

GRADE LEVEL: 7th Grade
GLCEs: 7th Grade

STRAND: Algebra

LESSON TITLE: With math, “I believe I can fly!”

LEARNING OBJECTIVES:

Students will use the concept of ratios by measuring various distances, graphing these measures, and finding an unknown by indirect measurement or analyzing a line graph.

MATERIALS:

Measuring tape, notebook, calculator, graph paper, pencil.

BACKGROUND:

Students will need to have an understanding of ratios as a comparison. Students will need to be able to plot two points on a graph and make a line. Students will also need to know how to compare two ratios and solve a proportion.

INSTRUCTIONAL PLAN:

Initial story presented to students:

A tower was built in the center of a very large field for the purpose of honoring the wonderful subject of mathematics. After viewing the tower, the mayor wanted to know how tall the tower was, however, he didn't want anyone to climb on the tower in order to solve this problem. After a long period of time, one man came forward. He was able to find the height of the tower without taking his foot off the ground. How was he able to do this?

Students will write down a list of suggestions that they might try in order to solve the problem.

Students will be asked to solve each equation for x .

1) $\frac{2}{5} = \frac{x}{10}$

2) $\frac{7}{28} = \frac{4}{x}$

Introduce the idea of a ratio as a comparison between two numbers. For example, when comparing two skate boards, we can compare them as follows:

$$1) \quad \frac{\text{Wheel size of 1}^{\text{st}} \text{ skateboard}}{\text{Length of 1}^{\text{st}} \text{ skateboard}} = \frac{\text{Wheel size of 2}^{\text{nd}} \text{ skateboard}}{\text{Length of 2}^{\text{nd}} \text{ skateboard}}$$

$$2) \quad \frac{\text{Wheel size of 1}^{\text{st}} \text{ skateboard}}{\text{Wheel size of 2}^{\text{nd}} \text{ skateboard}} = \frac{\text{Length of 1}^{\text{st}} \text{ skateboard}}{\text{Length of 2}^{\text{nd}} \text{ skateboard}}$$

The man who figured out how tall the tower was used this concept.

Students will be asked what two numbers this man compared.

Students will be asked to consider comparing their own height to the length of their shadows. Then they will be asked to consider the comparison of their own height and the height of the tower or their shadow and the shadow of the tower.

Students will then be asked to write a comparison of two ratios (as in the skateboard example above) that would compare the height of the man and the tower, and the shadow length of the man and the tower.

Which of the four parts of the equation is the unknown? Which one of these four parts cannot be measured without leaving the ground?

How can we solve for the part of the equation that we do not know (i.e. the height of the tower?)

Students will then be asked to graph two points on graph paper and connect them as a straight line. The x-axis will be the shadow length and the y-axis will be the height.

Students will finally be asked to predict new heights of a tower if the shadow length was different.

Students will be asked to repeat this process and find the height of their own house.

MICHIGAN GLCEs:

N.FL.07.05 Solve simple proportion problems using such methods as unit rate, scaling, finding equivalent fractions, and solving the proportion equation $a/b = c/d$; know how to see patterns about proportional situations in tables.

G.TR.07.03 Understand that in similar polygons, corresponding angles are congruent and the ratios of corresponding sides are equal; understand the concepts of similar figures and scale factor.