What's My Ratio?

Math Concepts

- fractions
- ratio
- decimals
- proportion
- division
- similarity
- linear measure

Materials

- TI-15 Explorer™
- **What's My Ratio?** recording sheets
- centimeter grid paper
- rulers or other linear measuring tools
- pencils
- pictures with enlarged or reduced copies

Overview

Students will use linear measurement and calculators to investigate proportionality and determine the constant ratio between similar figures.

Introduction

1. Read appropriate sections of *Goosebumps—Monster Blood III* (Chapters 15 and 16) by R.L. Stine or *The Shrinking of Treehorn* by F. Heide. Have students discuss what would happen to a picture in the pocket of someone who is shrunk or "blown up."

2. Have students draw a simple picture on centimeter grid paper (or use the centimeter grid provided on page 94). Have them decide to either increase or decrease the size of the picture, predict what they think the dimensions will be in the increased or decreased version, and discuss their reasoning.

3. Have students draw the increased or decreased picture on grid paper, keeping the picture's original shape, to test their predictions.

4. Discuss the use of ratio (comparing the measurements of corresponding parts) to describe how the picture has been increased or decreased.

   Example:
   If a line in the first picture is 3 cm and the corresponding line in the second picture is 6 cm, the ratio of the first picture to the second picture is 3 to 6 or three-sixths (or one-half, in simplest form).

5. Divide students into groups. Give each group an interesting picture (or use those provided on page 93) and a reduced or enlarged copy of the same picture. Ask each group to measure several pairs of corresponding parts on the two pictures, record their data on the recording sheet, and make some conclusions about copies of pictures.

What's My Ratio? *(continued)*

Collecting and Organizing Data

While students take measurements to generate data for comparing the ratios, ask questions such as:

- How are you going to compare these two pictures?
- What is your estimate of the change in size?
- Does that estimate make sense? Why or why not?
- How would you express the change as a comparison between the two pictures?
- What kinds of attributes could you compare?
- Is it important to compare the same things in the two pictures? Why or why not?
- What have you done previously in mathematics that might apply to this problem?
- How will you explain your strategy to the rest of the class?
- Would your strategy work for any picture? If so, why? If not, why not?
- What patterns, if any, do you see in the data?
- What conjectures have you made from the patterns in the data?

How are you using the calculator to help you with this problem?

How can you use [F↔D] to help you look for patterns?

How can you use the calculator to compare fraction and decimal representations of ratios?

Analyzing Data and Drawing Conclusions

After students have taken several measurements and compared several ratios in their pictures, have them discuss their results as a whole group. Ask questions such as:

- Did your results match your estimates? Why or why not?
- How did you determine the ratio between the two figures?
- How did you use measuring tools to help find the ratios?
- What problems did you encounter, and how did you solve them?
- What mathematics did you use to find the ratios?

How could you use [n/d] in this problem?

How could you use [F↔D] in this problem?

How could you use [÷] in this problem?

Would you want to use [Int÷] in this problem? Why or why not?

What's My Ratio? *(continued)*

Analyzing Data and Drawing Conclusions (continued)

- What patterns did you find in the ratios?
- Why do you think those patterns exist?
- What do you think would happen if you changed the values of any of the ratios between corresponding parts in a pair of pictures? Why do you think that would happen?

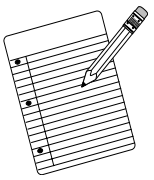
Continuing the Investigation

Have students:

- Create their own drawings, trade drawings with other students, and increase or decrease the drawings by a given ratio.
- Investigate the ratio between the areas of the two pictures. Is it the same as the ratio between the linear dimensions? Why or why not?

  Note: Investigate with simple squares to form a conjecture.

Name:



What's My Ratio?

Recording Sheet

Collecting and Organizing Data

We measured a picture of a _____

Part of the Picture That We Measured	Measurement in 1st Picture	Measurement in 2nd Picture	Ratio in Fraction Form	Ratio in Decimal Form

Analyzing Data and Drawing Conclusions

Questions we thought of while we were doing this activity:

What's My Ratio?

Sample Pictures to Shrink or Enlarge