

## • ANALYZE INFORMATION

### Lesson 2 Draw a Diagram

#### Objective

Students will draw diagrams to analyze important information.

#### Teacher's Note

Drawing a diagram helps:

- **all** students to analyze the information presented graphically, as well as verbally
- **struggling** students to work with important information on a concrete level
- **advanced** students to slow down, enabling them to think through the problem more carefully and methodically

# Introduction

approx. 2 min.

## Read the text aloud.

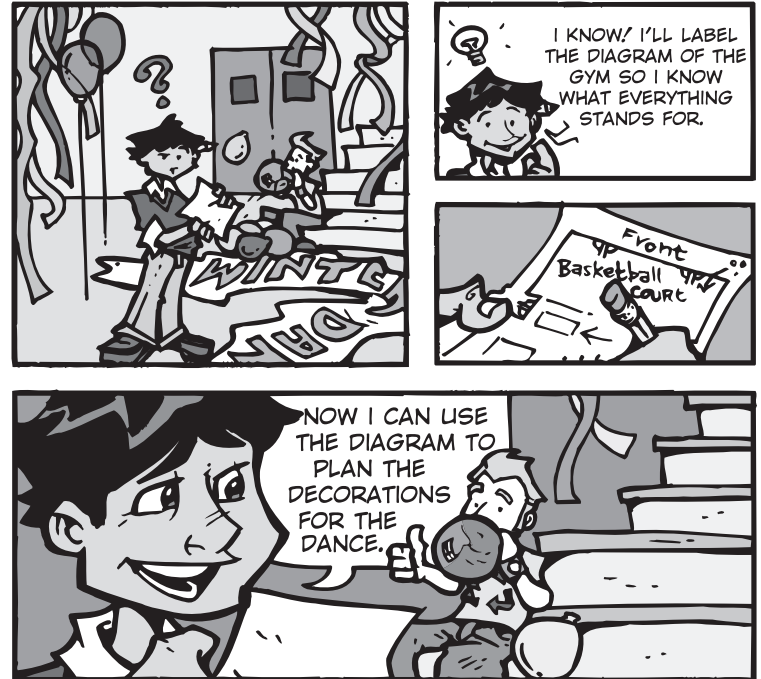
Review the situation with students. Point out that labeling the diagram of the gym helped Enrique plan where to put the decorations.

• UNDERSTAND • ANALYZE INFORMATION • SOLVE • LOOK BACK

## DRAW A DIAGRAM

### INTRODUCTION

Enrique is setting up the gym for the winter dance. He draws and labels a diagram to help him while decorating.



Just as creating a diagram helped Enrique plan how to decorate, drawing the diagram in a problem can help you analyze the information you are given.

### ANALYZE INFORMATION

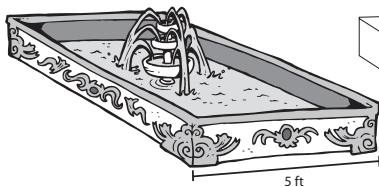
#### DRAW A DIAGRAM

- Draw and label a diagram using the important information from the problem.
- Use the labeled diagram to solve the problem.

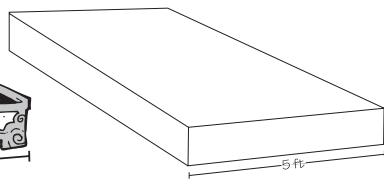
#### WHAT IS A DIAGRAM?

A diagram is different from a picture. In a picture, you take time to draw many details. In a diagram, you draw more quickly, adding only the information you need to analyze in the problem.

PICTURE



DIAGRAM



#### Help students connect the scenario to the strategy.

Emphasize that just as Enrique used a diagram of the gym to help him plan decorations, students can use a diagram to help them analyze important information and solve math problems. Remind students that the second step, or key, in solving a problem is Analyze Information. In this lesson, students will learn one strategy for analyzing information in a problem.

#### Introduce the strategy of drawing a diagram.

Students should first identify and underline the clues in a word problem. Tell students to use their underlined clues to label the diagram. Students can then identify what they need in order to solve the problem. Students should continue to label the diagram with their work in order to find a solution.

#### Clarify the difference between a picture and a diagram.

Emphasize that a diagram is less detailed than an artistic drawing. A detailed drawing will take too much time to create and will not help them solve the problem more effectively.

EL

Labeling the diagram with the important information in a word problem may be a helpful instructional tool for students who understand the mathematical concepts, but continue to struggle with the vocabulary. Ask students to share the translations of key vocabulary in their home languages. Students should create a chart comparing the English math vocabulary and their translations.

## Instruction

 approx. 5 min.

### Guide students through the example.

Read the information in Enrique's speech bubbles aloud.

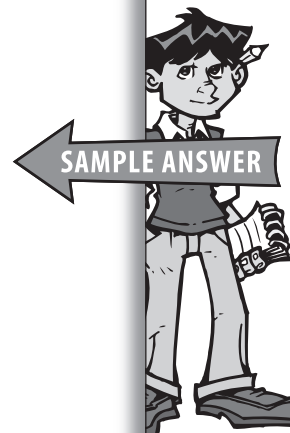
### Answers

1 C

Students should recall that finding the volume of a rectangular prism requires multiplying the width, the length, and the height. The product of 14, 20, and 6 is 1680.

*Related Content Standard: 6MG1.3*

Parker saw a pool in the shape of a rectangular prism in the park. She found that the length of the pool was 20 feet, the width was 14 feet, and the pool was 6 feet deep. What is the volume of the pool?



SAMPLE ANSWER

## INSTRUCTION

Help Enrique use the diagram to analyze the information in the problem below.

1 Parker saw a pool in the shape of a rectangular prism in the park. She found that the length of the pool was 20 feet, the width was 14 feet, and the pool was 6 feet deep. What is the volume of the pool?

- A 40 cubic feet
- B 280 cubic feet
- C 1680 cubic feet
- D 3360 cubic feet

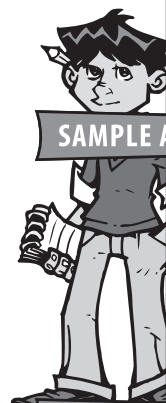
FIRST, I NEED TO UNDERLINE THE CLUES. THE FIRST CLUE IS "RECTANGULAR PRISM." UNDERLINE THE REST OF THE CLUES.

-  Draw and label a diagram using the important information from the problem.

I KNOW I CAN DRAW A RECTANGULAR PRISM TO REPRESENT THE POOL. I KNOW I NEED TO LABEL THE LENGTH, HEIGHT, AND WIDTH TO FIND THE VOLUME.

-  Use the labeled diagram to solve the problem.

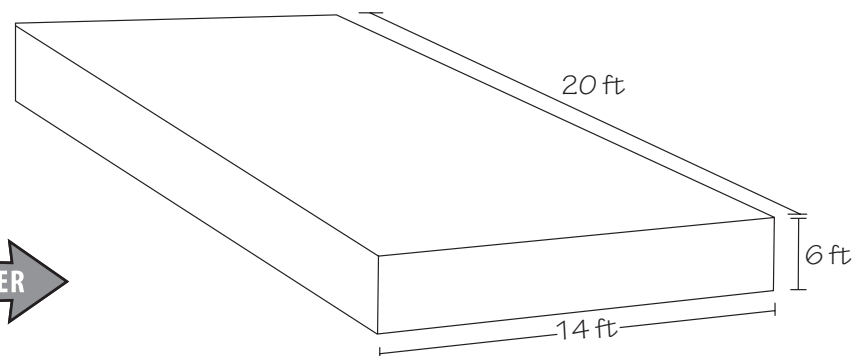
NOW THAT I KNOW THE MEASUREMENTS, I CAN FIND THE VOLUME. WHAT IS THE VOLUME OF THE POOL?



SAMPLE ANSWER

SAMPLE ANSWER

## Answers



$$14 \times 20 \times 6 = 1680$$

### Teacher's Note

Students working too quickly may choose (B) as the answer because they used the formula for area instead of volume. Labeling the diagram may help students to catch this common error.

## Exploration

 approx. 13 min.

Give students approximately 8 minutes to complete the Exploration.

As students work, circulate and ask them to explain their thinking. Redirect students as needed by asking them questions about their work. Effective questions might include:

- What are the important clues in this problem?
- What information do you know? Where does that information go on the diagram?
- How can the diagram help you to solve the problem?

Reserve 5 minutes to review the answers as a class.

### Answers

1 B

To help solve this problem, students can draw a diagram of a pair of vertical angles. Using the diagram, students should recognize that the vertical angles are equal. They are not necessarily always adjacent, complementary, or supplementary.

*Related Content Standard: 6MG2.1*

2 J

To help solve this problem, students can visualize drawing a diagram of a quadrilateral with four equal sides and four equal angles. Using the attributes of the figure in the student diagram, students should recognize that the shape is a square.

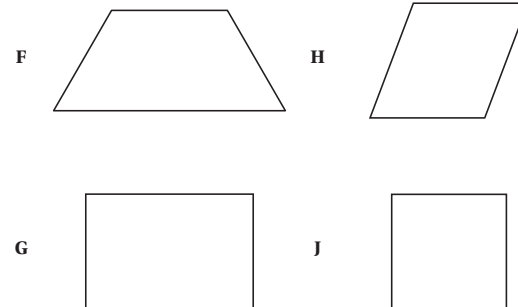
*Related Content Standard: 6MG2.3*

## EXPLORATION

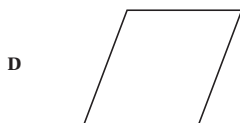
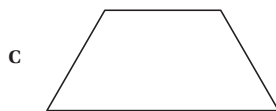
1  $\angle A$  and  $\angle B$  are vertical angles. Which statement about  $\angle A$  and  $\angle B$  must be true?

- A  $\angle A$  and  $\angle B$  are adjacent.
- B  $\angle A$  and  $\angle B$  are equal.
- C  $\angle A$  and  $\angle B$  are complementary.
- D  $\angle A$  and  $\angle B$  are supplementary.

2 Which of the following is a quadrilateral with four equal sides and four equal angles?



3 Which of the following is a quadrilateral with exactly one pair of parallel sides?



4 Which of the following is true of a triangle with two angles each measuring  $45^\circ$ ?

- F It is an equilateral triangle.
- G It is a right triangle.
- H It is an obtuse triangle.
- J It is a scalene triangle.

## Answers

3 C

To help solve this problem, students can visualize drawing a diagram of a quadrilateral with exactly one pair of parallel sides. Using the attributes of the figure in the student diagram, students should recognize that the shape is a trapezoid.

*Related Content Standard: 6MG2.3*

4 G

To help solve this problem, students can draw a diagram of a triangle with exactly two equal angles. Using the attributes of the figure in the student diagram, students should recognize that the shape is a right triangle.

*Related Content Standard: 6MG2.3*

## Answers

### 5 D

To help solve this problem, students can draw a diagram of a quadrilateral with two pairs of parallel sides but no right angles. Using the attributes of the figure in the student diagram, students should recognize that the shape is a rhombus. The shape cannot be a square because a square has four right angles. The shape cannot be a rectangle because a rectangle also has four right angles. The shape cannot be a trapezoid because a trapezoid has only one pair of parallel sides. Therefore, students should choose (D), which is the diagram of a rhombus.

*Related Content Standard: 6MG2.3*

### 6 J

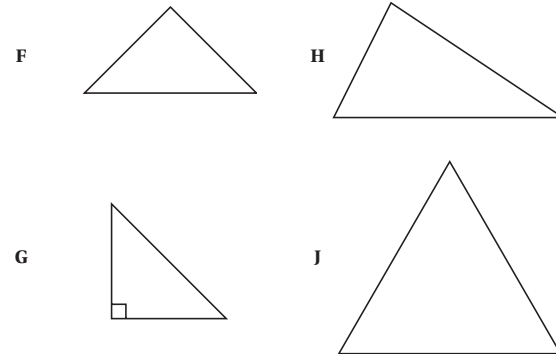
To help solve this problem, students can draw a diagram of a triangle with three equal sides and three equal angles. Using the attributes of the figure in the student diagram, students should recognize that the shape is an equilateral triangle. The shape cannot be an isosceles triangle because an isosceles triangle only has two equal sides. The shape cannot be a right triangle because a right triangle cannot have three equal angles. The shape cannot be a scalene triangle because a scalene triangle has no equal sides and no equal angles. Therefore, students should choose (J), which is the diagram of an equilateral triangle.

*Related Content Standard: 6MG2.3*

5 Which of the following is true of a quadrilateral with two pairs of parallel sides but no right angles?

- A It is a square.
- B It is a rectangle.
- C It is a trapezoid.
- D It is a rhombus.

6 Which of the following is a triangle with three equal sides and three equal angles?



7  $\angle X$  and  $\angle Y$  are complementary. If  $\angle X = 40^\circ$  what is the measure of  $\angle Y$ ?

- A  $50^\circ$
- B  $45^\circ$
- C  $40^\circ$
- D  $35^\circ$

8 Which of the following identifies a triangle with three sides of different lengths?

- F Right triangle
- G Equilateral triangle
- H Isosceles triangle
- J Scalene triangle

## Answers

7 A

To help solve this problem, students can draw a diagram of two adjacent complementary angles labeled  $\angle X$  and  $\angle Y$ . Using the diagram and the definition of complementary angles, students should recognize that the sum of  $\angle X$  and  $\angle Y$  must be  $90^\circ$ . Students must subtract  $90^\circ - 40^\circ$  to get  $50^\circ$ . Therefore, the answer is (A).

*Related Content Standard: 6MG2.2*

8 J

To help solve this problem, students can draw a diagram of a triangle with three sides of different length. Using the attributes of the figure in the student diagram, students should recognize that the shape is a scalene triangle.

*Related Content Standard: 6MG2.3*

### An Inside Look

In sixth grade, students should be able to identify types of triangles and quadrilaterals based upon their attributes. Students should first draw a diagram based on the given attributes and then compare their drawing to the answer choices to identify the correct answer.

## Extension

### Response Question

Have students respond to the following prompt in their journals or in class discussion.

*How can you draw a diagram so that a younger student could understand the concept of multiplication?*

### Group Activity

Have students work in pairs to create a word problem and make a diagram of the important information. Allow pairs to share their problems with other students and see what others would choose to diagram based on their problems. Students who have difficulty writing an original word problem may refer to the language of the problems in this lesson.

### Vocabulary Development

Make sure students understand the terms *area*, *circumference*, *diameter*, *perimeter*, and *radius*. For a quick reference tool, students should draw a circle and use colors and labels to identify the parts of the circle.