The Size of Things

Grades:
3 – 5

Objectives:
- Students will be able to explain that the Sun is the largest object in the solar system.
- Students will be able to describe the relative sizes of the 8 planets in the solar system, and Pluto.

Description:
Students begin by estimating the size of each planet and making it with Play-doh. Then they use their play dough to make a size model of the solar system by following directions and dividing a mass of clay into appropriate sizes.

Suggested Timing:
25 – 30 minutes.

National Standards
Content Standard D: As a result of their activities in grades K-4, all students should develop an understanding of objects in the sky: The Sun, moon, stars, clouds and airplanes all have properties… that can be described.

Content Standard D: As a result of their activities in grades 5-8, all students should develop an understanding of Earth in the solar system: The earth is the third planet from the sun in a system that includes the moon, the sun, eight other planets and their moons, and smaller objects, such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system.

Vocabulary:
- Scale
- Size

Materials: (One per group)
- Size instructions
- Play-doh, 4-6 tubs. (3lbs: minimum quantity required for this activity)
- 11 X 17 in sheet of paper.

Background Information:
The scale of the solar system can be represented here on earth using common materials. By selecting a small ratio a scale model can be created to shoe both relative size and distance. The Sun is 90% of the mass in our solar system. One million earths could fit inside the Sun. The gas giants are the next largest, followed by the terrestrial planets, accounting for only 10% of the mass of the solar system. The inner or *terrestrial* (rocky) planets; Mercury, Venus, Earth and Mars are smaller than the *jovian* (gas) planets; Jupiter, Saturn, Uranus and Neptune. It should also be noted that this figure does not account for the smaller objects in the solar system, asteroids and moons. Jupiter for example, has over 50 moons, one of which is larger than the planet mercury.

Content:

Predict: (Engagement and assessing prior knowledge)
Give students their tubs of Play-doh and tell them to divide it up into the 8 planets and Pluto, making each one the size they think it ought to be compared to the rest of the planets. Have them place the planets on a large sheet of paper. Give students time to make their predictions. Students must use ALL the Play-doh. After making each of the planets and Pluto have students trace the circumference of each planet and label it.

Method: (Body of the lesson)
This activity is best done when the instructions are given out loud and also posted on a white board, projector, or hand out. Explain to students that they will be learning about the size of the planets compared to each other.

1. Make 10 equal balls from all 4 or 6 tubs of Play-doh combined. Squash 6 of them together...this will be JUPITER. Place the ball on the paper labeled JUPITER.

2. Take another 3 and squash them together...this is only part of SATURN (you will add to SATURN two more times before the activity is over). Place the ball on the paper labeled SATURN.

3. Divide the ball of Play-doh that is left into 10. Squash 5 of them together and add them to SATURN. Take 2 and squash them together...this is NEPTUNE. Place the ball on the paper labeled NEPTUNE.
4. Take another 2 and squash them together...this is URANUS. Place the ball on the paper labeled URANUS.

5. With the ball that is left, make 10 equal sized balls. Squash 9 of them together...add them to SATURN. SATURN is now complete!
6. Divide the remaining ball into 2. 1 is EARTH. Place the ball on the paper labeled EARTH.

7. Now is when things get tricky! Divide the ball that is left into 10. 9 of them make up VENUS. Place the ball on the paper labeled VENUS.

8. Make 10 balls out of the 1 that is left. Use 9 to make create MARS. Place the ball on the paper labeled MARS.

9. Divide the ball of Play-doh that is left into 10. 9 of them make up MERCURY (Place them on the paper labeled MERCURY)

10. And the one left is PLUTO! Place the ball on the paper labeled PLUTO.

Why isn't the Sun included in this activity? The Sun is so much larger than all of the planets that if you use a 3lb tub of Play-doh to make the 8 planets and Pluto, it would take 980 tubs to make the Sun!

Live-It: (Assessment/application assignment)
Have students rearrange the planets in order of largest to smallest, then make a poster with each planet labeled and in the order of largest to smallest.

Answer this question: “Were your planet size predictions right? Explain.”

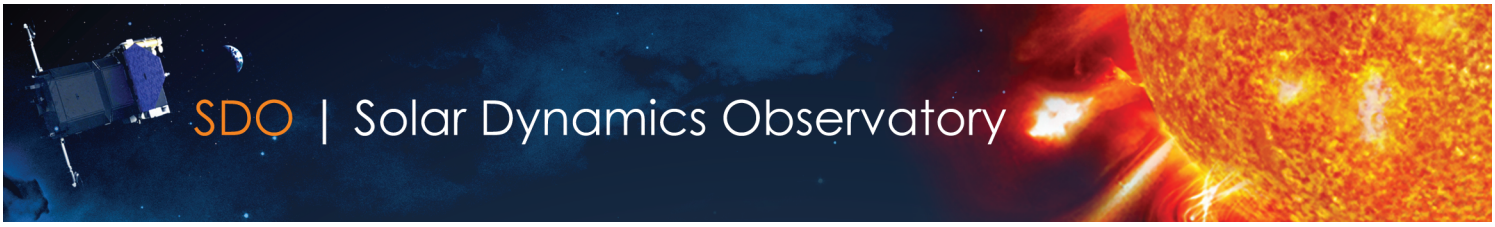
Extension:

Students can make their poster out of magazine photos, or trace the circumference of the accurate clay planets onto their poster to make it more accurate.

Resources:

NASA’s Solar System Website:
http://solarsystem.nasa.gov/planets/index.cfm

The Nine Planets:
http://nineplanets.org/



LAB SHEET: PLAY-DOH SOLAR SYSTEM

STEP 1:

- ☐ Mash play-doh from all cans into one big ball
- ☐ Now make 10 equal balls.
- ☐ Squash 6 of them together...this will be JUPITER. Place the ball on the paper where you labeled JUPITER.
- ☐ Take another 3 and squash them together...this is only part of SATURN (you will add to SATURN two more times during this activity). Place the ball on the paper labeled SATURN.

STEP 2:

- ☐ Divide the ball of Play-doh that is left into 10 equal balls.
- ☐ Squash 5 of them together and add them to SATURN.
- ☐ Take 2 and squash them together...this is NEPTUNE. Place the ball on the paper labeled NEPTUNE.
- ☐ Take another 2 and squash them together...this is URANUS. Place the ball on the paper labeled URANUS.

STEP 3:

- ☐ With the ball that is left, make 10 equal sized balls.

  Squash 9 of them together...add them to SATURN. SATURN is now complete!

STEP 4:

- ☐ Divide the remaining ball into 2. 1 is EARTH. Place the ball on the paper labeled EARTH.

STEP 5:

- ☐ Now is when things get tricky! Divide the ball that is left into 10. 9 of them make up VENUS. Place the ball on the paper labeled VENUS.

STEP 6:

- ☐ Make 10 balls out of the 1 that is left. Use 9 to make create MARS. Place the ball on the paper labeled MARS.

STEP 7:

- ☐ Divide the ball of Play-doh that is left into 10.
- ☐ 9 of them make up MERCURY (Place them on the paper labeled MERCURY).
- ☐ The one left is PLUTO! Place the ball on the paper labeled PLUTO.

CONGRATULATIONS!!! YOU HAVE COMPLETED A SCALE MODEL OF THE SOLAR-SYSTEM PLANETS OUT OF PLAY-DOH!!