

MATH

Can Take You Places

LESSON 12

“Picture This”

by Sonya Cook

CONCEPT AREA Patterns

GRADE LEVEL 6

TIME ALLOTMENT Two 60-minute sessions

LESSON OVERVIEW Students will become employed at a photo shop and will have to learn how to enlarge or reduce photographs requested by customers.

LESSON ACTIVITIES OVERVIEW Students will use color tiles to represent the original length and width and repeat the pattern to find a new length and width. Students will also show the pattern on a ratio table.

LEARNING OBJECTIVES Students will be able to:

- Use ratios to compare length and width.
- Use original ratio to scale up or down.
- Use a table to show a proportionally-similar relationship.

STANDARDS (TEKS) From the Texas Essential Knowledge and Skills (TEKS) for Math for grade six: 6.3A; 6.4A

MEDIA COMPONENTS Video: *Math Can Take You Places #005 “Patterns”*

MATERIALS

- Rulers
- Scissors
- Manila paper or construction paper
- Photographs of various sizes
- Color tiles
- Computer (if you want students to create tables on computer)

PREP FOR TEACHERS

- Gather materials
- Reproduce poem
- Bring in photographs
- Prepare practice problems for peer practice

Note:

The following concepts will be covered during this lesson: **ratio**, **proportion**, **length** and **width**. Students may need to review the concepts prior to beginning the activities, especially if your class includes students who are acquiring English as a second language (ESL).

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INTRODUCTORY ACTIVITY: Begin by watching the *Math Can Take You Places* patterns video. Ask students to name one way Chef Koval uses patterns in his everyday working situations. Then, ask the students to think of other jobs that may use patterns. Lead them into the lesson by emphasizing that a photographer uses patterns.

SETTING THE STAGE

1. Have students bring in photographs or magazine pictures from home and discuss enlarging and reducing.
2. Tell students they are beginning a new job working at a photo shop, and they will be responsible for enlarging and reducing customers' photographs.
3. Tell students that if they become experts at enlarging and reducing, they will be promoted to the framing department.

LEARNING ACTIVITIES 1. Tell students that on their first day of the job, they must attend training (as with any new job). Their boss will be conducting the training.

2. In the training, your boss teaches you a poem called, “Tables with Labels.”

Making tables with labels is fun; can't you see,

It's as easy as 1, 2, 3.

First you find width, then you find length,

Your table is almost finished; what do you think?

Now you multiply, or you divide,

But that's all that goes inside.

Your picture is now larger, or it's smaller,

You're all done, so give me a holler.

3. Next, your boss shows you how to enlarge your first picture. “The customer brings in a photograph that has a length of five inches and a width of three inches. The customer wants one picture with the length and width two times the original, and one picture with the length and width three times the original.”

4. Have students use rulers and scissors to cut out a five-by-three-inch rectangle. Next, have students use red and blue color tiles to show the original length and width. Let blue equal length and red equal width. Have students stack up five blue tiles and three red tiles. Next, have students repeat the pattern showing a second stack of five blue tiles and a second stack of three red tiles. Ask the students to provide the new length and width. Allow them to create a new rectangle with a length of 10 inches and a width of six inches. Have the students repeat the pattern a third time, showing a third stack of five blue tiles and a third stack of three red tiles. Ask students to provide the new length and width. Allow students to create a third rectangle with a length of 15 inches and a width of nine inches. Last, have the students transfer the information to a table.

Length	5	10	15
Width	3	6	9

Ask students what the stacks of tiles represent.

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5. Have students repeat the process using a new photograph, which has a length of 8 inches and a width of 5 inches.

Length	8	16	24
Width	5	10	15

6. Allow students to work with partners to enlarge other photographs.

7. Say, “Next, your boss shows you how to reduce a picture for a customer. The first customer brings in a photograph with a length of eight inches and width of six inches.” Allow students to create the picture and cut it out. The customer wants the photo reduced so that the length and width of the new photograph is half the length and width of the original. Have students use blue tiles to represent length and red tiles to represent width. Have students show eight blue tiles in a stack and six red tiles in a stack. Next, have students split the stacks in half to create two stacks of four blues and two stacks of three blues. Ask students to provide the new length and width.

8. Students may cut out a new picture or fold the original in half vertically and horizontally. Last, have students transfer the information to a table.

Length	8	4
Width	6	3

9. Have students repeat the process using an original length of 12 inches and an original width of nine inches. This time the customer wants the original photograph’s length and width to be three times as long as the new.

Length	12	4
Width	9	3

10. Allow the students to work with partners to create new reductions of photographs. Be sure to monitor students to make sure that they are working with measurements that can produce whole numbers when scaled down by a specific factor.

CULMINATING ACTIVITY

1. Tell students after a successful few weeks that they are promoted to the frame shop, where they will be enlarging and reducing photographs and framing them for the customer. They will have to find new lengths and widths and determine how much framing material will be used. (You may want to do a mini-lesson to review perimeter.) Give the students specific instructions about enlarging and reducing the photographs. You can also incorporate cost if you feel the students are ready.

2. Extension: Provide students with a price code for enlarging and reducing photographs and have them determine the cost. Example: The cost of enlarging a photograph is \$3.00 to double the length and width and \$5.00 to triple the length and width. Sarah took a picture to the photo shop and wants two \$3.00 enlargements and four \$5.00 enlargements. Write a number sentence to show how to determine the price and give the total before tax. $(2(3.00) + 4(5.00) = \$26.00)$

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CROSS-CURRICULAR EXTENSIONS Art/Social Studies
Students study collage and create a class collage from photographs.
Students study famous artists and their works and determine the size of an original masterpiece. Students create prints of the original that are proportionally similar.

REAL-WORLD CONNECTIONS Have a graphics designer visit the class to discuss how he/she uses proportions and ratios in everyday life.

ASSESSMENT Observe students closely as they work in pairs to develop their own reduction scenarios. Check them closely to evaluate whether their understanding of the concepts and proper use of vocabulary.

STUDENT HANDOUTS None