

Teacher Idea Kit for

Virginia Skies

**A Space Science Program
For Grades K-12**

Presented by

ABBITT
PLANETARIUM



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Virginia Skies

Suggested for Grades K-12

Objectives

After visiting the planetarium for *Virginia Skies*, the student should be able to:

1. Recognize, point out, and name one major constellation.
2. Recognize, point out, and name one bright star.
3. Describe the manner in which most of the constellations were named.

State Standards of Learning Objectives

This planetarium presentation meets the following Virginia State SOL's:

SOLs covered by this program will vary considerably due to the changing nature of this live program. **If certain SOLs are desired, please contact the Virginia Living Museum BEFORE the day of your visit.**

Vocabulary

- pattern: A recognizable configuration or grouping.
- myth: A story told by early cultures to explain natural phenomena.
- star: A luminous body made mostly of hydrogen which produces energy by fusing hydrogen into helium.
- constellation: One of 88 recognized star groupings which divide up the sky.
- asterism: A recognizable pattern of stars in the sky which is not one of the 88 officially recognized constellations.
- planet: A large nonluminous body orbiting a central star.
- sun: A star with a family of planets.
- moon: A small, nonluminous, natural body in orbit around a planet.
- planetarium: A projector designed to show the night sky on a dome shaped projection screen.

Background Material for Virginia Skies

Since the beginning of history, people have had a close relationship with the skies overhead. They served as clock and calendar; by observing the movements of the sun, moon, stars and planets, people of ancient times knew when to plant, when to harvest, and when to celebrate. They served as entertainment; lacking the books and television we have today, early people found stories in the patterns they saw in the stars at night. Objects in the night sky served as gods and heroes; the wandering planets were seen by the Greeks as their pantheon of gods, and groupings of stars, today called constellations, were thought to be beasts and heroes placed in the sky by those gods. Ancient people built buildings, such as the pyramids of the Incas and Egyptians, or the circle stones of Stonehenge, in order to better track the movements of celestial objects. And no king or emperor would dream of ruling without the advice of several Royal Astronomers.

In modern times, our technological advances have replaced many of the functions once performed by celestial objects. And yet, on a clear night, many people still feel drawn to observe the sky, even as their ancestors did. Professional astronomers now have highly sophisticated telescopes and satellites with which to explore the farthest reaches of the universe. However, the backyard astronomer can enjoy the sky with little more than a pair of binoculars, or even the naked eye.

In this program, the student will learn the basics of viewing the sky, and find out what constellations and planets are currently visible. The names and locations of several bright stars and constellations will be discussed, and identified for the students on the planetarium dome. In addition, students will learn how to use the sky to navigate, just as early mariners did, by locating the North Star. This live program can be made appropriate for any age group, and includes many exciting aspects such as the telling of myths surrounding the constellations, and the use of a variety of images to show close-up views of planets and other celestial wonders.

Concepts Covered During the Planetarium Visit

1. Most of the constellations we know today came to us from the Ancient Greeks through the Romans. However, many other peoples saw patterns in the sky as well. Today, astronomers have established 88 "official" constellations. All other star patterns are called asterisms.

2. Many constellations are easily visible in the night sky in Hampton Roads.

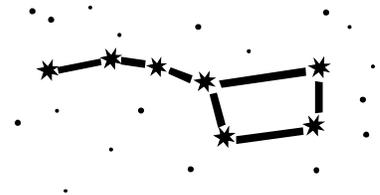
Ursa Major and Ursa Minor (most prominent in spring)

Ursa Major means the Great Bear

Ursa Minor means the Little Bear

Within these constellations are the asterisms the
Big and Little Dippers

The North Star is part of The Little Bear.



Orion the Hunter (winter)



This constellation contains the bright star Betelgeuse

Betelgeuse comes from ancient Arabic, meaning

"armpit of the Great One"

It also contains the Orion Nebula, a region of active star
formation

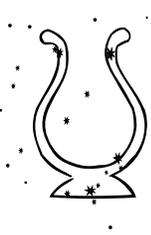
Leo the Lion (spring)

One of the 12 zodiacal constellations

The bright star Regulus represents the lion's heart



The Summer Triangle (autumn)



This asterism contains stars from three different constellations

Deneb is part of Cygnus the Swan

Altair is part of Aquila the Eagle

Vega is part of Lyra the Harp

In 12,000 years, Vega will be the North Star



Andromeda the Princess (autumn)



Contains the star Alpheratz, which is also part of Pegasus the Flying Horse

Part of a myth encompassing 5 constellations: Cassiopeia, Cepheus,

Andromeda, Perseus, and Pegasus

3. Many other objects can be seen in the night sky, such as planets, nebulae, galaxies, and the Moon.

Pre-Visit Activities

We recommend that you conduct at least one of these activities with the class before your visit to the planetarium theater. Be sure to raise questions that can be left unanswered until the groups attends the program.

1. Hand out to the students a page of random dots and have them "connect the dots" to form a person or object. Since there are no numbers to follow, the students must use their imaginations to find a picture. When the pictures are complete, select several and place them on the wall together. Try to develop a story that goes with the pictures. This is similar to the way the constellations were developed.

2. Play two variations on a "story in the round" game. Have one student start a story about a fairly common subject, such a trip to the zoo. After a few minutes, have the next student in the circle continue the story, adding their own touches. Continue through the rest of the students. Encourage them to become more and more elaborate in their telling of the story. Alternatively, have the students play "telephone". Give the first student a simple phrase like "Yellow ducks run through puddles in the rain." The students must then whisper the phrase in the ear of the student to their right, moving all the way around the circle as quickly as possible. Have the last student say the phrase out loud. These games demonstrate the changes and embellishments in stories told over and over.

3. Have the students observe the night sky, and discuss their observations in class. Sketching the sky as they see it may prove helpful. Discuss the various objects appearing in the sky, such as planets, stars, galaxies and nebulae.

4. For a more extended project, have the students observe the moon once a week for a month. Discuss the changes in the moon and what they might mean.

5. You may wish to discuss some well-known star clusters or asterisms with the class before your visit. Several common ones are listed below.

- Milky Way: A band of fuzzy light passing across the sky. This band is the light of billions of stars in one arm of our Milky Way galaxy.
- Seven Sisters: An open cluster of stars of which only seven are visible to the naked eye; thus the name Seven Sisters.
- Little Dipper: An asterism seen in the northern part of the sky in the vicinity of Ursa Minor. The end of the handle of the Little Dipper is the North Star.
- Summer Triangle: An asterism composed of three stars, it is first visible towards the end of summer.
- Big Dipper: An asterism located in the northern part of the sky in the vicinity of Ursa Major. The pointer stars of the Big Dipper point the way to Polaris.

6. You may wish to discuss some of the brighter stars with your class. If you wish to do some observing to try to locate these stars, call the Abbitt Planetarium at 595-1900 for optimal viewing times and to find out which of these stars are visible in the current night sky.

- Procyon: A bright star in the constellation Canis Minor.
- North Star: The name of the star at the end of the Little Dipper. It is the only star that does not appear to move during the night, since it is located close to the line of Earth's axis projected into space.
- Polaris: Another name for the North Star.
- Vega: One of the three stars of the Summer Triangle; it is located in the constellation Lyra the harp.
- Altair: One of the three stars of the Summer Triangle; it is located in the constellation Aquila the eagle.
- Deneb: One of the three stars of the Summer Triangle; it is located in the constellation Cygnus the swan.
- Arcturus: A bright red giant star in the constellation Bootes the herdsman. It can be located by following the arc of the handle of the Big Dipper.
- Spica: A bright star in the constellation Virgo. It can be located by following the arc of the handle of the Big Dipper, then speeding past Arcturus to Spica.
- Aldebaran: A bright star in the constellation Taurus. It represents the bull's red right eye.
- Rigel: A bright star in the constellation Orion. It represents Orion's left foot.
- Betelgeuse: A bright star in the constellation Orion. It represents Orion's right shoulder.

Sirius:	A bright star in the constellation Canis Major. It is the brightest star in the nighttime sky.
Regulus:	A bright star in the constellation Leo. It marks the lion's heart.
North:	One of the four compass directions. If you are facing the North Star, you are facing North.
South:	One of the four compass directions. If you are facing the North Star, South is behind you.
East:	One of the four compass directions. If you are facing the North Star, East is to your right.
West:	One of the four compass directions. If you are facing the North Star, West is to your left.

7. You may wish to discuss with your class the ancient Greeks and their mythology. Their myths are the basis for many of the constellations we know today. If you wish to locate some of these constellations during nighttime viewing sessions, call the number above for optimal viewing times.

Orion:	A constellation depicting a hunter; it is prominent in our winter sky.
Pegasus:	A constellation depicting a flying horse; it consists mainly of a large square.
Cassiopeia:	A constellation depicting an ancient queen of Ethiopia; it appears as a letter W.
Cephus:	A constellation depicting an ancient king of Ethiopia; it has the shape of a house.
Andromeda:	A constellation depicting an ancient princess of Ethiopia; it appears as a large, curvy letter A.
Perseus:	A constellation depicting a legendary Greek hero.
Ursa Major:	A constellation depicting a large bear. It includes the stars that form the Big Dipper.
Ursa Minor:	A constellation depicting a small bear. It includes the stars of the Little Dipper.

8. Discuss with your students the Zodiac. Discuss the difference between the astronomical significance of the Zodiac and the astrological significance.

Zodiac:	The band of 12 constellations through which the Sun seems to pass in our sky during the course of a year.
Libra:	The scales; one of the 12 zodiacal constellations.
Pisces:	The fish; one of the 12 zodiacal constellations.
Aries:	The ram, one of the 12 zodiacal constellations.
Taurus:	The bull, one of the 12 zodiacal constellations.
Gemini:	The twins; one of the 12 zodiacal constellations.
Cancer:	The crab; one of the 12 zodiacal constellations.
Leo:	The lion; one of the 12 zodiacal constellations.
Virgo:	The virgin; one of the 12 zodiacal constellations.
Scorpius:	The scorpion; one of the 12 zodiacal constellations.

Sagittarius: The archer; one of the 12 zodiacal constellations.
Capricornus: The mer-goat; one of the 12 zodiacal constellations.
Aquarius: The Water Bearer; one of the 12 zodiacal constellations

Post-Visit Activities

We recommend that you conduct at least one of these activities with your class following their visit to the planetarium theater.

1. Have them draw pictures of a constellation they saw in the planetarium. See if they can find another object that the constellation looks like.
2. Read about some American myths (Paul Bunyon, Casey Jones, etc.). See if patterns can be found in the stars to go with these myths.
3. Visit a library to find books on constellations stories, astronomy, etc.
4. Have an "Observation Month". Every clear night for a month, the students should go outside and sketch the sky at the same time each night. Discuss the changes that occur over the course of a month.
5. If a planet is currently in the sky, have your students observe its position relative to the background stars over the course of a month. Some planets may appear to move backwards, undergoing retrograde motion for part of the month. This is a visual artifact of the fact that we move faster in our orbit than the outer planets do - planets do not actually move backwards.
6. Read about the way various ancient cultures lived, and how their sky mythologies reflected their culture and beliefs.

Notes

The constellations discussed in this program will vary according to the season of your visit. It is not possible to cover all four seasons during the 45-minute presentation. Key constellations are discussed in this guide, however, final selection of the constellations presented rests with the astronomy staff member who actually performs your program. Please note that this guide covers all ages; be selective when choosing pre- and post-visit activities.

If there are specific topics you wish to have covered during your program, you must contact the Abbitt Planetarium prior to your visit. It is also helpful if the teachers accompanying your children speak briefly about the topics desired with the instructor just prior to entering the theater.

Recommended Books and Web Sites

Astronomy edited by James B. Kaler, Harper Collins College Publishers, New York.

Astronomy Clubs in Virginia: <http://www.astronomyclubs.com/state/Virginia>

Observer's Handbook edited by Roy L. Bishop, The University of Toronto Press Inc., Ontario.

NASA: <http://www.nasa.gov/>

The Beginner's Observing Guide by Leo Enright, The University of Toronto Press, Inc., Ontario.

Earth Images: <http://www.jpl.nasa.gov/news/news.php?release=2013-229>

Burnham's Celestial Handbook (in 3 volumes) by Robert Burnham Jr., General Publishing Co., Blacksburg.

Interactive Mars Map: <http://marsoweb.nas.nasa.gov/globalData/>

The New Patterns in the Sky by Julius Staal, The McDonald and Woodward Publishing Co., Blacksburg.

NASA's Jet Propulsion Laboratory Homepage: <http://www.jpl.nasa.gov>

365 Starry Nights: A Fireside Book by Chet Raymo, Simon and Schuster, New York.

Messier Images: http://www.nasa.gov/mission_pages/hubble/science/messier-61.html#_UgZ_qqyDmCg

Seeing the Sky by Fred Schaaf, John Wiley & Sons Inc., New York.

Seeing the Deep Sky by Fred Schaaf, John Wiley & Sons Inc., New York.

Shuttle Homepage: <http://shuttle.nasa.gov>

A Field Guide to the Stars and Planets: Peterson Field Guide Series by Jay M. Pasachoff and Donald H. Menzel, Houghton Mifflin Co., Boston.

Views of the Solar System: <http://space.jpl.nasa.gov/>

The Facts on File Dictionary of Astronomy edited by Valerie Illingworth, Facts on File Inc., New York.

Astronomical Calendar: Astronomical calendars can be obtained from Guy Ottewell at Furman University, Greenville, South Carolina.

Virginia Living Museum and Abbitt Planetarium <http://www.thevlm.org>

