

3. *Solar System* -The sun together with all the planets and other bodies that revolve around it.
4. *Milky Way* - The spiral galaxy containing our solar system. With the naked eye it is observed as a faint luminous band stretching across the heavens, composed of approximately a trillion stars, most of which are too distant to be seen individually.
5. *Big Dipper* - The group of seven bright stars in Ursa Major resembling a dipper in outline.
6. *Orion*- A giant hunter who pursued the Pleiades, was eventually slain by Artemis, and was then placed in the sky as a constellation. *Astronomy*: the Hunter, a constellation lying on the celestial equator between Canis Major and Taurus, containing the bright stars Betelgeuse and Rigel.
7. *Hemisphere* - *Half of the Earth*
8. *Navigation* - the art or science of plotting, ascertaining, or directing the course of a ship, aircraft, or guided missile.
9. *Astronomer* - *a person who studies the sky*
10. *Light-year* - *the distance light travels in one year (9,458,000,000,000 kilometers)*
11. *Nebulae*- places where new stars are born.

Materials:

What will you bring with you?

- Flashlight & ball to show earth's rotation & the rotation of the moon in relation to the solar system
- Glow in the dark stars, if we can make it dark enough to use in the classroom. If not, I will project on an overhead projector some constellations and pictures of the night sky. If no access to an overhead projector or plug in for my computer is there, then I will skip this portion of the activity
- Copies of 8.5" x 11" paper that have a grid on them so students can "connect the dots" to form their own constellations.
- Book that is appropriate for 3rd grade that has stories of constellations & pictures
- Overhead projector sheets of constellations: Orion, Big Dipper, Scorpion
- Tentative activity: Sheets of connect-the-dot constellations to project onto a large piece of black paper taped to the wall that students can color in with chalk while projected or stick glow-in-the-dark stars on to see a constellation., Then another group of students can draw the lines between the stars to mark the contour of the constellation. We will primarily work with the Big Dipper and Orion constellations.
- Laptop computer with pictures of constellations in case I have access to a projector.

What should students have ready (pencils, paper, scissors)?

- Paper
- Pencil

- Crayons

Classroom Set-up:

- Ability to darken the room.
- Projector and outlet for powerpoint slides if possible.
- Blank wall or some area to create shadows

Classroom Visit

1. Personal Introduction: __5__ Minutes

Who are you? I'm Ellie, I go to school at UC Berkeley. I study our environment, Earth, and how people relate to it in order to build a healthy future for all the creatures on Earth. I am interested in how people have related to Earth and the natural world throughout time. I also study stories and myths as ways to express your relationship to Earth.

What do you want to share with students and why?

I would like to share a story about the patterns that stars make in the sky (constellations) so students gain an understanding of what they are looking at when they look skyward at night. I would like to share the name of The Big Dipper Constellation and how to find it in the night sky (I might also talk about the Orion constellation if there is time) to gain awareness and a deeper connection with our natural world.

How will you connect this with students' interests and experiences?

Students will be able to engage more fully with the natural world through learning about the stars that make up the night sky and the stories behind them. The stories (myths) that I tell about the constellations will help the students connect more fully with the stars in the night sky whenever they experience them.

Topic Introduction: __5-10__ Minutes

What questions will you ask to learn from students?

Where do stars live? (in the sky)

Can you see stars during the day? (no)

Does that mean that they aren't there? (no)

Are they still there, but you just can't see them? (yes)

Why do you think they're there, but you can't see them?

(explain why you can't see stars during the day: The Sun's brightness during the day outshines the others stars that are farther away from the sun.)

Can you see stars when it's cloudy at night? (no) (sometimes)

Why can't you see clouds when it's cloudy at night?

(explain that the stars are still there, but they are farther away in the sky than the clouds. The clouds are closer to you, and they cover the stars up)

Big Idea(s), vocabulary, assessing prior knowledge...

Just because you can't see something, doesn't mean its not there. The Earth rotating around the Sun is why we have night and day. The Sun is a star too; it is the closest star to Earth, and the source of all life on Earth.



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2. **Learning Experience(s):** 30 Minutes

What will you do, what will kids do? Demonstrations, hands-on activities, images, games, discussion, writing, measuring... Describe in order, including instructions to kids.

Explain about space and the Milky Way:

How is it that we can see the Milky Way galaxy and yet we are in it?

Picture the Milky Way to be like a big, translucent pancake. We are in it about half way from the middle to the edge on one side. The big strip you see in the sky as the Milky Way is the light from many of the stars in our disk-shaped galaxy. The Milky Way seems to wrap around the whole sky because of the pancake-shape that surrounds us. But because of all of the gas and dust in the galaxy, it is not transparent, so we can only see about 5-10% of the way across with visible-light telescopes, so the Milky Way appears about equally bright in a band around the sky.

Explain about stars:

A **light-year** is the distance light travels in a year. A light-year is the most common unit of distance for stars and galaxies. The nearest star is about four light-years away. The lesson from the table of Orion stars is that, even though the stars appear similar, they have different properties and are at very different distances from Earth.

Explain Constellations:

The constellations were invented, not discovered. The constellations are just distinctive and easy-to-remember patterns of stars. Most of the famous ones were invented before the beginning of recorded history. Orion, for example, has a history dating to before about 4000 BC.

Explain Orion:

Orion is only visible in the fall and winter, because in the spring and summer it would appear during the day (and so it is drowned out by the Sun).

Point out Orion's shoulders, knees, and belt as you describe them.

Orion also has a sword hanging down below his belt, and a bow extending to the right of his right shoulder.

The most famous object in Orion is the Orion Nebula, the middle "star" of Orion's sword (below his belt) is not a star at all, but the nebula. **Nebulae** are places where new stars are born. The Orion Nebula is the brightest nebula in the night sky, and also the easiest to find. I'll encourage students to look for the nebula with their parents.

Other shapes in Orion: Ask students what they can see in the Orion photo.

Some students may have difficulty seeing anything other than a hunter, which shows how strongly what people know influences what they see. I will survey students to find out what shapes they can and cannot see in Orion

Storytelling- read a myth about the Orion constellation and how it got there – 5-8 min

Short talk about why we read the story and how stars were used to navigate by sea and also to help farmers know when to plant certain crops-2min

Around the world, farmers know that, for most crops, you plant in the spring and harvest in the fall. But in some regions, there is not much differentiation between the seasons. Since different constellations are visible at different times of the year, you can use them to tell what month it is. For example,



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Scorpius is only visible in the northern hemisphere's evening sky in the summer. Some historians suspect that many of the myths associated with the constellations were invented to help the farmers remember them. When they saw certain constellations, they would know it was time to begin the planting or the reaping.

Hand out sheets of paper with dots on them, instruct students to connect the dots to form a constellation of something from their own life, making their own constellation and story of how it got into the night sky. Have them connect the dots to form a shape of a family member, friend, pet, or anything else they want to make into a constellation. Have some students color in their constellations if they finish before others. -20min

Re-convene and share stories – 5 min

Project some pictures of constellations as they appear in the real night sky, so students can see what they actually look like and better recognize them at night.

If time allows- extra activity- tape large piece of black paper on wall and project dots on it to form a constellation. Have students stick glow in the dark stars up (if dark enough) or have them color in the projected dots with chalk & connect the lines to form a constellation. Have the students guess which constellation we formed.

Wrap-up: Sharing Experiences

 10 Minutes

*Putting the pieces together – how will students share learning, interpret experience, build vocabulary? Now when you look at the night sky, you will be able to recognize some of the shapes that patterns of stars make and know that those are called **constellations**. Students will be able to show the constellations that they made to their friends and family and be able to talk about the stories that go along with the constellations. Students will get a chance to share their constellations that they made with the group in a show & tell setting. Students will also know that humans for thousands of years past have seen similar shapes in the sky and those shapes have been really useful to help navigate ships.*

Follow up questions:

So, are stars visible during the day? Why?

What are some of the constellations we learned about? (orion, scorpion, big dipper)

What hemisphere are they visible in? (Northern)

When is Orion visible? (Fall & Winter)

Can we see it at this time of year? (yes)

How many of you are going to look for constellations now that you know they exist? (everyone!)

3. Connections & Close:

 5 Minutes

*What else might kids relate this to from their real-life experience? How can they learn more
Thanks and good-bye! Clean-up.*

*Students can learn more by getting a book on constellations and myths from their local library.
My favorite book for beginners is "The Stars: A New Way to See Them" by H.A. Rey (the Curious*



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George author). It is very well done and entertaining too. They can also take some time to stare at the stars on clear nights to learn which ones are the brightest. The more they learn the names and stories of the constellations, the easier and more enjoyable it will be to engage more fully with the night sky and the natural world.

- *What does it take to be an astronomer?*

Almost always, you need to graduate from college and get a PhD in Physics or Astronomy.

Total 50 – 60 Minutes

Follow-up – After Presentation

Suggest students write a letter explaining “How we learned about constellations _____?”

List or attach examples of activities, websites, connections for additional learning.

Attach worksheets, hand-outs, visuals used in classroom presentation.

- Students can create simple stories about their constellations (follow-up activity)

"The Stars: A New Way to See Them" by H.A. Rey (the Curious George author). It is very well done and entertaining too.