NEW STARLAB

inspiring creative learning
THE RESOURCE CENTER

**When:**
Classes are scheduled for Fall and Spring; please check your work email for updates.

**Time:**
4:00pm to 5:45pm
Wear comfortable clothing!

**Where:**
*Grand Theatre*
7 N. Wall St.
Cartersville GA 30120

**Register:**
770.387.1103
or
info@bartowtrc.org

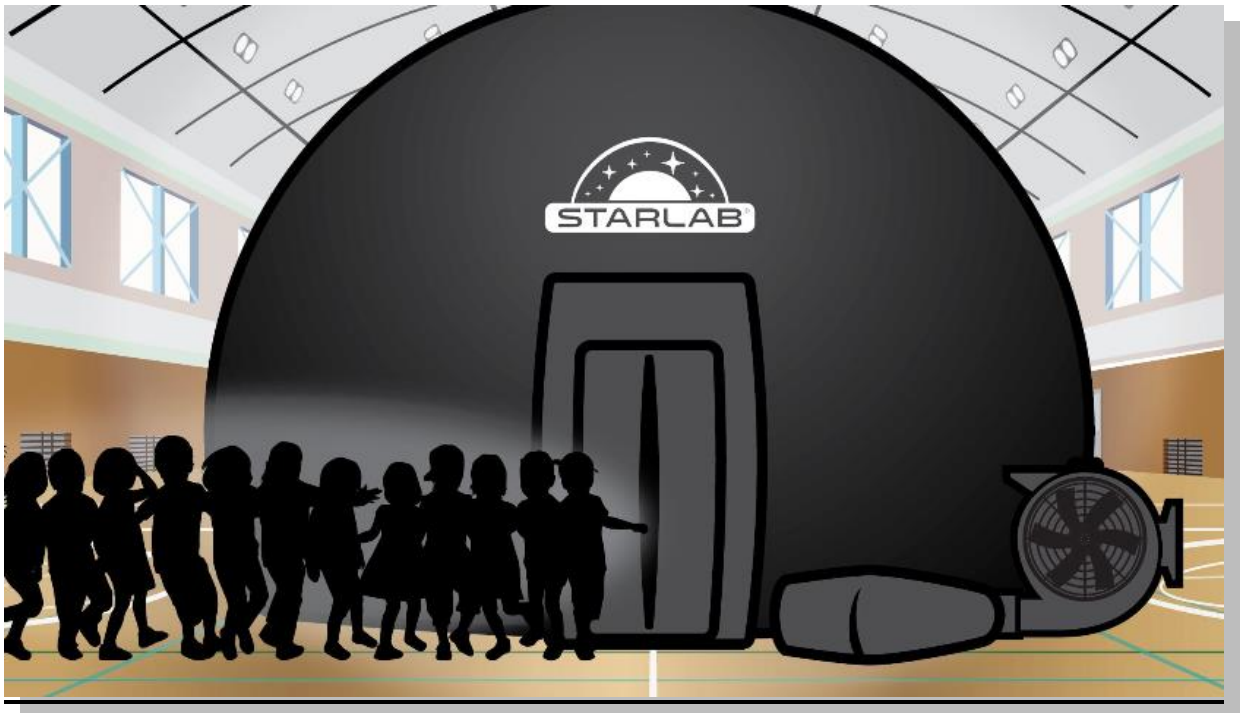
**Cost:** NONE!

Give Your Students a Memory That Will Last a Lifetime

You're teaching, they're engaged.

| **Starry Night** | **Layered Earth** | **and more…** |
|---|---|---|
| Explore the wonders of the universe with a curriculum that spans the solar system, galaxies, dark matter, planets, stars, and more. | With interactive activities and lessons designed to spark discussions, you'll be more effective in teaching lessons in meteorology, geology, and geography. | ▪ Biological Cell<br>▪ North American Constellations / Native American Mythology<br>▪ Ocean Currents<br>▪ Plate Tectonic<br>▪ Weather<br>▪ FULL DOME YouTube shows |

All training participants will receive a letter of completion; your administrator will determine if the credit is applicable to your certification.




Participants with physical limitations may enter through the side of the dome, rather than the doorway.  e.g. crutches, wheelchairs

# StarLab Planetarium Checklist

Teacher*_____

**This teacher has been trained and is responsible for the care and return of the StarLab*

School_____

Email _____

Reserved for Checkout: Date/Time _____

PICK UP Date/Time:_____

RETURN Date/Time:_____

## Please initial that you are receiving/returning the following items:

| | CHECK OUT | CHECK IN |
|---|---|---|
| Dome in bag | | |
| Blower | | |
| Projector Case | | |
| Extension Cord | | |
| The following items are stored in the projector case cubby:<br>☐ Computer<br>☐ Computer power cord<br>☐ Speaker<br>☐ Speaker power cord<br>☐ Projector remote<br>☐ Projector power cord<br>☐ HDMI cable<br>☐ Light feature | | |

Please update us so the next educator has an easy set-up

1. Did any equipment malfunction? Please explain.

2. Does anything need attention or repair?

# Layered Earth - Lessons

A. Solid Earth

- Earth as a System
- Earth's Layered Structure
- Oceans & Continents

B. Plate Tectonics

- Continental Drift
- Seafloor Spreading and Paleomagnetism
- The Theory of Plate Tectonics

C. Minerals and Rocks

- Minerals: Building Blocks of Rocks
- The Rock Cycle
- Igneous, Sedimentary, and Metamorphic Rocks
- Weathering and Soil Formation

D. Shaping the Earth

- Shaping Earth's Surface
- Mass Movement
- Water and Ice Landforms
- Wind Landforms

E. Earthquakes

- Earthquakes and Faults
- Earthquakes and Waves
- The Strength of Earthquakes
- Seismic Waves and the Earth's Interior
- Living with Earthquakes

F. Volcanoes

- Formation of Volcanoes
- Types of Volcanoes
- Living with Volcanoes

G. Geologic Time

- Age of the Earth
- The Geologic Timescale
- Catastrophic Events and Mass Extinctions
- Earth's Future

Teachable Moments Lesson(s)

- Lesson Plan with Guiding Question
- Learning Objectives
- Custom globe datasets to tell the story of the earthquake and tsunami (Honshu)
- Activity – calculating the Epicenter of the Earthquake
- Before and after satellite images of the earthquake and tsunami
- Interactive animations that explain how a tsunami is generated and how an earthquake occurs along a fault.

Comprehensive Custom datasets include:

- Earthquake location and aftershocks
- Plate boundaries near Japan
- Earthquake shaking intensity map
- Tsunami warning map along Japan's coast
- Tsunami wave height map
- Tsunami Time Travel

# Starry Night Elementary / Lessons Plans at a Glance

**Section I: Grades K-2 Sky Ranger Adventures**

- Lesson One: Day and Night
- Lesson Two: How Big is it?
- Lesson Three: Motion in the Sky
- Lesson Four: The Moon
- Classroom - Culminating Activity

**Section II: Grades 3-4**

- Lesson One: Our Solar System
- Lesson Two: The Seasons
- Lesson Three: The Constellations
- Classroom – Culminating Activity

**Section III: Resources**

- Using Starry Night Elementary
- Formative Assessment Tools
- Rubrics
- Graphic Organizers for Classroom Experiments
- Log Sheets
- K-W-L Chart
- Idea Diagram: Our Sun
- Idea Diagram: Constellations
- Photocopy Masters: Day and Night Icons
- Foldables:
- One: Star
- Two: Solar System
- Three: Seasons Tab Booklet
- Four: Constellations Folio
- Solar System Fun Facts Cards

# Starry Night Middle School / Lessons Plans at a Glance

**A. Earth, Moon, and Sun**

- A1 Day and Night Cycle (20-40 minutes)
- A2 The Year and Seasons (40-50 minutes Add 10 mins for extensions)
- A3 The Moon (30-50 minutes Add 10 mins for extensions)
- A4 Phases of the Moon (40-50 minutes Add 10 mins for extensions)
- A5 Eclipses (30-50 minutes)

**B. The Solar System**

- B1 Overview of the Solar System (15-30 minutes)
- B2 Size and Scale of the Solar System (40 minutes to 50 minutes Add 10 mins for extensions)

**C. The Planets**

- C1 The Inner and Outer Planets of the Solar System (20-40 minutes)
- C2 Motion of the Planets (20-50 minutes Add 10 mins for extensions)
- C3 The Moons of the Planets (15-20 minutes)
- C4 Pluto as a Dwarf Planet (40-50 minutes over 2-3 class periods)

**D. Asteroids, Comets and Meteors**

- D1 Asteroids and the Main Belt (40-50 minutes Add 10 mins for extensions)
- D2 Comets and Meteors (45-50 minutes Add 10 mins for extensions)
- D3 Impact: Near Earth Objects (35-40 minutes)

**E. Star Finding and Constellations**

- E1 Finding Your Way Around the Sky (15-45 minutes)
- E2 Constellations and Star Lore (45-50 minutes Add 10 mins for extensions)
- E3 Seasonal Constellations (35-45 minutes)
- E4 The Zodiac & Astronomy's Astrological Roots (45-50 minutes over 2 class periods)

**F. The Sun as a Star**

- F1 The Sun as a Source of Energy (45-50 minutes Add 10 mins for extensions)
- F2 Solar Weather (25-30 minutes)
- F3 The Formation of the Sun and Solar System (25 minutes)

**G. The Stars**

- G1 The Solar Neighborhood (40-50 minutes Add 10 mins for extensions)
- G2 The Stars (45-50 minutes Add 10 mins for extensions)
- G3 Black Holes (45-50 minutes Add 10 mins for extensions)

**H. Galaxies & the Universe**

- H1 The Milky Way Galaxy (45-50 minutes. Add 10 mins for extensions)
- H2 The Universe (45-50 minutes, add 10 mins/ Add 10 min for extensions)

**I. Space Exploration and Technology**

- I1 Artificial Satellites and the Space Environment (50 minutes over 2-3 class periods)
- I2 Great Explorations in the Solar System (50 minutes over 2 class periods)

(Times indicated include both classroom activities and computer exercises)

# Starry Night High School / Lessons Plans at a Glance

**A - Earth, Moon and Sun**

- A1: Day and Night Cycle
- A2: The Year and Seasons
- A3: The Moon
- A4: Phases of the Moon
- A5: Eclipses

**B - Solar System**

- B1: Overview of the Solar System
- B2: Size and Scale of the Solar System

**C - The Planets**

- C1: The Inner and Outer Planets of the Solar System
- C2: Motion of the Planets
- C3: The Moons of the Planets
- C4: Pluto as a Dwarf Planet

**D - Small Solar System Bodies**

- D1: Asteroids of the Main Belt
- D2: Comets and Meteors
- D3: Impact: Near Earth Objects

**E - Star Finding and Constellations**

- E1: Finding Your Way Around the Sky
- E2: Constellations and Star Lore
- E3: Seasonal Constellations
- E4: The Zodiac and Astronomy's Astrological Roots

**F - The Sun as a Star**

- F1: The Sun as a Source of Energy
- F2: Solar Weather
- F3: The Formation of the Sun and Solar System

**G - The Stars**

- G1: The Solar Neighborhood
- G2: The Stars and the HR Diagram
- G3: Black Holes

**H - Galaxies and the Universe**

- H1: The Milky Way Galaxy
- H2: The Universe
- H3: The Origin and Evolution of the Universe

**I - Space Exploration and Technology**

- I1: Artificial Satellites and the Space Environment
- I2: Great Explorations in the Solar System
  - Part 1 -The Early Years: Pioneer and Voyager spacecraft
  - Part 2 - Lord of the Rings: Cassini and Huygens at Saturn
- I3: Space Exploration

Artificial Satellites & the Space Environment

Great Explorations

Tools of the Astronomer

**The Life Cycle of Stars / Stellar Evolution**

1. Setting the Stage – **Star Beginnings**
   - A. Interstellar medium
   - B. Protostars
2. **Star Birth**
   - A. Ignition – nuclear fusion
   - B. Stellar equilibrium and the main sequence
   - C. Brown dwarf
3. **The Life of Low Mass Stars**
   - A. Protostar à red dwarf
   - B. White dwarf à black dwarf
4. **The Life of Sun-Like (Medium Mass) Stars**
   - A. Protostar à Sun-like star
   - B. Red giant
   - C. Planetary nebula
   - D. White dwarf à black dwarf
5. **The Life of High Mass Stars**
   - A. Protostar à supergiant
   - B. Supernova
   - C. Neutron star
   - D. Black hole
6. **Black Holes**
   - A. Cygnus X-1
   - B. Event horizon / Schwartzschild radius
   - C. Our very own black hole
   - D. Quasars

**Exoplanets**

- 1: What Is an Exoplanet?
- 2: Detecting Exoplanets I – Radial Velocity
- 3: Detecting Exoplanets II – Transit Photometry
- 4: Detecting Exoplanets III – Direct Imaging
- 5: Detecting Exoplanets IV – Gravitational Microlensing
- 6: The Habitable Zone I – Temperatures of Exoplanets
- 7: The Habitable Zone II – Habitable Zones and Stellar Luminosity
- 8: Properties of Exoplanets – Exoplanet Classification

# What is the STARLAB?

The Star Lab is an inflatable, portable planetarium. In the dome, you have a unique opportunity to view world knowledge that includes astronomy, geology, physical geography, and more. With the Star Lab, educators can be confident the curriculum they're presenting meets current Next Generation Science Standards. To expand the experience, search **FULL DOME** through YouTube to cover additional topics.

https://youtu.be/OnAdRAMdM5w planetarium overview

https://www.youtube.com/watch?v=fwfky2lFXlU 3min / navigation of lessons for teachers

https://www.youtube.com/watch?v=QUS_A9l67LI 8min / navigation of lessons for teachers

https://www.youtube.com/watch?v=fwfky2lFXlU Earthquakes effect on society 1:20 min / 3:56 math link

**FULL DOME YOUTUBE: available for free**

https://www.youtube.com/watch?v=h0IEOaXV7Wg FullDome Beagle Cell Natural Selection 2:51 min

https://youtu.be/rDo2vRvMPDU?feature=shared CYCLE Time-lapse video / The video is composed from 10,000 HiRes still photographs

https://youtu.be/OUcv3ORj2jc?feature=shared 30:00 min ESO "From Earth to the Universe" / To learn about this journey of celestial discovery, from the theories of the ancient Greek astronomers to today's grandest telescopes, we invite you to experience From Earth to the Universe. / / Earth's violent history, impacts from comets and asteroids

https://youtu.be/G_ax6bjZexE 26:35 min SEE! Retina / Biology

https://www.fddb.org/fulldome-shows/dark-side-of-light/ Dark Side of Light / 21:23 min / sign into FDDB.org / free / A free full dome show about the importance of the natural darkness.

https://youtu.be/rDo2vRvMPDU?feature=shared 6:44 min / The video is composed from 10,000 HiRes still photographs and is intended to be seen in a Fulldome theater. Music is from the ElderFlux project and is mixed in surround sound for the theater. Much thanks to Toshi Hoo and Jason Fletcher for their help on this.

https://youtu.be/T0iFEZSutrY?feature=shared 14:35 Billy Goat Trail - full dome test shots pf planetarium / no sound

https://youtu.be/4FLqjbfFmSc?feature=shared 1:52 min Fulldome Motion Control Time-Lapse - Glienicker Bridge

Catalogue of Full Dome Shows: https://www.brnoplanetarium.com/

https://youtu.be/uYBvjduyJtM?si=7TwXtpRaBPRxdR7R Can you be an Astronaut? 14:00

https://youtu.be/mlsEyzvub3A?si=wn4YTUdXTdEIl5vs Sky on Fire 22:50 min Around the world, fireworks are watched by hundreds of thousands, even millions, of people, who most likely do not realize, they are partaking in the celebration of one of the oldest and most important discoveries of all time - the taming of fire by man.

https://youtu.be/hLMYRT9SIwo?si=i-hCN9JZ4Xu4PqjR 39:40 min AMAZING PLANETS

https://youtu.be/smT3YrSW_jA?si=eYu3QvNYCkB_2qBZ 25:00 min

The show is a unique combination of hand-made puppets and virtual CGI world, which will take you to a dream world of a forgotten spaceport. And with a blink of an eye, you will find yourself in space!

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links to the NGSS teaching standards:

https://www.starrynighteducation.com/products-astronomy-education-correlations.html

https://layeredearth.com/resources-layered-earth-education-national-state-correlations.html