



MOSH

MUSEUM OF SCIENCE & HISTORY

The Sky Tonight

Grades 1-12

OBJECTIVES

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

1. State that the Sun supplies heat and light energy to Earth.
2. State that the Sun is a star.
3. State that the appearance of sunrise and sunset is due to rotation of the Earth every 24 hours.
4. State that there are many objects (stars, planets, etc.) in the sky that is only visible at night.
5. State that the stars can appear to make patterns in the sky.
6. State that the light reflected by the Moon looks a little different every day but looks the same again after about 28 days.
7. State that in order to learn, it is important to observe the same things often and compare them.
8. State that most natural events occur in patterns.
9. Know to use the senses, tools, and instruments to obtain information from his or her surroundings.

CONCEPTS COVERED DURING THE PLANETARIUM VISIT

1. The Sun gives off light and heat.
 - a. The Sun is dangerous to look at.
 - b. The Sun is a star that is close by.
2. The Sun sets.
 - a. Earth's rotation causes the apparent motion of the Sun.
 - b. When the part of the Earth we are on rotates us away from the Sun, we experience night.
3. Night falls.
 - a. Stars appear (and maybe some planets and the Moon, depending on the current night sky).
 - b. The city lights prevent us from seeing all of the stars we should be able to see.
 - c. We "travel" out to the country side, where we can see many more stars.
4. Tour of the night sky.
 - a. The stars and constellations.
 - i. Some of the brighter or more interesting star patterns are pointed out.
 - ii. Tips are given out to help the students find these patterns on their own.
 - iii. Some stars are bigger, brighter, and hotter than our Sun, and some are smaller, dimmer and cooler.
 - b. The Moon
 - i. The Moon is Earth's closest neighbor in space.
 - ii. The Moon appears to change position and shape over time.
 - c. The Planets.
 - i. Show what Planets are visible that night, and where.
 - ii. The Planets do not remain in the same location in the sky, they move around.
 - iii. Take a close look at these Planets, as seen from telescopes/space probes.
 - d. The Milky Way
 - i. Band of dim light across the sky, really made up of very far away stars.
 - ii. The Milky Way is our own galaxy.
 - iii. The solar system is located 2/3 of the way out from the center of our galaxy. It is not located at the center of our galaxy.

PRE-VISIT ACTIVITIES

1. Discuss with students that groups of stars can be connected together to form pictures known as constellations (similar to connect-the-dots). Not every culture, or even person, sees the same pictures in the stars. Have students research which constellations different cultures created. Some culture to examine include: Greek, Roman, Norse, Native American, Chinese, etc. What stories went with the pictures? Why were these pictures/stories important to each culture?
2. Discuss with students that the Sun is a star. Have student's research facts about the Sun and other stars. Compare the Sun to other stars in our galaxy. How do they differ? How are they similar? How big is the Sun compared to other stars?
3. Discuss with students that the Moon looks different each night, and appears to change shape. Have them look for the Moon every night for 1-2 weeks and draw what they see. (**Important Note:** the Moon is often not visible until very late in the evening. This project should be started soon after the New Moon. Please call MOSH's Planetarium staff for observing opportunities and tips).
4. Discuss with students whether or not it is possible to see planets in the sky, and if so, what might they look like? How would you find them?

POST-VISIT ACTIVITIES

1. Using a basic, unlabeled star map, have the students draw their own constellations and make up stories about them.
2. Have the students make a scrap book of pictures and articles cut from newspapers and magazines about the Sun, Moon, planets and stars.
3. Ask the students to imagine taking a trip to the Moon or to another planet. Working in groups or individually, have them list some of the things they would want to take on their trip, and why.
4. To visualize how even though the stars all look smaller and dimmer than the Sun, they are not really necessarily so, have the students do the following: Working in pairs, have the students stand a few feet apart, facing each other. Ask them to hold out their hands so that their partner's head looks like it is between their thumb and forefinger. Now have the teams take a step away from each other and repeat. Keep this up for as long as space allows for or is practical, if outside. Ask the students if their partner's head appeared to be getting larger, smaller or staying the same. How big would the partner's head look from one mile away? One hundred miles away? One million miles away?



Sunshine State Standards Benchmarks

SC.K.N.1.5	Recognize that learning can come from careful observation.
SC.K.E.5.2	Recognize the repeating pattern of day and night.
SC.K.E.5.3	Recognize that the Sun can only be seen in the daytime.
SC.K.E.5.4	Observe that sometimes the Moon can be seen at night and sometimes during the day.
SC.K.E.5.6	Observe that some objects are far away and some are nearby as seen from Earth.
SC.K.P.12.1	Investigate that things move in different ways, such as fast, slow, etc.
SC.1.E.5.1	Observe and discuss that there are more stars in the sky than anyone can easily count and that they are not scattered evenly in the sky.
SC.1.E.5.2	Explore the Law of Gravity by demonstrating that Earth's gravity pulls any object on or near Earth toward it even though nothing is touching the object.
SC.1.E.5.3	Investigate how magnifiers make things appear bigger and help people see things they could not see without them.
SC.1.E.5.4	Identify the beneficial and harmful properties of the Sun.
SC.1.P.12.1	Demonstrate and describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.
SC.2.N.1.1	Raise questions about the natural world, investigate them in teams through free exploration and systematic observations, and generate appropriate explanations based on those explorations.
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.
SC.5.E.5.1	Recognize that a galaxy consists of gas, dust, and many stars, including any objects orbiting the stars. Identify our home galaxy as the Milky Way.
SC.5.E.5.2	Recognize the major common characteristics of all planets and compare/contrast the properties of inner and outer planets.
SC.5.E.5.3	Distinguish among the following objects of the Solar System -- Sun, planets, moons, asteroids, comets -- and identify Earth's position in it.
SC.8.E.5.1	Recognize that there are enormous distances between objects in space and apply our knowledge of light and space travel to understand this distance.
SC.8.E.5.2	Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars.
SC.8.E.5.3	Distinguish the hierarchical relationships between planets and other astronomical bodies relative to solar system, galaxy, and universe, including distance, size, and composition.
SC.8.E.5.4	Explore the Law of Universal Gravitation by explaining the role that gravity plays in the formation of planets, stars, and solar systems and in determining their motions.
SC.8.E.5.7	Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions.
SC.8.E.5.9	Explain the impact of objects in space on each other including: 1.the Sun on the Earth including seasons and gravitational attraction 2.the Moon on the Earth, including phases, tides, and eclipses, and the relative position of each body.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.



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SC.912.E.5.5	Explain the formation of planetary systems based on our knowledge of our Solar System and apply this knowledge to newly discovered planetary systems.
SC.912.E.5.6	Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.

VOCABULARY

Your class should be familiar with the following vocabulary words before their visit to the Planetarium.

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.

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.

Day: The time between sunrise and sunset.

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

Energy: The capacity to do work.

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

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

Light Pollution: Illumination of the night sky by electric lights, as in an urban area, that interferes with astronomical observation.

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 revolving around a planet.

Nighttime: The time between sunset and sunrise.

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.

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

Sky: The expanse of air over any given point on the earth.

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.

Sunrise: The event or time of the daily first appearance of the sun above the eastern horizon.

Sunset: The event or time of the daily disappearance of the sun below the western horizon.

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