

Star Quest

3rd-5th grades, 45 to 60 minutes

Notice

This lesson plan was created by Digitalis Education Solutions (DigitalisEducation.com) and is provided free of charge as a public service to encourage the teaching of astronomy. It was written for use with the Digitalium Alpha portable digital planetarium projector. You may need to modify this lesson to work with other projectors with different capabilities.

License

Permission is granted to copy, distribute, and modify this document provided that existing copyright notices, the text of this license, and the text of the "Notice" section are not removed or modified, other than to add your own copyright notice for your modifications.

Copyright

Copyright 2003-2004, Digitalis Education Solutions.

Objectives

Students will learn:

- To use a star map to find constellations;
- Stories or interesting facts for at least three constellations;
- Some reasons for the creation of constellations; and
- Some cultures which created constellations.

Materials required

- Flashlight
- Current, laminated star maps (32)-*see our website for sources*
- One laser and six to eight light pointers
- Earth on a stick (globe with handles at north and south poles to represent axis)
- Posters of several Greco-Roman constellations
- At least one unlaminated current starmap to be left with classroom teacher

I. Introduction (10 to 15 minutes)

A) Inform students that you'll be exploring astronomy today. What is astronomy? What might astronomers study? If time permits, briefly discuss some current *[and age-appropriate]* astronomy research.

B) Assess students' knowledge of stars and constellations. What is a star made of? What does the word constellation mean? What are some examples of constellations? If possible, show the posters of the constellations they name. Why did people create constellations? *[Many reasons: as a kind of clock; to help with timing planting and harvesting; to explain how things came to be; to communicate what was important in their lives; and more.]* Many different cultures created pictures in the sky: ancient Greeks and Romans, Egyptians, Chinese, Native American tribes, African tribes, and more. Today they'll be exploring some Greco-Roman constellations, which have become dominant.

C) Inform students that you'll be using a tool to find constellations today, and that it will be easier to take a good look at it outside the planetarium. Pass out star maps and ask students how the star map differs from road maps. Be sure to highlight:

- 1) the trees, houses, etc. representing the horizon;
- 2) that the center of the map is the center of the sky, or zenith;
- 3) that the directions line up if they hold the map upside down over their heads; and
- 4) how to tell bright stars from dimmer stars.

D) Prepare students to enter the planetarium *[rules, method of entry, expectations for behavior, etc.]*. Ask students to bring the starmaps in with them.

II. Finding Directions (10 minutes)

A) *[When all are in and seated, darken the planetarium to allow students to better see the stars.]* Inform students that you'll first need to figure out which direction is which in the planetarium. Ask them if they know of a star that can help them find their directions. Right, Polaris, the north star. How can we find Polaris? *[Share the trick of finding the Big Dipper first, and let a student point out the Big Dipper with a LIGHT pointer.]* After the Big Dipper has been pointed out, show how to use the pointer stars to find Polaris.

B) If Polaris is the north star, what part of the sky is this *[point out Polaris again]*? Right, north. So what direction is over here *[move your pointer to the south]*? Repeat for east and west, then review the directions as a group, where you all say what direction your pointer is pointing to. Turn on the cardinal

points to help students remember the directions.

III. Using Maps to Find Constellations (20 to 25 minutes)

A) Inform students that you'll find one constellation as a big group, for practice using their maps. You'll first be looking for Cassiopeia, the queen of Ethiopia. Tell students to go through these steps to figure out where Cassiopeia or any other constellation should be:

- 1) What part of the sky (North, East, etc.) will she be in?
- 2) Will she be close to the horizon? the zenith? somewhere in between?
- 3) What does her shape remind you of?
- 4) Are there any bright stars to help you?

B) After students have answered the four questions, have them put their maps in their laps and point to the part of the sky where they expect to find Cassiopeia. If their guesses are way off, have them look at their maps again, and/or review the directions in the planetarium.

C) Turn down the lights to allow them to look for Cassiopeia in the sky. When 10 to 20 seconds have gone by, ask if anyone has found and would like to point out Cassiopeia. Pass a LIGHT pointer to a student, and let him/her point to Cassiopeia. *[Have a second person try if the first person was wrong.]*

D) When you feel the students are ready, bring up the lights, assign them to groups of three or four, then give each group a constellation to find *[Hint: try to pick constellations that will be opposite their small group in the dome, so that they don't have to look behind themselves to find the constellation.]* Remind them to answer the four questions and to make a prediction while the dome is bright. When all students are in groups and know which constellation they're looking for, have them point to where they expect to find their constellation. Pass out a light pointer to each group to help them find their constellation, then turn down the lights for 30 to 60 seconds to let them look.

Allow the groups to point out their constellations one at a time. Turn on the line drawing or artwork for each constellation, and share a fact or brief story as each is pointed out. After all groups have pointed out their constellations, collect the light pointers.

E) Ask students what we'd see if we stayed up all night. Right, most of the stars would end up in different places than they started. Why is that? *[Speed up time to demonstrate this, and point out Polaris, Be sure to emphasize that it's the rotation and revolution of the earth that change our view!]* Why doesn't Polaris seem to move? *[Use the Earth on a Stick to show how our north*

pole is tilted toward Polaris.] Encourage students to track the constellation their group found as it moves across the sky, and turn on all the line drawings or artwork to make it easier for them to follow their constellation.

F) Prepare students for exiting the planetarium.

IV. Conclusion (5 minutes)

A) Ask students what they learned today. Could they find their constellation in the real night sky? Remind them what time the sky was set for when they first found their pictures in the sky. Leave a starmap with the teacher.