in the lesson:*

You have an important decision to make. You have been offered a job selling hot dogs at Hank's Hot Franks at the ballpark next summer. Hank will let you decide how you would like to be paid: a fixed weekly salary, an hourly wage, or a straight 5% commission.

This summer, Hank had three employees. Each decided on a different method of pay. Here's how each was paid:

- Kirby decided to be paid a fixed weekly salary of \$50 for 12 weeks.
- Lena decided to be paid an hourly wage of \$5.50, for 108 regular hours, plus  $1\frac{1}{2}$  times her hourly wage for overtime of 11 hours.
- Joel decided to be paid 5% commission on each hot dog he sold. His sales totaled \$17,100.

You know that your goal is to make the most money possible. Now you must decide how you want Hank to pay you next summer so you can meet your goal.

**Directions:** Use the additional information about another employee to re-evaluate your decision:

### Additional Information

Marcus, another one of Hank's employees, chose to be paid a base salary of \$35.00 per week plus 2% commission. Marcus had hot dog sales of \$16,300 during the 12-week summer season that he worked.

What do you need to know to find Marcus's total earnings? Do the calculations.

Who earned the most money: Kirby, Lena, Joel, or Marcus?

Now that you have another choice, do you want to change your decision about how you want to be paid next summer? Why or why not?

**Write Idea:** You have \$500 and want to open a checking account. There are two kinds of accounts to choose from: 2% interest and no per check charge, or 4% interest plus a 50¢ per check charge. You usually write 15 checks per month. Using the decision-making process you have just learned, which type of account will you open?

Name:

Date:

Word Problems: Thinking Skills Lesson 2

Student Activity

## Comparison: Pondering Puddings

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- STEPS:**
1. Identify the items you are comparing.
  2. List the features of the items you are comparing.
  3. See how the items are similar or different for each feature.
  4. Summarize what you have learned.

*Here is the problem that appeared in the lesson:*

Wanda and Noah Moore are two senior citizens you are helping. They are planning a special meal to celebrate their 49th wedding anniversary. Both of them enjoy chocolate pudding very much. Noah is limited to 150 calories and 85 mg (milligrams) of sodium in his pudding. Wanda can have 175 calories. In the lesson, you compared two puddings and picked the one that came closest to meeting the needs of both Wanda and Noah. Wanda and Noah now want to consider two other puddings. The new puddings are the following:

**Grandma's Creamy Pudding.** When milk is added to the mix, the pudding has 1120 calories and 650 mg of sodium. One package makes eight servings.

**Kiwi Chocolate Pudding.** When milk is added to the mix, the pudding has 840 calories and 630 mg of sodium. One package makes six servings.

**Directions:** Create a table to compare the two new puddings. Which one would be best for BOTH Wanda and Noah?

Features		

**Write Idea:** Describe a situation where you must choose between two or more similar items (e.g., telephones, cars, bicycles, CD players, classes to take, movies to see, job possibilities). List the features that are most important to you. Complete a table of the items to be compared and their important features. Then select the one that is best for you. In a paragraph, explain the reasons for your decision.

Name:

Date:

Measurement and Geometry: Thinking Skills Lesson 2

Student Activity

## Problem Solving: Designing a Playground

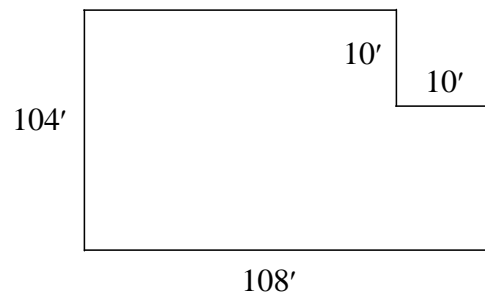
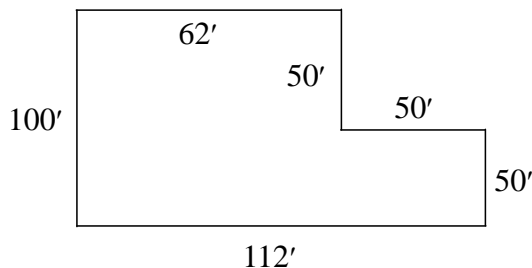
- STEPS:**
1. Identify your goal.
  2. Identify limiting conditions.
  3. Identify ways to meet the limiting conditions.
  4. Identify and try possible solutions.
  5. Evaluate your possible solutions.

*Here is the problem that appeared in the lesson:*

Your neighbors have asked you to design a fenced-in playground for the kids in your community. A local hardware company has donated 424 feet of fencing for the playground. You must come up with a design that has 4 sides, 4 right angles, uses all the fencing, and provides the largest possible area for the playground.

**Directions:** If you had been able to use any shape, you might have chosen an L-shaped design with 6 sides. So, based on what you learned in the lesson, evaluate the two designs below. (Your goal is to find the shape with the largest area.) You have only two limitations. You must use all 424 feet of fencing and have a shape with all right angles. Is either of these shapes a better solution than the one you found in the lesson (a square)? Why? Or why not?

**Hint:** Divide the shapes into rectangles. Then compute the areas.



**Write Idea:** Choose a problem you have or one that involves everyone. You might consider air pollution, nuclear waste disposal, or world hunger. Use the problem-solving steps. Identify the goal, the limitations, and possible solutions for the problem you selected. Which is the best solution? Why?

