



A Trip through Space

Grades 3 & 4

OBJECTIVES

As a result of this Planetarium visit, the student should be able to:

1. State that the tilt of the Earth on its own axis as it rotates and revolves around the Sun causes changes in season, length of day and energy available.
2. State that the combination of the Earth's movement and the Moon's own orbit around the Earth results in the appearance of cyclical phases of the Moon.
3. Explain why we have tides and lunar and solar eclipses.
4. State the Sun is a star.
5. State that the planets differ in size, characteristics and composition and that they orbit the Sun in our Solar System.
6. Understand the arrangement of planets in our Solar System.
7. State that our Sun is one of many stars in the galaxy.
8. Describe stars and constellation patterns.
9. Describe black holes.
10. State that, in addition to the Sun, there are many other stars that are far away.

PRE-VISIT ACTIVITES

1. Discuss with the students whether or not it is possible to see planets in the sky, and if so, how they might appear.
2. The moon and planets can quite often be found in the evening sky, but because they move in orbits about the sun, as does the earth, they wander against the background of stars over time. If you'd like your students to observe a planet before their visit, please call the Planetarium for suggestions. **Important: Remind students that, for safety reasons, they should always take an adult family member with them when they go outside to observe the night sky.**
3. The moon, our nearest neighbor world, is likewise a wonderful object to watch, and is usually easy to find; as it revolves about the earth, students can observe it change its place and apparent shape over the course of several nights. But there are sometimes of the month when the moon is difficult to watch because it rises well after midnight or is too near the sun to see. Once again, please call the Planetarium before assigning your class any moon watching activities.
4. Display a photograph of the full moon and ask the students to imagine the outlines of people or animals or faces, using the dark and light areas. Have them draw or sketch the shape they see, and ask them to make up and tell or write a story about how that person or animal ended up on the moon. Ask the students which planet, besides earth, they would like to live on, why and how!
5. Ask your students why we have night and day, why we have seasons and whether the earth moves.
6. Ask your students what stars are like and where they come from.

POST-VISIT ACTIVITIES

Students should be given an assignment which helps them to think about what they have seen in the Planetarium, such as:

1. Follow up on pre-visit activity #5, and see if any students have changed their minds and why?
2. Create stories and artwork about the planets, stars and outer space.
3. Learn the names and locations of the lunar seas and craters.

4. Use a flashlight for the sun, students for the earth and moon, and illustrate how we have day and night, phases and seasons.
5. Make a mobile of the solar system, or a model of the galaxy, locating our earth's place.
6. Start a scrapbook of pictures and articles cut from newspapers and magazines about astronomy.
7. Draw a scale model of the solar system. Use a scale of 1 inch = 5 million miles (this makes the sun about 1/5 inches in diameter, and the earth on this scale is a pencil dot 18.6 inches away).
One way to help students understand that the solar system is very large is to first ask them to make a scale model with the sun the size of a beach ball. They will soon discover that on a scale that large, they will need to place most of the planets well outside the classroom's walls!
8. Make up stories about the stars and constellations, or read constellation myths.
9. Plan a trip into space:
 - a. What items are needed for the trek;
 - b. What would be the trip length;
 - c. How do we leave earth;
 - d. How do we rendezvous with our target planet;
 - e. What things would we see on the journey;
 - f. How do we land on a planet;
 - g. How can we get back home?

Sunshine State Standards Benchmarks

SC.3.N.1.6	Infer based on observation.
SC.3.E.5.1	Explain that stars can be different; some are smaller, some are larger, and some appear brighter than others; all except the Sun are so far away that they look like points of light.
SC.3.E.5.2	Identify the Sun as a star that emits energy; some of it in the form of light.
SC.3.E.5.3	Recognize that the Sun appears large and bright because it is the closest star to Earth.
SC.3.E.5.4	Explore the Law of Gravity by demonstrating that gravity is a force that can be overcome.
SC.3.E.5.5	Investigate that the number of stars that can be seen through telescopes is dramatically greater than those seen by the unaided eye.
SC.3.E.6.1	Demonstrate that radiant energy from the Sun can heat objects and when the Sun is not present, heat may be lost.
SC.4.E.5.1	Observe that the patterns of stars in the sky stay the same although they appear to shift across the sky nightly, and different stars can be seen in different seasons.
SC.4.E.5.2	Describe the changes in the observable shape of the moon over the course of about a month.
SC.4.E.5.3	Recognize that Earth revolves around the Sun in a year and rotates on its axis in a 24-hour day.
SC.4.E.5.4	Relate that the rotation of Earth (day and night) and apparent movements of the Sun, Moon, and stars are connected.

VOCABULARY

Constellation: A formation of stars perceived as a figure or design, especially one of 88 recognized groups named after characters from classical mythology and various common animals and objects.

Crater: A hole or depression. Most are roughly circular or oval in outline. On Earth most natural craters are of volcanic origin. On the Moon most are of impact origin.

Black Hole: An object so massive that nothing, not even light, can escape its gravity.

Asteroid: A small, mostly rocky body orbiting the Sun. Asteroids range in size from 1000 kilometers in diameter to tiny objects you could hold in your hand. Most asteroids orbit the Sun between Mars and Jupiter, and are the source of most meteorites.

Astronaut: Person engaged in or trained for spaceflight.

Astronomy: The study of stars, planets, comets, asteroids, galaxies, and other phenomena that occur outside the Earth's atmosphere.

Dwarf Planet: A body that orbits the Sun, round in shape, has not cleared its orbit of debris, and is not a moon. Pluto, Ceres, Makemake, Eris, and Haumea are called this.

Earth: Third planet from the Sun and made out of rocks. It's our home planet.

Eclipse: the blocking out of light from one object by the intervention of another object. The most dramatic eclipses visible from the Earth are eclipses of the sun (when sunlight is blocked by the moon) and eclipses of the moon (when sunlight on its way to the moon is blocked by the Earth).

Galaxy: A very large group of stars orbiting a central point.

Gas: The atoms or molecules in gases are more widely spaced than in solids or liquids and suffer only occasional collisions with one another.

High Tide: The tide at its fullest, when the water reaches its highest level.

Jupiter: Fifth planet from the Sun and made out of gases. It's the largest planet in our Solar System.

Light Year: The distance traveled by light in a year (over five trillion miles).

Low Tide: The lowest level of the tide.

Mars: Fourth planet from the Sun and made out of rocks. Also known as the "Red Planet".

Mercury: Closest planet to the Sun and made out of rocks. It's the smallest planet.

Milky Way: The galaxy that contains our Solar System and every star you can see.

Moon: A natural satellite orbiting a planet.

Nebula: A diffuse mass of interstellar dust, gas, or both visible as bright patches or areas of darkness depending on the way the mass absorbs or reflects radiation.

Neptune: Eighth planet from the Sun and made of gases.

Orbit: The path of one object as it moves around another.

Planet: A body that is in orbit around the Sun, is round in shape, and has cleared its orbit of debris.

Revolution: Orbital motion about a point, especially as distinguished from axial rotation.

Rocket: A vehicle or device propelled by one or more rocket engines, especially such a vehicle designed to travel through space.

Rotation: Turning around a central point.

Saturn: Sixth planet from the Sun and made of gases. Also known as the "Ringed Planet".

Season: One of the four natural divisions of the year, spring, summer, fall, and winter, in the North and South Temperate zones. Each season, beginning astronomically at an equinox or solstice, is characterized by specific meteorological or climatic conditions.

Shadow: Darkness that results from the blocking of light rays.

Space: The expanse in which the solar system, stars, and galaxies exist; the universe.

Spaceship: A vehicle intended to be launched into space.

Star: A ball of gases that glows and makes heat.

Sun: The "Star" of our Solar System; where most of our light and heat comes from.

Uranus: Seventh planet from the Sun and made of gases.

Venus: Second planet from the Sun and made of rocks.