HOW HIGH? Beyond a Shadow of a Doubt

There are several methods to mathematically determine the height of an object. One of those methods involves measuring the object's shadow. It is assumed that the sun's rays strike the earth in parallel, forming a triangle with the ray, the object's height and it's shadow. Any such triangle will be similar to that of another object in the same location, as shown in the diagram below.

$$\frac{6}{9} = \frac{12}{18}$$

$$\frac{2}{3} = \frac{2}{3}$$
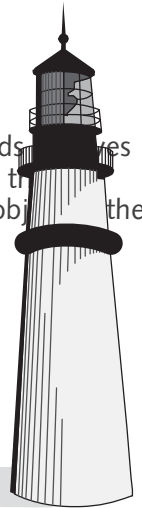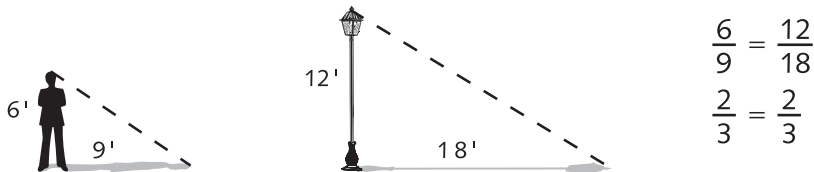
Test this principle of similar triangles among objects with an object that has a height that you can actually measure (short object). Compare the ratio of your height to your shadow (or partner in the group) to the ratio of the object's height to the object's shadow. If these ratios are equal, then measure the shadow of three other objects and estimate their heights by using your new found ratio. Record your measurements and calculations to the chart below.

	Object	Your Height	Your Shadow	Object's Shadow	Object's Height
1					
2					
3					
4					

In the space provided for each object, draw and label the pair of similar triangles and corresponding proportion that you used to calculate the height of the object. Show your calculations.

Object #1
(small object)

Object #2

Object #3

Object #4

Prove geometrically that these triangles will indeed be similar, given that the sun's rays are parallel.

Given: BC // EF
       BA ⊥ AF, ED ⊥ AF
Prove: △ABC ~ △DEF