

Our Place in Space

Program Summary

Instead of just listening to someone talk about the Earth and the Sun, students will be asked to help solve a crossword puzzle about the sky. Some clues are easier than others.

Starting with ideas as basic as the difference between a star and a planet, one clue builds on another. The answers lead to exploration of the relationship between the Earth and Sun, how apparent size changes with distance, the rotation of the Earth and the effects of gravity (or the lack thereof), and the cause(s) of day and night.

There is a brief segment about constellations and how the sky is a big dot to dot game. From there, students will use their imaginations to take a trip into space to visit the planets in the Solar System and travel beyond the realm of the Milky Way galaxy.

Tennessee Science Standards

1. Earth And Its Place In The Universe 7.0

Objectives

1. Explain the difference between a star and a planet.
2. Describe how Earth's rotation causes day and night.
3. Name a common constellation or make up their own star picture.
4. List here objects that are found in space.

Pre-Visit Activities

1. Discuss the difference between the daytime and nighttime skies. Have students draw daytime and nighttime pictures. Students could also find and cut out pictures in magazines of day and night, fixing them on a board divided and labeled with DAY and NIGHT.
2. Discuss how size appears to change with distance using familiar examples such as airplanes, cars, etc.
3. Make the classroom dark and use an Earth globe and a bright light. While rotating the globe, have students observe how light shines on one side of the globe while the side away from the light remains dark (a clear light bulb works best for this demonstration).
4. Ask the class to name objects found in space. Have students look for ways to classify the list or separate it into groups (planets, stars, and etc..).

Post-Visit Activities

1. Have students drop 6 to 10 beans onto black construction paper. They will glue each bean down exactly where it landed. Once the glue has dried, students play connect the dots with the beans and try to find a picture. They can connect the beans to form a picture using chalk or white crayon. Have them write or dictate a story about their bean constellation and give it a name. Share individual pictures with the class or display their creations.
2. Using a globe, demonstrate the difference between rotation (turning around an axis) and revolution (orbiting/moving around another body). Then go outside and divide students into groups of two. One student will be the Sun

Vocabulary

constellation

day

Earth

galaxy

gravity

night

planet

planetarium

star

Sun

and one the Earth. You could also have students stand and act out both movements in a big circle with one student acting as the Sun in the center of the circle. Divide groups into threes and make the third student the Moon. Now have all three create a simulation of the Sun, Moon, and Earth, showing rotation and revolution all at the same time. Emphasize how all three objects are rotating and be prepared for a dizzy experience!

3. Take the class outside on a sunny day to explore shadows. Have pairs of students draw a chalk outline of each other's shadow and note the time they drew it. Draw their footprints first and then they can more easily return to the same position each time. Go out several times during the day and redraw the outline with students standing in the same spot. Be sure to write the time they made each shadow beside each marking. Discuss how the shadow has changed; size, length, direction of the shadow. Help students draw conclusions about their observations.
4. Assign each student an object in space from the following list: Sun, Mercury, Venus, Earth, Earth's Moon, Mars, Asteroids, Jupiter, Saturn, Uranus, Neptune, Pluto, another star, double star, star clusters, nebula, galaxy,.
 - Have each student create a representation of his or her object. These could be 2d or 3d using anything from crayon on paper to Styrofoam balls or paper plates.
 - Have the students line up in order of position moving outward from the Sun. What tricks can be used to remember the order of the planets? After reciting the standard "Mary's Very Eager Mother Just Served Us Nine Pizzas." ask the students to make up their own sentences.
 - Each student could then tell the class two things about their object.
 - An extension of this activity would be to create a scale model that shows the relative distances of the planets and other objects from the Sun. Space is mostly empty space.
5. Download the monthly star chart from our website. Encourage students to locate the constellations and any planets visible in the evening sky.

Exhibit Connections

Space Chase

The movement of the earth around the sun can be seen in the Earth-sun orrery in the solar System Survey.

Students can explore the Solar System Touchscreens to learn more about the Sun and human exploration of Earth's planetary neighborhood.

Resources

Books

Touch the Sun by Noreen Grice a NASA Braille book

Websites

Monthly star charts and related articles - www.SudekumPlanetarium.com

clever astronomy demonstrations using paper plates <http://analyzer.depaul.edu/paperplate/>

Build a Solar System -

http://www.exploratorium.edu/ronh/solar_system/

How Big is the Solar System? -

<http://www.noao.edu/education/peppercorn/pcmain.html>

National Space Science Data Center: (up-to-date data about the Solar System)

<http://nssdc.gsfc.nasa.gov/planetary/planetfact.html>

Scale models of the solar system

<http://www.vendian.org/mncharity/dir3/solarsystem/>

The 'classic' lightbulb and Styrofoam ball demo:

<http://education.jpl.nasa.gov/educators/moonphase.html>

Use a clear glass/unfrosted bulb, not a flashlight, for better results