Big Trouble.

Finn Mac Cumhail, (pronounced M'Cool) leader of the ancient Fianna warriors, and gifted with "magic, insight and the power of words" when he was the first to eat of the Salmon of Knowledge, and ended up a giant. One of his rival giants, Benandonner, lived across the sea in Scotland. Benandonner wasn't able to swim across the sea to Ireland for a proper gigantic challenge so Finn tore pieces of volcanic rock into columns to make the causeway to Scotland. Benandonner came across to Ireland and Finn's house, where Finn was dressed up as a baby. Yes, a baby over 15 feet long! The "baby" bit the Scottish giant's hand off and the Scot took off for Scotland, terrified at how big Finn himself must be if his baby was so big.

a) If Finn was really a 15 foot long baby, how tall would the father be? (State any assumptions clearly.)
b) Say a typical 6-foot tall Celtic Warrior weighs 9 stone. (Ancient weight measure.) How much might the 15 foot tall Finn weigh? (Weight, density being equal, corresponds roughly with volume.)
c) If it takes two square yards of wolf pelt to make a fierce looking warrior costume for your typical 6 foot warrior, how many much material would Finn need to make a costume?
d) Give the measurements (dimensions, area, volume, weight, etc.) of a giant sized something you might find in Finn's house. (Iron cooking skillets feature heavily in the Benandonner story, but don't feel limited by that.)

Tangram

1) Use all the Tangram pieces of one set to make a square.
2) Since all squares are similar (why?) this large square is similar to the small square in the set. What is the scale factor?
3) If the small square has area = 1, what is the area of the large square?
4) Use the tangram pieces to make three different similar figures.
5) Prove the similarity of your figures in (4) by using ratios.

3-D Similarity

1	2

1) Build the building with mat plan:
2) Build a geometrically similar building twice as large.
3) Prove your building is similar with ratios of corresponding sides.
4) Build or design a building three times larger than the original. Explain how you know what is needed.
5) Find the volume and surface area of each building. What relationship do the enlarged surface areas and volumes have with the original? Why?
6) Can you design a building which has a buildable enlargement of 125%? Find their surface and volumes. Do they have the same scale factor relationship as in (5)?

Dilation

Find the link to the Hexagon Dilation geogebra sketch on mathhombre.blogspot.com, or to the webpage version.

In this sketch, the blue hexagon is dilated from the red point by a scale factor of S. The sketch allows you to change S, and move the dilation point or any of the blue vertices. It also measures the area and perimeter of the hexagon and the dilation.

The check box lets you show a square with area equal to 1 square unit for comparison, and its dilation by a scale factor S also.

1) Try varying the scale factor S. What do you notice? What questions do you wonder about?
2) Collect data on the areas and perimeters for a fixed blue hexagon and its dilation as you vary S.
3) Can you find a pattern in your data? Can you find a formula for the purple area and perimeter in terms of the original measurement and S?
4) Use your formula to make a prediction for a scale factor and original area of your choice. Use the sketch to check. Does your formula work for a scale factor that is a decimal? Does it work for a scale factor less than 1?
5) Compare the edges of the original and the edges of the image. What do you notice as you vary S? As you move the center of dilation?
6) Can you predict the coordinates of the image of a vertex if the center of dilation is at the origin? If it is not at the origin?