Preparing a Lesson

1

The *Objective* sidebar clearly indicates the focus of each lesson.

2

Vocabulary words and definitions are listed in the *Vocabulary* sidebar in the order they appear in the lesson.

3

The *Preparation* sidebar identifies materials that need to be obtained and activities that should be performed in advance. Its handprint icon appears beside the components of the lesson that require preparation.

The *Safety* sidebar and *Alternative* sidebar (not shown) contain icons that appear beside headings as needed. These sidebars provide ways to expedite or simplify activities or add caution for the teacher when materials or activities could trigger student allergies or health conditions.

4

The *Extension* sidebar offers ideas to extend certain parts of the lesson, cross-curricular activities, and circular review.

5

The *Worldview* section connects mathematical concepts to biblical teaching that the teacher can share with students.

6

Introduction contains activities or discussions that will elicit students' interest in the topic.

7

Directed Instruction gives sequential instructions to teach the concepts of the lesson and a guide for how students should complete their pages. This section also provides optional activities to reinforce the objective.

4.6 Congruent and Similar Figures

Geometry

1 OBJECTIVE

- Students will identify figures as congruent or similar.

2 VOCABULARY

- **congruent figures** geometric figures that have the same shape and same size
- **similar figures** geometric figures that have the same shape but a different size

3 PREPARATION

- Cut out 2 scalene triangles of equal shape and size. (*Directed Instruction*)
- Select **CP 4.1 Geometry Figures** or **TM 4.1E Geometry Figures** for display. (*Directed Instruction*)
- Obtain 1 geoboard and 1 geoband for pairs of students. (*Directed Instruction*)
- Print **BLM 4.6A Congruent Figures Practice** for each student. (*Directed Instruction*)

4 EXTENSION

- Share that the word *congruent* comes from the Latin word *congruo*. The word originally means to agree or to coincide. Congruence means agreement.
- Draw the following figure on the board. Have students use a systematic list to find the 8 different pairs of congruent rectangles. **(a and b; a and c; a and d; b and c; b and d; c and d; ab and cd; ac and bd)**

a	b
c	d

Worldview 5

Today's lesson discusses the meaning of congruence. Congruence means to be exactly the same. Because of sin, people can never be exactly like Christ. However, those who believe in Him are being transformed into His image (2 Corinthians 3:18). First John 3:2b states, "We know that when Christ appears, we shall be like Him, for we shall see Him as He is." Read **Romans 12:2**. God's Word makes it clear that Christians should strive after the model that Jesus set. The goal should be congruence with Christ, not with the world.

Introduction 6

Discuss the word *same*. Ask students what it means if two things are the same. (**Possible answers: identical, matching, copies**) Have students give real-life examples. (**Possible answers: The ceiling tiles are all the same; two students in the class have the same first name; two students have the same pair of shoes.**) Then discuss the term *similar* and have students give definitions. (**Possible answers: like; alike without being the same; resembling; close to; something like**) Have them use the word *similar* to make some real-world comparisons. (**Possible answers: A student is similar in looks to his brother; two students have a similar hairstyle.**) Call up a group of three or four students to the front of the room who all have a similar feature, such as hair color, shirt color, or height. Have the rest of the class guess the similarity between the members of the group. Have students identify shapes in the room that are exactly the same and shapes that are similar.

Directed Instruction 7

1 Explain that shapes that are the same or are similar have geometric terms to describe them. Define **congruent figures** and **similar figures** and discuss the differences between them. Reiterate that congruent figures have the same shape and same size; they are exactly the same. Similar figures have the same shape, but they are a different size.

To demonstrate this difference, show 2 cut-out scalene triangles of equal shape and size. Have the triangles turned at different angles. Ask students whether the figures are congruent. (**Answers will vary.**) Place one triangle on top of the other. Demonstrate that it is often necessary to rotate or flip one shape in order for it to exactly fit the other shape. Explain that the two triangles are congruent because they have the same shape and the same size. Have a volunteer draw a triangle on the board that is similar to the cut-out triangle. Reiterate that for the drawn triangle to be similar, it must be the same shape and must be larger or smaller than the cut-out.

2 Display figure 6.1 from **CP 4.1 Geometry Figures** or **TM 4.1E Geometry Figures**. Have students name the figures and describe their characteristics. (**Possible answer: Line segments *A* and *B* are the same length, *D* is a bit shorter, and *C* is the shortest.**) Discuss congruence in relation to line segments. Reiterate that congruent line segments are the same length. Measure the line segments to show which are congruent.

Display figure 6.2 and explain that the congruence of a pair of angles depends upon the size of their openings. The angles in figure *A* are congruent, but the angles in *B* are not. Have students discuss with a partner whether they think the angles in figure *C* are congruent or not. Then have volunteers share their reasoning. (**Answers will vary.**) State that the angles are congruent because the size of their openings is the same. Teach that the lengths of the sides of an angle do not affect congruence.

Display figure 6.3 and ask students whether the triangles are congruent. (**Answers will vary.**) Demonstrate how tracing a figure and placing it on top of the second figure can show congruence. Explain that two figures are congruent if sliding, flipping, or turning one figure allows it to fit exactly on the other. Show this with the triangles used earlier in the lesson.

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3 Distribute a geoboard and a geoband to student pairs. Direct one student in each pair to make a shape on her geoboard. Her partner should copy the design on paper to make a congruent shape. Guide students to check for congruence by cutting out their shapes and placing them over the shapes on the geoboards. Have partners switch roles.

4 Direct students' attention to the first student page. Use the images on the page to discuss the terms *congruent* and *similar*. Explain the differences between the congruent figures and the similar ones. Have students use notebook paper and scissors to check the triangles for congruence. Advise them to use rulers for Exercises 1–4 in *Practice*. Then, have students complete the page for independent practice.

5 Direct the class to draw and label in their math journals one example showing congruent figures and one example showing similar figures.

6 Distribute **BLM 4.6A Congruent Figures Practice** as needed to use as an assessment or to give students extra practice in matching congruent figures.

8 **Lesson Review**

If objects are the same shape, are they always congruent? (**No; congruent objects are exactly the same shape and also must be the same size.**) What is the term used to describe two figures that are the same shape but not the same size? (**similar**) How can you tell if two shapes are or are not congruent? (**Possible answers: Measure the shapes or trace one shape and place it over the other one; one figure may need to be turned or flipped so that it fits exactly on the other.**)

Notes

RECOVERY **10**

- Have students practice making congruent and similar figures on a simple computer program. Guide them to select a shape, copy it, and paste the copy next to the first. Have them rotate the copied shape in any direction and label it *congruent*. Then, direct students to make another copy of the first shape and to make the copy similar by resizing it. Have them label it *similar*. Allow students time to practice making congruent and similar figures with a variety of shapes.

ENRICHMENT **11**

- Print and distribute **BLM 4.6B Congruent Figures: Hexagon** for students to practice identifying congruent figures within a hexagon.

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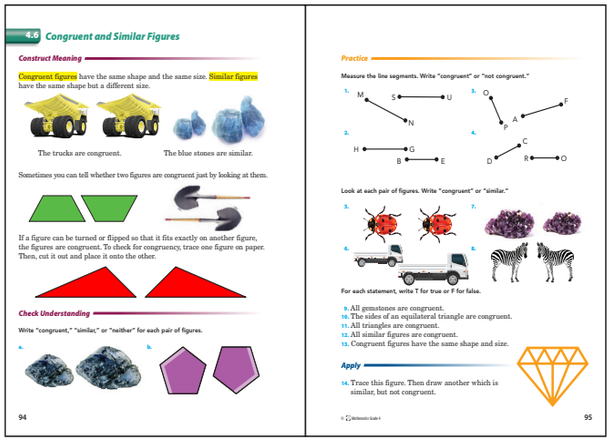

4.6 Congruent and Similar Figures

Construct Meaning

Congruent figures have the same shape and the same size. Similar figures have the same shape but a different size.

The trucks are congruent. The blue stones are similar.

Sometimes you can tell whether two figures are congruent just by looking at them.

If a figure can be turned or flipped so that it fits exactly on another figure, the figures are congruent. To check for congruency, trace one figure on paper. Then, cut it out and place it onto the other.

Check Understanding

Write "congruent," "similar," or "neither" for each pair of figures.

a. b.

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Practice

Measure the line segments. Write "congruent" or "not congruent."

1. M S U N
2. H G B E
3. O A P F
4. C D R O

Look at each pair of figures. Write "congruent" or "similar."

5. 7.
6. 8.

For each statement, write T for true or F for false.

9. All gemstones are congruent.
10. The sides of an equilateral triangle are congruent.
11. All triangles are congruent.
12. All similar figures are congruent.
13. Congruent figures have the same shape and size.

Apply

14. Trace this figure. Then draw another which is similar, but not congruent.

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ANSWER KEY **12**

a. similar
b. congruent

1. congruent
2. not congruent
3. not congruent
4. congruent
5. congruent
6. similar
7. similar
8. congruent
9. F
10. T
11. F
12. F
13. T
14. Drawings will vary but should be the same shape in a different size.

8

Lesson Review offers specific questions or activities to assess students' understanding of lesson content.

9

Readable reductions of each student textbook page are large enough for the teacher to read the text. Student pages include the sections *Construct Meaning*, *Check Understanding*, *Practice*, *Challenge*, *Apply*, and *Review*.

10

The activities in the *Recovery* sidebar can be used for differentiated learning instruction or to supply extra practice for students who would benefit from more opportunity to learn the concepts taught.

11

The *Enrichment* sidebar lists activities that will challenge those students who have clearly understood the concepts presented and are ready to learn more.

12

The *Answer Key* lists the answers for the exercises on the student pages.