

Planetarium Lessons for Other Groups

*Field trip programs are best described as live, multimedia **LESSONS** that are developed and taught by a certified science teacher. All lessons are aligned to the **Next Generation Science Standards (NGSS)** and created to be memorable experiences.*

Updated 8/2022

Grade Level	Lesson "Title" & Description	NGSS
PreSchool & Kindergarten	"Friendly Stars" is a friendly introduction to the sky for the youngest students. Students observe one 24 hour period during which they meet an animated Sun named Sol and the stars in the night sky. The engaging lesson has students draw, observe, sing, point, and more. Students learn how to differentiate between a star (a sphere that produces light and heat) and other things in the sky (weather, planets, moon, etc.). Students will identify constellations in the dome that could also be found in their own backyards.	K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface. 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.
First Grade	"Patterns" is a first grade lesson in which students observe and predict patterns in the planetarium's sky for one rotation of the Earth (24 hours). In the lesson, students will identify the sun, moon, stars, planets, and constellation patterns. For example, students will observe that objects rise in the east and set in the west. Students will also compare an object that produces light (stars) to an object that is visible due to the reflection of sunlight (moon, planets, etc.).	1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted. 1-ESS1-2 Make observations at different times of the year to relate the amount of daylight to the time of year. 1-PS4-2 Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.
Fifth Grade	"Stars" are explored in this fifth grade lesson using the current month's sky map. Students will learn how to use a sky map (constellations, stars, star brightness, directions, etc.). Then students will practice the skill using the planetarium's night sky. Students will observe the apparent changes in the sky are due to Earth's motions (rotate, revolve, & precession).	5-ESS1-1. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth. 5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Elementary (2nd - 5th)	“Light pollution” is wasteful artificial/human lighting that has negative impacts on ecosystems. Students will examine evidence of changes in animal behavior, habitats, and populations as a result of light pollution. Students will observe a dark sky without light pollution in the planetarium dome. Less than 10% of students have ever experienced seeing a dark sky. The planetarium’s dark sky is breathtakingly beautiful and looks so real that visitors need to be reminded.	3-LS2-1. Construct an argument that some animals form groups that help members survive. 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. 3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
Elementary (2nd - 5th)	“Earth’s Place in the Universe” is a lesson that targets the NGSS Earth and Space Science (ESS1) performance expectation with the same name. The sky is our view from Earth and our visible window of the universe. Students will identify visible objects in the sky including sun, moon, planets, stars, and Milky Way while observing a 24 hour period. Students will be able to explain how and why we see things in the sky as a result of our location on Earth. Students will be able to describe light pollution and our human impact on the night sky and environment.	1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted. 4-ESS3-1 Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. 5-ESS1-1 Support an argument that the apparent brightness of the sun and stars is due to their relative distances from the Earth.
Middle School	“Light” is a lesson that explores astronomy phenomena to explain the concept of light. Students will make observations and predictions to identify patterns of lunar phases, eclipses, and more. The lesson will include a brief overview of the electromagnetic spectrum.	MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
Middle School	“Solar Calendar” is a lesson in which a model of a solar calendar is created in the planetarium’s dome using the star projector. Students will make observations, predictions, and analyze data graphically to arrive at the conclusion that the seasons are a result of earth’s tilt. Changing the latitude using the star projector provides a unique opportunity for students to observe	MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

	the sky at different locations on the Earth. Students will make connections between latitude and light intensity, temperature, visible constellations, altitude of the Sun, and seasons.	
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