In these activities you will solve problems involving proportional relationships in geometric figures when one figure is scaled up or down from the other. After completing the activities, discuss and/or present your findings to the rest of the class.

Activity 1 [Pages 1.5; 1.7]

1. On page 1.5, Rectangle S is a scaled copy of Rectangle R. Reveal the scale factor and the height of Rectangle R.
   a. Do you know anything about the dimensions of Rectangle S? Explain your thinking.
   b. Reveal the height of Rectangle S to check your thinking.
   c. Now reveal the base of Rectangle S. What is the base of Rectangle R?
2. Select **New**.
   a. Select enough information to enable you to find the ratio of the corresponding sides in the two rectangles.
   b. What is the ratio of the perimeters of the two rectangles? Explain how you found your answer.
   c. What is the ratio of the areas of the two rectangles? Explain your reasoning.

d. How do the ratio of the corresponding sides, the ratio of the perimeters, and the ratio of the areas compare? Use the TNS lesson to generate several examples to help think about the problem. Use one of the examples to explain your reasoning.

3. Page 1.7 has five missing pieces of information: a scale factor and the height and base of two different rectangles. Answer each of the following questions and use an example to explain your reasoning.

   a. Select to find the measures of any three of the lengths. Predict the scale factor and what the missing length will be.

   b. Select **New**. Select the bases of the two rectangles. Does this give you information about any of the other 3 missing pieces?

   c. Select **New**. Select the height of one rectangle, the base of the other. Does this give you information about the other three missing pieces of information?

4. Select **New**. Select what you think you will need to be able to figure out the other pieces of information. Share what you have done with a partner and have them find the missing information for your problem. Use the TNS lesson to check their answer.

Activity 2 [Page 2.2]

1. Select the yellow triangle in Rectangle S.
   a. Describe what changed.

   b. How do you think the yellow triangle in Rectangle R is related to the yellow triangles in the large yellow triangle in Rectangle S? Explain your reasoning.

   c. Make a prediction about the number of orange triangles from Rectangle R that will tile the orange triangle in Rectangle S. Select the orange triangle in S to check your prediction.

2. Change the scale factor to 2.
   a. Predict how many purple triangles in Rectangle R will tile the purple triangle in Rectangle S.

   b. What is the area of the orange triangle in Rectangle S? Explain your reasoning.

3. Given the scale factor of 4, which of the following describes the relationship among the areas of the yellow triangle in Rectangle R and the yellow triangle in Rectangle S? Explain how the scale factor helps you answer the question and why it does.

   a. The area of the triangle in S is four times the area of the triangle in R.

   b. The area of the triangle in S is $\frac{1}{4}$ times the area of the triangle in R.

   c. The area of the triangle in S is 16 times the area of the triangle in R.

   d. The area of the triangle in S is $\frac{1}{16}$ the area of the triangle in R.

4. Tim made the following claims. Use an example from the TNS activity and explain what you would say to Tim.

   a. The internal ratios of two sides of a figure will stay the same in a reduced or enlarged copy of the figure.

   b. The ratio of the perimeters of a figure and a scaled copy will be the same as the ratio associated with the scale factor.

   c. The ratio of the areas of a figure and a scaled copy will be the same as the ratio associated with the scale factor.

   d. If the scale factor is $\frac{3}{4}$ each length in a scaled copy of a figure will be $\frac{3}{4}$ of the length in the original figure.