

EARTH, MOON, MARS SCALING

Goals:

1. To understand ratio and proportion concepts in a contextualized setting;
2. To better comprehend the size of the Universe using contextualized mathematics.

Objective:

To construct a scale model of the Earth-Moon-Mars system in terms of planetary sizes and to discover how far one might have to travel to get to the Moon or to Mars.

Assessment:

Formative assessment will be conducted throughout the lesson by listening and questioning student groups regarding their plans, calculations, models, and conclusions. Further assessment will be conducted when students are asked to communicate their results and how they obtained their results to their peers.

Motivation:

Begin by reading portions of James Thurber's *Many Moons* in order to assist children in wondering about just how far away is the Moon and just how large is the Moon.

Administer [Many Moons Pre-assessment](#) at the conclusion of the story.

Statement of Purpose:

This balloon activity will allow students the opportunity to construct a scale model of the Earth/Moon system, both in terms of planetary sizes and distances. In addition, students make a scale model of Mars, and discover how far one might have to travel to visit the most Earth-like planet in our solar system.

Teacher Modeling or Demonstration:

- Divide students into groups and distribute Student Sheets (see attachment) and balloons. Groups should all have three different colored balloons to represent the Earth, Moon, and Mars.
- Tell students that the Earth balloon should have a diameter of 20 centimeters. Ask students to inflate their Earth balloons to inflate their model to this scale.
- Ask students to look at their Student Sheets and to calculate the size that the Moon and Mars should be using the same scale as the Earth model.
- Have students inflate their Mars and Moon balloons.
- Ask students if they would also like to inflate a balloon to represent Phobos. (They will find out that this will not work since Phobos would be about the same size as a grain of sand using this scale model).
- Ask students to determine how far apart the Earth and Moon should be at this same scale, and how far apart the Earth and Mars should be.
- Compare the size of the Mars model with the Earth and Moon models and ask students to demonstrate their model distances.
- Ask students to communicate how they determined all celestial diameters and distances.

Adapted from NASA's Earth, Moon and Mars Balloons Lesson
<http://www.nasaexplores.com/>