

Proportion Project

Description: Use your knowledge of ratios, proportions, similar triangles, and measurement to find the height of a tall object using your height, shadows, and the sun!

Common Core Standard: CCSS.MATH.CONTENT.7.RP.A.1 Analyze proportional relationships and use them to solve real-world and mathematical problems. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

Due Date: Feb 3, 2017

Directions

Materials Needed:

- Ruler or Tape Measure
- Pencil
- Paper
- Camera or camera on phone/laptop
- A helper (a sibling, parent, friend, classmate, neighbor, etc.)

1. Choose a time of day when objects cast a nice shadow!

([Here's a website that shows that time of day gives the longest shadow](#))

2. Find an object that is TOO TALL for you to physically measure (a tree, light post, flagpole, statue, stop sign, speed limit sign, a really tall person, a friend carrying a friend who is holding a stick, etc.)... BE CREATIVE!

3. Stand next to the object and have your helper take the picture. Be sure to include the following in the pic:

- YOU
 - Your SHADOW
 - The entire object
 - The entire object's SHADOW!
- (don't cut anything off!)



4. Using FEET & INCHES, measure the following lengths using a ruler, yard stick, or measuring tape:

- Your height
- Your shadow (your helper needs to do this for you)
- The object's shadow
- DO NOT ATTEMPT TO MEASURE THE HEIGHT OF YOUR OBJECT. THIS IS WHERE MATH WILL COME IN! :)

5. Write down the measurements on a sheet of paper. Don't lose it!

my shadow: 1 ft 4 in
 my height: 5ft 5 in
 object shadow: 3 ft 4 in
 object height: ???

6. Convert your measurements from feet & inches to only inches

my shadow: 1 ft 4 in = 16 in
 my height: 5ft 5 in = 65 in
 object shadow: 3 ft 4 in = 40 in
 object height: ??? = ???

7. Create 4 DIFFERENT proportions that you can use to find the height of your object.

$\frac{\text{my height}}{\text{my shadow}} = \frac{\text{object's height}}{\text{object's shadow}}$ $\frac{\text{my height}}{\text{object's height}} = \frac{\text{my shadow}}{\text{object's shadow}}$

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8. Solve all 4 proportions! Use "x" to represent the object's height. You should have the same answer for all problems.

~~$\frac{65}{16} = \frac{x}{40}$~~
 $65 \cdot 40 = 16 \cdot x$
 $\frac{2600}{16} = \frac{16x}{16}$
 $162.5 = x$
 $x \approx 13 \text{ ft } 6 \text{ in}$

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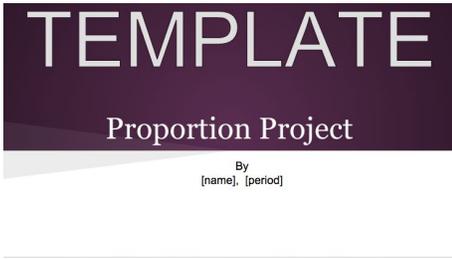
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[Watch this video on Proportions if you need help:](#)



9. Create a google presentation and put all of your information/findings in the presentation.



[Click here to see an example](#)

[Click here to copy the template](#)

[How to: Video Tutorial on importing a picture into Google Slides and “drawing” triangles and measurements on the screen \(4 minutes\)](#)

10. Share the slideshow with your math teacher and submit your assignment into the form **below**.

11. You will present your project in class on.... Feb 3, 2017

Grading Rubric

| Indicator. Student... | 3 points Evident | 2 points Developing | 1 point Not Evident |
|---|---------------------|------------------------|------------------------|
| Measurement- gathered lengths of all objects needed | | | |
| Conversion- accurately converted between ft/in. to in. | | | |
| Equations- created four unique proportions | | | |
| Proportions- solved and found height of object using proportions | | | |
| Similar triangles- outlines triangles to prove they are similar (proportionate) | | | |
| Presentation- student presented project in class | | | |

SUBMIT YOUR PROJECT HERE:

[Paste link into this form \(click here\)](#)