

SIEMENS STEM DAY ACTIVITY

THE DYNAMIC TRIO

REAL-WORLD SCIENCE TOPICS

- Relative location of the Solar System objects including the Sun, Moon, and the major planets.
- Explore relationships between the Sun, Moon, and Earth and how they impact one another.
- Explore relationships of the Sun, the planets, Moon and other objects of the Solar System.

ADDRESSES NGSS LEVEL OF DIFFICULTY

2

GRADE RANGE

K-2

OVERVIEW

In this activity, students will learn about the stars, planets, and Moon found in our solar system and how they relate to one another. Students will work in groups to create models of the Solar System.

OBJECTIVE

After completing this activity, students should be able to describe our Solar System and the location of the Earth, Moon, and Sun in relation to one another as well as how they orbit in space. Second graders should be able to list major planets, describe their location in the Solar System and how they function within our Solar System.

NGSS THREE-DIMENSIONS

Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts
<p>Analyzing and Interpreting Data</p> <p>Use observations (first hand or from media) to describe patterns in the natural world in order to answer scientific questions.</p> <p>Asking Questions and Defining Analyzing and Interpreting Data</p> <p>Use and share pictures, drawings, and/or writings of observations.</p> <p>Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.</p>	<p>E-SS1-A:</p> <p>Patterns of the motion of the Sun, Moon, and stars in the sky can be observed, described, and predicted.</p>	<p>Patterns</p> <p>Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.</p>

BACKGROUND INFORMATION

What are the unique characteristics of the Sun and what is its major role in the Solar System?

The Sun, which has no solid surface, is mostly ionized gas that is held together by gravity. It is approximately 92.96 million miles away from the Earth. Eight planets including the Earth orbit the Sun. It is very dense and contains almost all of the mass in our Solar System. It exerts a tremendous gravitational pull on the planets and other objects in our Solar System.

How do the Sun, Moon, and Earth relate to one another?

Earth orbits the Sun over the course of 365 days. The distance from the Sun and the lean of Earth's axis determine the Earth's seasons, weather, climate, and ocean currents. Our Moon is Earth's natural satellite. It orbits the Earth every 27 days.

What are the other components of our Solar System and how do they contribute to its existence?

In addition to the Sun, Earth, Moon, and eight planets, there are also dwarf planets, asteroids, and meteors. The eight planets in our solar system listed from closest to the Sun are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Our solar system is located in the Milky Way galaxy and many of the objects in Solar System have atmospheres including planets, dwarf planets, and Moons.

KEY VOCABULARY

Solar System: The solar system includes the Sun and everything that orbits it. This includes eight planets and their natural satellites such as Earth's Moon; dwarf planets such as Pluto and Ceres; asteroids; comets and meteoroids.

Sun: a star made up of 92% hydrogen and 7.8% helium, which is at the center of our solar system.

Moon: Earth's natural satellite, it is composed of a rock. It has a surface that is cratered and pitted from impacts of space debris.

Earth: a rocky planet, also known as a terrestrial planet, with a solid and dynamic surface of mountains, valleys, canyons, plains, which is covered primarily by water and inhabited by human beings

Star: a fragment of gas and dust that has overtime (millions of years) become so hot and dense that a chemical reaction causes its substance to change and form (into the stars we see)

MATERIALS NEEDED FOR ACTIVITY

Note: You will divide your students into groups of four.

- A trade book about the Solar System containing facts about the Sun, planets, Moon, and other major objects in our solar system. Suggested title is The Planets in our Solar System by Franklyn M. Branley.
- A non-fiction book or fictional text for each child about space, the Earth, the planets, etc. Each book can be a different title.
- Bulletin Board Paper
- Cups of varying sizes to represent the Sun, Earth, Moon, eight planets, and minor planets:
 - 1 large Cup (Sun)
 - 1 Medium Cup (Earth)
 - 1 Small Cup
- Spherical objects that parallel the size of the cups listed above (Teachers can often access a variety of balls from their physical education teacher)
- Yellow, blue, and white construction paper
- Masking tape
- Black markers
- Full sticky notes
- Three long sheets of Bulletin Board Paper
- Handout of the Solar System

TEACHER PREPARATION

Cut out three circles for each set of two students. For each pair, you will need a medium yellow circle, a smaller medium-sized blue circle, and a small white circle.

Prepare a chart with a list of the planet names.

Place one sheet of bulletin board paper along a wall with a flat surface for writing. Have all other materials ready for student use.

- 1. Warm-up Activity:** Give each set of partners a blue circle, a yellow circle and a white circle. Tell them that the yellow circle represents the Sun, the blue represents the Earth, and the white circle represents the Moon. Tell them to work with their partner to make a model of the Earth, Sun, and Moon and where they are located in relation to each other. Tell them to talk to their partner about how they think the Earth, Sun and Moon work together.

Tell the partners to discuss how the Earth, Sun, and Moon relate to each other. Tell them to discuss how the Sun, Earth and Moon move in relation to one another.

- 2.** Tell the students that they are going to study the Solar System. They will learn about the planets and how they move. They are going to make a model of the Solar System. If you have a specific area for reading, invite them to come and listen to the story you selected about the Solar System. Read the story to the students. As you read, be sure to emphasize the following facts:
 - The Sun is the center of the Solar System.
 - How the Earth, Sun, and Moon move in relation to one another.
 - The names of the major planets and minor planets.
 - There are comets and asteroids in our Solar System too.

For this grade level, during reading, be sure to highlight specific facts about the major and minor planets. Also, highlight details about comets and asteroids and their function in the Solar System.

- 3.** After reading, tell the students that they will see a quick model of the Sun, Moon, and Earth's orbit. Bring three students to the front of the room. Position the students so they represent the Sun, Earth, and Moon. Show the students that the Earth is revolving around the Sun as the Moon is acting as the Earth's satellite.
- 4.** Next, tell the students that you are going to draw a model of the solar system and you need their help to make your drawing. Tell the students to give you a fact they remember about the name and location of anything in the solar system. Draw their ideas on your diagram on the bulletin board paper.

As students provide information, ask them to give any specific details they remember about the planets and how they function in space.

- 5.** Now tell the students that they are going to use your drawing to create a model of the Solar System. Explain to them that they are going to use the diagram on the board and other materials to create their model. Show the students the cups, balls, masking tape, and markers. Tell them that they are to work together to create their models.
- 6.** Tell the students that the bulletin board paper will represent space. Unroll the paper on to the floor or a large table or appropriate flat surface. Demonstrate to the students how to set up one of the models. Tell

the students the cups will be used for balance. Turn the cup upside down. Select one of the appropriate size balls and tape the ball to the top of the cup. Take one of the full sticky notes and write the name of the planet on the sticky. Affix the sticky to the cup. Now, take more of the masking tape and affix it to the bulletin board paper in the location where the planet exists in space. Place the cup on top of the tape. Tell the students they are going to create the model of the Solar System just as you did.

As you describe the task to the students tell them they are going to work in groups to complete their task. For older grades, students can work in groups of four or more to create their model of the Solar System. You can still assign specific roles to the students, but each child can be responsible for two planets as well as contributing to the background.

EXTENSION ACTIVITY

Students can create individual models of the Solar System by gathering several sphere shaped objects, newspaper, and glue. It is recommended that students use smaller balls for this project to save space. Students can work with partners or alone to create their models. They can cut the newspaper into strips, then glue it onto the balls. Each of the balls can be painted a different color. Students should make a take a small mound of play dough and put it on their Solar System platform to hold each planet, the Sun, and Moon. Then, they can affix the balls onto play dough mounds. Students can label their planets using mail labels, which have sticky backing. Students should be able to present information on their project, sharing the names of all of the objects in their solar system, functions of the Earth, Moon, and Sun and additional information about how all of the objects in the Solar System function together.

SOURCES

<http://solarsystem.nasa.gov/planets/profile.cfm?Object=Sun&Display=OverviewLong>

http://www.kidsastronomy.com/solar_system.htm

<http://solarsystem.nasa.gov/kids/>

