What's Up? Curriculum

Kindergarten through 2nd grades, 30 to 45 minutes

Notice

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Objectives

Students will learn:

- That we can see stars in the night sky, as well as the moon and some planets;
- Some ways in which stars, planets, and the moon differ from each other;
- The difference between reflecting and emitting light;
- The definition of a constellation; and
- The shapes and stories of some currently visible constellations.

Materials required

- Flashlight and extra batteries
- Small mirror
- Posters of the sun, earth, moon, solar system
- Posters of at least three constellations, including Ursa Major
- Digitarium Alpha projector set for a time when the moon and at least one planet are visible
- Light and laser pointers

I. Introduction *(10 to 15 mins)*

A) Inform students that you will be studying astronomy today. Ask students what the words 'astronomy' and 'astronomer' mean. Discuss what astronomers might study. If time permits, briefly discuss some current ***[****and age-appropriate****]*** astronomy research.

B) One of the things we'll be learning about is stars. ***[****Show poster of the sun.****]*** Why can we see the sun? Why can't we see the other stars when it's daytime? Why is the sun so important to us? What is the sun made of?

C) Some of the stars in our night sky were grouped together to make pictures. We'll be learning more about those pictures, called constellations, when we go inside the planetarium. Here are some pictures we'll be seeing. ***[****Show posters of two to five constellations they'll be seeing.****]***

D) What else can we see in the sky? Right, the moon. ***[****Show poster of the moon.****]*** What is the moon made of? Does it make its own light? No, it doesn't make its own light, so why can we see it? Some things in our sky make light, like stars, and other things reflect light, like the moon. What does reflecting mean? Right, bouncing light.

When we think of reflecting, we usually think of a mirror. Mirrors certainly do reflect light ***[****point flashlight at the mirror, with mirror aimed at the ceiling****]***, which you can see when I do this. We can see the moon because it's reflecting light from the sun back to Earth. The moon acts like this mirror to bounce light to us on Earth, and the sun acts like the flashlight--it makes light. ***[****If time and attention spans permit, introduce the idea of light being invisible unless it reflects off something. Turn off lights and spray water droplets or Fog in a Can into the beam to make the beam visible.****]***

E) What else is in the sky? Right, many things, including planets. ***[****Show poster of the solar system.****]*** Do the planets make light like stars, or do they reflect light like the moon? Right, they reflect light. What are the planets made of? Right—it depends on the planet. Some are made of rock, like Mars and Earth, while others are made of gas, like Jupiter and Saturn. But none of them make their own light. Just like the moon, they reflect light from the sun, which is why we can see them.

F) Prepare to enter the planetarium--rules, method of entry, etc.

II. Tonight's Sky *(15 to 30 mins)*

Important note: make sure that the Digitarium Alpha projector is set for a time when the moon and at least one planet are visible.

A) ***[****When all are in and seated, darken the planetarium to allow students to better see the night sky.****]*** Inform students that they're looking at the sky as it would appear at about ___ p.m./a.m. on _____*(date)*. What do they see? Where's the sun? the moon? Ask students how they would describe the shape of the moon. Have they noticed that the moon isn't always the same shape in the sky? ***[****If appropriate, discuss VERY briefly the idea of moon phases being due to the changing positions of the earth, moon, and sun. Encourage students to make observations of the moon in the real sky.****]***

B) Do they see anything they think is a planet? How can we tell if we're looking at a star or a planet? Inform students that planets are often a slightly different color than the stars in the sky. ***[****Give students a few seconds to look for planets, then turn on planet labels. Click and zoom in on all planets that can be seen with your projector settings. Share one or two interesting facts about each planet when you are zoomed in.****]***

C) **OPTIONAL:** Use the images in the “Planet Tour” folder in the “Whats_Up” directory on the lesson slides CD to discuss the planets in order.

D) What do we see the most of up there? Right, stars. Thousands of years ago, the Greeks and Romans 'connected the dots' and made pictures in the sky; those pictures are called constellations. Today we still use many of the names they gave to their constellations. Here's a picture in the sky ***[****slowly outline the Big Dipper****]****.* Does anyone recognize this group of stars? Yes, the Big Dipper. To turn the Big Dipper into the picture that the Romans made, we have to add more stars. The ancient Romans imagined an animal with sharp teeth and claws that likes to eat fish and berries. ***[****Outline the stars of Ursa Major, describing what parts of the bear they make, then turn on the line drawing and finally artwork.****]*** Share your favorite story about Ursa Major.

E) Choose at least two other constellations in different parts of the sky to share stories about.

F) Discuss the importance of the north star, how to find it, and then speed up time. Emphasize that in real life, the stars don't move around the earth. Earth's rotation and orbit give us a different view of the stars throughout the night and the year.

G) **OPTIONAL:** Turn on planet labels and planet trails. Make sure

that Mercury is visible in the sky, or speed up time until Mercury is visible. Jump forward in time week by week to show students the movements of the planets against the background of the stars. Move forward in time until Mercury's trail makes a loop in the sky.

Be sure to emphasize that Mercury and the other planets, including Earth, are simply rotating on their axes and orbiting the sun. However, as Earth rotates and revolves and the other planets rotate and revolve, we can end up noticing some strange patterns, like the one that Mercury made. Briefly discuss how long it takes for Earth to make one trip around the sun, then how long it takes for two or three of the other planets to make one trip around the sun.

H) Prepare students for exiting the planetarium.

III. Conclusion *(5 mins)*

A) **OPTIONAL**, after all are outside and seated**:** If time permits, use two volunteers to model the earth-sun system. See the 'Moving Right Along' lesson plan for tips on how to set up that demonstration.

B) Review what the students have learned today. What are stars made of? the moon? the planets? Why can we see stars? the moon? the planets? What does the word constellation mean?