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Strategy 1: Draw a Picture

Learning Objectives

- ◆ Solve problems by using pictures to clarify relationships between parts of a problem
- ◆ Understand spatial relationships using pictures

Problem 1

Materials:

- ◆ Playdough or straws (optional)
- ◆ Student activity (page 10)

Questions

Read each question aloud. Then work through the question with students. Encourage students to use the picture below the problem to help them answer the questions. Students can also use a piece of clay that can be formed into a log. If clay is not available, a straw can be used to represent a log.

a. (minutes)

After students answer, ask where they found their answer in the problem. (The problem asks *how long* it will take.)

b. (1 cut)

Ask students how they can use the drawing to answer the question. (Answer may vary. Sample answers: Draw lines to stand for each cut; colour the log in two different colours to show that it has been cut once.)

c. (4 minutes)

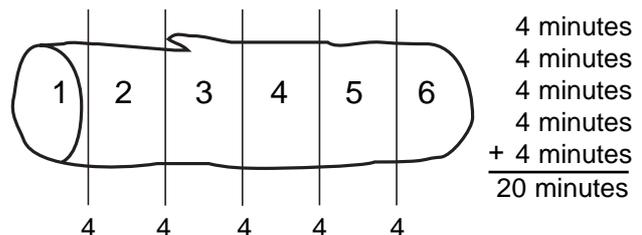
Have a volunteer read from the problem the sentence that answers the question. (In 4 minutes, Jenna can saw a log into 2 pieces.)

d. (5 cuts)

Ask students how this question can help them solve the problem. (Answers may vary. Students should note that if they know how many cuts are needed to saw 6 pieces, they can then find how much time it takes to saw that many cuts.)

Apply the Strategy

Students should show 5 cuts and 6 pieces on their drawings. For example:



If they use clay or a straw, students should make the actual cuts or use a texta to draw the cuts. Students should note that each cut takes 4 minutes to make, so they can multiply 5×4 or add $4 + 4 + 4 + 4 + 4$ to get the answer.

Alternatives: After they work through the questions, students can compare the number of cuts needed to make a number of pieces. The following table can help students compare.

Have students copy the table from the blackboard or distribute a copy for students to write on. Then have students enter in the table increasing numbers of cuts and the number of pieces made from the cuts. Students should find after several entries that the number of cuts is always one less than the number of pieces.

Number of cuts	Number of pieces
1	2
2	3
3	4

Solution: 20 minutes

e. (Answers will vary.)

Strategy 1: Draw a Picture *(cont.)*

Problem 2

Materials:

- ◆ 34 counters for each student (optional)
- ◆ student activity (page 11)

Introduction

For solving problems of this type, counters such as beans or buttons may be used in conjunction with a picture. To help them think about the questions and work through the problem, give each student 34 counters. Students can then arrange the counters around the tables illustrated on the page.

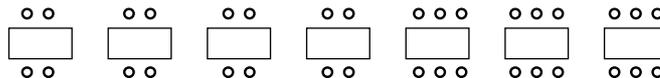
Think about:

Read the questions aloud and discuss them if necessary.

- (4 students) Have a volunteer read from the problem the sentence that answers the question. (There are small tables for 4 students and large tables for 6 students.)
- (28 students) To guide students, ask how they could use the picture of the seven tables to answer this question. (Draw 4 students around each table. Then find the number of students drawn by counting, by adding seven 4s, or by multiplying 7×4 .)
- (42 students) Discuss whether students can use the same strategy to answer this question as they used for the preceding question.
- (Answers may vary. Sample answer: Draw 4 students at each table, then add 2 to one table at a time until there are 34 students in all.)

Have students work through the problem. Encourage them to use their drawings in any way that will help them solve the problem. Students may find it useful to guess the number of students at each table and then to draw them in to test their guesses. Accept any use of drawings that will lead to the correct answer.

Sample drawing:



Alternatives: Students can also use the following table to solve this problem.

Have students copy the table from the blackboard or distribute a copy for students to write on. (Note that answers in parentheses are for teacher use.) Explain to students that they can fill in the table to solve the problem. To help them get started, point out that the number of tables in each row always equals 7. Then explain that they can draw a picture, use counters, or multiply to find the total number of people who can sit at the tables in each row. Students can continue the table until the total number of people is 34. Once they have completed the table, have students say the number patterns they see in the columns. (They should note that the first column decreases by 1 as the second column increases by 1. They should also note that the total number of people increases by 2.)

Tables with 4 students	Tables with 6 students	Total number of people
7	0	28
6	1	(30)
5	2	(32)
(4)	(3)	(34)

Solution: 4 small tables, 3 large tables

Challenge: If Problem 2 did not tell you how many tables to use, what would be the solution to the problem? Would there be more than one solution? (There are 2 solutions: 1 small table and 5 large tables; 7 small tables and 1 large table.)

Small tables	Large tables	Total tables	Total people
(1)	(5)	(6)	(34)
(4)	(3)	(7)	(34)
(7)	(1)	(8)	(34)

To help them solve this problem, have students work out additional ways to seat 34 people at tables of 4 and 6 people. Students can use any of the strategies used to solve Problem 2. For students who enjoy or need extra practice, have them show their results in a table such as the one below.

Students should copy the table from the blackboard or write on copies of the table. (Note that answers in parentheses are for teacher use.) Once students have completed the table and found the solutions, have students look for patterns. Discuss any patterns students see.

You may also wish to modify Problem 2 so that the total number of tables is always 7 but the total number of people changes. Have students fill in a table like the one below to show all the different numbers of people that can be seated. Students should copy the table from the blackboard or write on copies of the table. (Note that the answers in parentheses are for teacher use.)

Have students look for patterns. Discuss their findings.

Small tables	Large tables	Total people
(0)	(7)	(42)
(1)	(6)	(40)
(2)	(5)	(38)
(3)	(4)	(36)
(4)	(3)	(34)
(5)	(2)	(32)
(6)	(1)	(30)
(7)	(0)	(28)

Name: _____

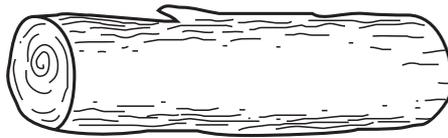
Date: _____

Draw a Picture

Problem 1



In 4 minutes, Jenna can saw a log into 2 pieces. If she saws at the same speed, how long will it take her to saw a log into 6 pieces?



Questions

a. Is the solution a number of *pieces* or a number of *minutes*?

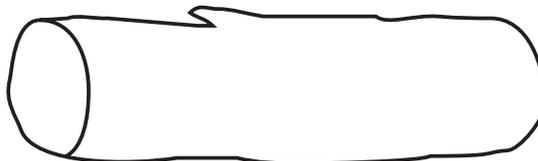
b. How many cuts are needed to saw a log into 2 pieces?

c. How much time does Jenna use to saw 1 cut? _____

d. How many cuts are needed to saw a log into 6 pieces? _____

Apply the Strategy

Use the picture of the log to help you solve the problem. Draw lines on the log to show Jenna's cuts. Write the number of minutes for each cut.



Solution _____

e. How did you use the picture to find the answer? _____

Name: _____

Date: _____

Draw a Picture *(cont.)*

Problem 2



At the Berry School library, 34 students can sit at 7 tables with no empty seats. There are small tables for 4 students and large tables for 6 students. How many small tables are in the library? How many large tables are in the library? (*Hint: The sum of your answers should be 7.*)



Think about:

- What is the smallest number of students that can sit at any table?
- How many students could sit if all 7 tables were small?
- How many students could sit if all 7 tables were large?
- How could you solve the problem if you began with 4 students at each table?

Use the picture to solve the problem.

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Solution _____