# Customize Your STARLAB Program

# Planning Your School Program

One STARLAB session generally lasts 60-90 minutes and can accommodate up to 50 students. You can customize your program by selecting one Starlab Dome (SD) lesson and one Outside the Dome (OD) lesson for each session. All STARLAB lessons are written to align with National Science Education Standards. Each lesson also has extendable applied math components. To discuss details, including pre- and post-visit activities, please call us at call 985-545-1500.

# Starlab Dome Lesson Options

*Start by selecting one SD lesson per session. Then select any OD lesson to pair with it.*

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| Inside the STARLAB Dome (SD) lessons | Outside the STARLAB Dome (OD) lessons |
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| **(SD1) Night and Day** | **(OD1) Sunlight Signatures** |
| **(SD2) Moon Phases** | **(OD2) Impact Craters** |
| **(SD3) Finding Your Way Around the Sky** | **(OD3) Drawing Orbits** |
| **(SD4) Constellations and Star Lore** |  |
| **(SD5) Seasonal Change** |  |
| **(SD6) Solar and Lunar Eclipses** |  |
| **(SD7) Overview of the Solar System** |  |
| **(SD8) The Motion of the Planets** |  |
| **(SD9) Meteors, Asteroids and Comets** |  |
| **(SD10) A Calendar in the Stars** |  |
| **(SD11) Properties and Life Cycles of Stars** |  |
| **(SD12) The Milky Way Galaxy** |  |
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*Where LA Student Science Standards are addressed, they are listed in green. All lessons are adaptable to various grade levels.*

1. **(SD1) Night and Day** – introduces students to the concept of Earth rotation by having them relate observed changes in day and night from here on Earth with a view of Earth rotating in space.

**LA Student Science Standards:**

**K-PS3-1** Make observations to determine the effect of sunlight on Earth’s surface.

 **1-PS4-2** Make observations to construct an evidence-based account that objects can be

 seen only when illuminated.

**1-PS4-3** Plan and conduct an investigation to determine the effect of placing objects

 made with different materials in the path of a beam of light.

**1-ESS1-1** Use observations of the sun, moon, and stars to describe patterns that can be

 predicted.

 **3-PS2-2** Make observations and/or measurements of an object’s motion to provide

 evidence that a pattern can be used to predict future motion.

1. **(SD2) Moon Phases** – introduces students to the concept of Moon phases and cyclic change.

**LA Student Science Standards:**

**6-MS-ESS1-1** Develop and use a model of the Earth-sun-moon system to describe the

 reoccurring patterns of lunar phases, eclipses of the sun and moon, and

 seasons.

1. **(SD3) Finding Your Way Around the Sky** – introduces students to the basic reference points in the night sky and how to use the stars to find a location on Earth (celestial navigation).
2. **(SD4) Constellations and Star Lore –** introduces students to some of the more famous Greek constellations and the myths that go with them.

**LA Student Science Standards:**

**ELA Grade 3** Anchor Standard RL 2: Recount stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text.

ELA Grade 7 Analyze how visual and multimedia elements contribute to the meaning, tone, or aesthetics of a text (e.g., graphic novel, multimedia presentation of fiction, folktale, myth, poem).

1. **(SD5) Seasonal Change** – introduces students to the observational evidence that explains the true reason that we have seasons on Earth.

**LA Student Science Standards:**

**1-ESS1-2** Make observations at different times of year to relate the amount of daylight to

the time of year.

**6-MS-ESS1-1** Develop and use a model of the Earth-sun-moon system to describe the

 reoccurring patterns of lunar phases, eclipses of the sun and moon, and

 seasons.

1. **(SD6) Solar and Lunar Eclipses** – introduces students to the concept of why and when we see eclipses from Earth.

**LA Student Science Standards:**

**1-ESS1-2** Make observations at different times of year to relate the amount of daylight to

the time of year.

**6-MS-ESS1-1** Develop and use a model of the Earth-sun-moon system to describe the

 reoccurring patterns of lunar phases, eclipses of the sun and moon, and

 seasons.

1. **(SD7) Overview of the Solar System (this lesson is longer and can be split into two lessons) –**

introduces students to some of the characteristics of the known planets in the solar system.

**LA Student Science Standards:**

**6-MS-PS2-4** Construct and present arguments using evidence to support the claim that

 gravitational interactions are attractive and depend on the masses of interacting

 objects.

**6-MS-PS2-5** Conduct an investigation and evaluate the experimental design to provide

 evidence that fields exist between objects exerting forces on each other even

 though the objects are not in contact.

**6-MS-ESS1-2** Use a model to describe the role of gravity in the motions within galaxies and

 the solar system.

**6-MS-ESS1-3** Analyze and interpret data to determine scale properties of objects in the solar

 system.

**HS-ESS1-6** Apply scientific reasoning and evidence from ancient Earth materials,

 meteorites, and other planetary surfaces to construct an account of Earth’s

 formation and early history.

1. **(SD8) The Motion of the Planets –** introduces students to the motion of the planets in the solar system as they appear from Earth. In addition, it traces the development of both the geocentric (Earth- centered) and heliocentric (Sun-centered) models of the solar system.

**LA Student Science Standards:**

**6-MS-PS3-1** Construct and interpret graphical displays of data to describe the relationships

 of kinetic energy to the mass of an object and to the speed of an object.

**6-MS-ESS1-2** Use a model to describe the role of gravity in the motions within galaxies and

 the solar system.

**HS-ESS1-4** Use mathematical or computational representations to predict the motion of

 orbiting objects in the solar system.

**HS-PS2-1** Analyze data to support the claim that Newton’s second law of motion describes

 the mathematical relationship among the net force on a macroscopic object, its

 mass, and its acceleration.

**HS-PS2-4** Use mathematical representations of Newton’s Law of Gravitation and

 Coulomb’s Law to describe and predict the gravitational and electrostatic forces

 between objects.

1. **(SD9) Meteors, Asteroids and Comets –** introduces students to the composition, location and motion of meteors, asteroids and comets as they appear in the night sky.

**LA Student Science Standards:**

**6-MS-ESS1-2** Use a model to describe the role of gravity in the motions within galaxies and

the solar system.

**HS-PS2-1** Analyze data to support the claim that Newton’s second law of motion describes

 the mathematical relationship among the net force on a macroscopic object, its

 mass, and its acceleration.

1. **(SD10) A Calendar in the Stars – Seasonal Constellations –** introduces students to the zodiac and how the constellations can be used to predict the change of season.

**LA Student Science Standards:**

**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.

1. **(SD11) Properties and Life Cycles of Stars –** introduces students to the properties of stars, the Hertzsprung-Russell diagram and how stars change over time.

**LA Student Science Standards:**

**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.

**HS-ESS1-1** Develop a model based on evidence to illustrate the life space of the sun and

the role of nuclear fusion in the sun’s core to release energy that eventually

 reaches Earth in the form of radiation.

**HS-ESS1-2** Construct an explanation of the Big Bang theory based on astronomical

evidence of light spectra, motion of distant galaxies, and composition of matter

 in the universe.

**HS-ESS1-3** Communicate scientific ideas about the way stars, over their life cycle, produce

 elements.

**HS-PS1-8** Develop models to illustrate the changes in the composition of the nucleus of

 the atom and the energy released during the processes of fission, fusion, and

 radioactive decay.

1. **(SD12) The Milky Way Galaxy –** introduces students to the size and shape of the Milky Way galaxy.

**LA Student Science Standards:**

**6-MS-ESS1-2** Use a model to describe the role of gravity in the motions within galaxies and

the solar system.

# Outside the Dome Options

*For each session, pair one of these with the SD lesson of your choice.*

1. **(OD1) Sunlight Signatures –** introduces students to rainbows, the solar spectrum and absorption spectroscopy.

**LA Student Science Standards:**

**HS-PS4-1** Use mathematical representations to support a claim regarding relationships

 among the frequency, wavelength, and speed of waves traveling in various

 media.

**HS-PS4-3** Evaluate the claims, evidence, and reasoning behind the idea that

 electromagnetic radiation can be described either by a wave model or a particle

 model, and that for some situations one model is more useful than the other.

1. **(OD2) Impact Craters –** introduces students to orbital and projectile motion, lunar impact crater formation and forms of measurement.

**LA Student Science Standards:**

**8-MS-ESS2-2** Construct an explanation based on evidence for how geoscience processes have

 changed Earth’s surface at varying time and spatial scales.

**8-MS-ESS3-2** Analyze and interpret data on natural hazards to forecast future catastrophic

 events and inform the development of technologies to mitigate their effects.

**HS-PS2-1** Analyze data to support the claim that Newton’s second law of motion describes

 the mathematical relationship among the net force on a macroscopic object, its

 mass, and its acceleration.

1. **(OD3) Drawing Orbits –** introduces students to orbital shapes.

**LA Student Science Standards:**

**Algebra II (A2)** Interpret expressions for functions in terms of the situation they model.