



Clay Planets

Middle grades

Lesson Summary

Students test their knowledge of scale in the solar system by building clay models of the planets, asteroids, and moons.

Prior Knowledge & Skills

- General astronomy of the solar system

AAAS Science Benchmarks

Common Themes

Scale

The Physical Setting

The Universe

NSES Science Standards

- **Earth and Space Science:** Earth in the Solar System

NCTM National Mathematics Standards

- **Measurement:** Apply appropriate techniques, tools, and formulas to determine measurements

Teaching Time: One 45-minute period

Materials

Each group needs:

- 50 g each gray clay, green clay, blue clay and red clay
- 100 g yellow clay

Advanced Planning

Preparation Time: 20 minutes

1. Gather materials
2. Review the lesson plan

Why Do We Care?

Scientists use models to help understand and explain concepts that are difficult to visualize, like the inside of an atom or the structure of DNA. Here, students model the solar system to gain some insight into how big the sun is: 99 times bigger than everything else in the solar system put together!

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Type of Lesson: Hands-on Activity

Time Needed: 45-50 minutes

Standards Addressed

MEGOSE ES1 Describe the Sun, Moon, and Earth.

MEGOSE ES4 Describe, compare, and explain the motions of planets, moons, and comets in the solar system.

Quick Summary of Lesson

This is an introductory lesson about the planets of our solar system.

Material for each group of 4 students

50 grams of gray clay
100 grams of yellow clay
50 grams of green clay
50 grams of blue clay
50 grams of red clay
a balance for each group

Procedure

1. Ask the question "what do you know about the planets?" Get students to brainstorm about this question.
2. Explain to the students that you can study astronomy through the use of models. The students will be creating a model of the solar system using clay to represent different planets and other objects in the solar system (asteroids, moons, etc.). The students can use as much or as little of the clay their group is provided. Students may use their books or previous knowledge to try to make an accurate model for the solar system. Tell students that their models should represent the true size and scale of the solar system.
3. Allow 15-20 minutes for the students to build their models. During this time students should also pick a spokesperson to explain the model to the rest of the class.
4. Lead a class discussion about the models: 1) What are the strengths of our models? 2) What are the weaknesses of our models? 3) How are our models different from the real solar system? 4) How are our models similar to the real solar system?

5. As a conclusion, explain to the students that 99% of the mass of the solar system is found in the Sun. That leaves only 1% for the rest of the solar system. In other words, for the models to be an accurate representation in terms of mass, 99 grams of clay would be needed to represent the Sun, and only 1 gram could be used for all of the planets, 59 moons, and thousands of asteroids. Hold up 99 grams of yellow clay for the Sun and 1 gram of gray clay that represents everything else in the solar system. It is hard to believe isn't it!?

Notes to the Teacher

If there is time in the instruction period, ask students how they would change their models to make them more accurate.

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