Moving Right Along Curriculum

Kindergarten through 2nd grades, 30 to 45 minutes

Notice

This lesson plan was created by Digitalis Education Solutions, Inc. (DigitalisEducation.com) and is provided free of charge as a public service to encourage the teaching of astronomy. It was written for use with a Digitarium® planetarium system. You may need to modify this lesson to work with other systems with different capabilities.

License

Copyright

Objectives

Students will learn:

- That Earth rotates on its axis, with one rotation measured as one day;
- That Earth revolves around the sun, with one revolution equaling one year;
- That Earth's rotation and revolution affect our view of the stars;
- The definition of the word “constellation;”
- The shapes and stories of some currently visible constellations; and
- Why people created constellations.

Materials required

- Flashlight and extra batteries
- Earth on a stick (globe with handles at north and south poles to represent axis)
- Stick pin with small flag attached (to label students' part of the earth)
- Poster of the sun
- Posters of several constellations, including Ursa Major
- Digitarium® system set for the current date and time

I. Introduction *(10 to 15 mins)*

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

B) Inform students that one of the things they'll be learning about is stars. Discuss what stars are. ***[****Show poster of the sun.****]*** Ask students, 'What star is this a picture of? Why is the sun so important for us?' ***[****It provides light and warmth for humans and other living things, its gravity keeps us in our orbit, etc.****]***

C) Choose two volunteers to model the sun-Earth system. One volunteer will be the sun, the other the earth.

- Put the stick pin with the flag into the globe in the approximate location of the students' town, and hand the globe to your Earth volunteer. The sun volunteer will hold the poster of the sun.
- Discuss with students how the earth moves. Lead them to the idea that Earth rotates on its axis and revolves around the sun; both these movements happen counterclockwise. Have your Earth volunteer practice each movement separately, then put them together. ***[****Note: you may decide to introduce Earth's axial tilt with older students. This section as written does not mention it.****]***
- Have your Earth volunteer rotate slowly while revolving around the sun. **Don't let your Earth volunteer get too dizzy--s/he may need an occasional break from spinning!**
- Point out that sometimes the students' hometown is facing the sun ***[****pause your Earth volunteer at least once when the stick pin flag is facing the sun****]***. Ask students, 'Is it day or night when your town is facing the sun? How about when it's facing away from the sun?' ***[****Pause your Earth volunteer when the stick pin is facing away from the sun.****]***
- Alternatively, you may choose to have the entire class stand in a circle around the sun volunteer. Each person can rotate on his/her axis, and then the group can travel slowly around the sun. Tell the students to imagine that their hometown is right on the tip of their nose. Stop them from time to time to discuss what they've noticed in their trip around the sun ***[****and so they don't all fall over!****]***. What did the sun notice from the middle?
- Have the volunteers return to their seats.

C) Ask students if the sun is the only star we ever see. When do we see other stars? Why can't we see other stars during the daytime?

D) Define 'constellation,' and show some pictures of constellations

which the students will see in the planetarium.

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

II. Intro to Tonight's Sky/Constellations *(15 to 25 mins)*

A) *[When all are in and seated, speed up time to let the sun set, then turn off atmospheric effects and landscape.]* Inform students that they're looking at tonight's sky as it would appear at about ___ p.m./a.m. What do they see? Where's the sun?

B) Have the students look for the Big Dipper. Why is this such an important group of stars for us? Point out the other stars that make up Ursa Major, turn on the line drawing and then the constellation art, and tell your favorite story about the bear.

C) Point out constellations in different parts of the sky, turn on the line drawings and constellation art, and briefly share stories about those pictures.

D) Ask students how they think the sky would look if we moved forward in time three hours. Would the earth have moved in those three hours? How? Would the constellations they've just seen be in the exact same places? Take two or three predictions, then use the menu to jump forward in time three hours. Discuss what changed and why, being sure to emphasize that Earth's movements are what change our view of the sky.

E) Discuss why people created pictures like the great bear in the sky. How could the constellations act as a basic clock? Or to help time planting and harvesting?

F) **OPTIONAL:** Move forward in time one week, one month, and six months, allowing students to predict how they think the sky will change for each time period before testing those predictions. Again, emphasize that in the real world, Earth's movements change their views; the stars do NOT orbit the earth.

G) **OPTIONAL:** Run the Visit the Moon local script, zoom in on Earth, and speed up time to show Earth rotating.

H) **OPTIONAL:** Set the sky for daytime (atmospheric effects still turned off) so that students can see the sun against the background of stars. Take predictions on how moving forward in time will change our view of the Sun's position. Jump forward in time week by week to test those predictions.

I) **OPTIONAL:** Run the Solar System View local script to show Earth and the other planets orbiting the sun.

J) Discuss the importance of the north star, how to find it, and then speed up time once more to demonstrate its *uniqueness. [Be sure to emphasize that it's the rotation and revolution of the earth that change our view; the stars do not orbit the earth.]* Exit the planetarium and regroup outside the dome.

III. Conclusion *(5 mins)*

A) When all are outside and seated, review what the students have learned today. How does the earth move? How do these movements change what we see? How long does it take Earth to rotate on its axis one time? How long to revolve around the sun one time?