

Lesson Plan Follow the Drinking Gourd



Grade Level(s): 6-8

Subject(s): Astronomy, History

In-Class Time: 45-50 Minutes

Prep Time: 10 Minutes

Materials

- In class internet access
- Computers for each group of 3-5 students
- Photocopies of “Follow the Drinking Gourd” lyrics with interpretation (or projected from Internet). Suggested link: <http://quest.arc.nasa.gov/ltc/special/mlk/gourd2.html>.

Objective

In this lesson plan, students will learn how African Americans escaping slavery on the Underground Railroad relayed their knowledge of astronomy to one another, and how they used that knowledge to find their way to freedom. They will gain an understanding of how the sky looks in different parts of the world, how it changes over time, and how it can be used for navigation.

Introduction

In the early nineteenth century, many slaves in the United States sought freedom by fleeing to Canada. There, slavery was abolished in 1833, three decades before the United States would do so in 1865. In order to reach what was called the “promised land,” freedom seekers would follow the “Underground

Railroad,” a network of people and safe-houses that extended throughout fourteen northern states where travelers could find shelter and assistance. About one thousand African Americans found freedom using the Underground Railroad, a small percentage of the more than 3 million people enslaved in 1850. Despite their small numbers, those that chose to make the journey were remarkable in their bravery and posed a significant threat to slave owners.

The era leading up to the Civil War was an extremely dangerous time for African Americans. In the 1840s, slave owners pushed for the Fugitive Slave laws which granted rewards for the capture of “fugitive slaves.” The Fugitive Slave Laws not only threatened fugitive slaves, but free African Americans as well. Solomon Northrup’s biography provides once such example: he was a free African American from New York who was kidnapped in 1841 and lived for twelve years as a slave in Louisiana. He was able to escape, unlike many others that suffered similar fates, and wrote a memoir recounting his time called *Twelve Years a Slave*, now a major motion picture.

In 1857, the Supreme Court ruled in the famous Dred Scott case that black people were “so far inferior that they had no rights which the white man was bound to respect.” Even scientists were often on the side of the slave owners. In fact, the 18th century American physician Samuel Cartwright wrote in 1851 about a mental disease called “Drapetomania” which he thought was responsible for causing enslaved African Americans to flee. One of the most famous “conductors” on the railroad was Harriet Tubman, formerly enslaved in Maryland, who reportedly made nineteen trips to the South and helped some three hundred African Americans escape slavery. At one time, it was rumored that the reward for Harriet Tubman reached as high as \$40,000.

In order to impede African Americans ability to escape slavery, they were denied access to knowledge about geography and navigation. In addition, slaves were not permitted to read or write. Despite all this, those who traveled the Underground Railroad used astronomy in order to navigate to freedom. Specifically, freedom seekers followed the North Star, also called Polaris, to find their way north. By using two asterisms called the Big Dipper and the Little Dipper, travelers could identify Polaris and avoid being captured. These groupings of stars are part of larger constellations known respectively as Ursa Major (Big Bear) and Ursa Minor (Little Bear). Thus, while it was only recently that the first African Americans received their doctorates in astronomy and astrophysics – Harvey Washington Banks being the first African American to receive a Ph.D. in astronomy in 1961 – African Americans have long had deep connections with the stars, including bringing their own cosmologies and understandings of constellations from their various cultures in Africa. In this lesson plan, students will examine how the stars helped lead slaves north.

Instructions

Engage: 5 Minutes

In this section, students will recall what they have learned about the Underground Railroad.

What is the teacher doing?

Prompt the students to recall what they have learned about the Underground Railroad. Fill in any major gaps in what the students mention using the information from the introduction.

What are the students doing?

List what they have learned about the Underground Railroad.

Explore: 25 Minutes

Students will listen to and read the lyrics of “Follow the Drinking Gourd,” a song that directed slaves on how to use the stars to navigate their way north. They will also use a website that will allow them to explore how stars move across the sky, how they look from different places on Earth and how the stars can be used for navigation.

<p>What is the teacher doing? Hand out the lyrics and an interpretation of “Follow the Drinking Gourd”. If possible, play the song for the students. One possible link is: https://www.youtube.com/watch?v=pw6N_eTZP2U. Pause after each verse to discuss the interpretation of the lyrics, make sure that students understand that this song gave slaves directions on how to navigate their way north using the stars. One such place you can find the lyrics and an interpretation is: http://quest.arc.nasa.gov/lrc/special/mlk/gourd2.html</p>	<p>What are the students doing? Listen to/read the lyrics to “Follow the Drinking Gourd”. Discuss the lyrics and understanding that the song served to direct slaves on how to navigate their way north.</p>
<p>Rotating Sky Explorer activity: (Student directions can be found on a handout in the supplemental materials)</p> <ol style="list-style-type: none"> 1. Place students in groups of 3-5. Put each group at a computer or give them a laptop. Have them go to the University of Nebraska-Lincoln Rotating Sky Explorer at http://astro.unl.edu/naap/motion2/animations/cehc.html. A main computer projected at the front of the classroom can help orient students. 2. In the Star Controls section, select “Big Dipper” in the Star Patterns drop-down menu. 3. In the Star Controls section, click “Add a Star Randomly.” Click on the star that was added. In the “Celestial Sphere View”, set right ascension = 2.5 h and declination to 89.2°. This star is Polaris, the North Star. 4. In the Appearance Settings section, select “show labels”. 5. Click “Start Animation.” 6. Let the students play with the different options in the simulation. 7. Prompt the students to think about how the sky looks from different locations and how it changes over time. 	<p>Complete the Rotating Sky Explorer activity: In groups of 3-5, students will use the University of Nebraska-Lincoln Rotating Sky Explorer to understand how the sky looks from different places on Earth and how it changes over time. They will think about how the stars could be used for navigation.</p>

Explain: 5-10 Minutes

Students will switch groups and explain to each other what they noticed in the previous activity.	
<p>What is the teacher doing? Mix up the groups so that students that were not working together can share their experiences. Prompt the students to think about how the stars could be used for navigation based on what they noticed while using the website.</p>	<p>What are the students doing? Talk to students that they did not work with about what they did/noticed in their groups, especially in regard to how the sky looked from different locations and how it changed over time. Discuss how the stars could be used for navigation based on what they noticed while using the website.</p>

Elaborate: 10 Minutes

The teacher will lead a discussion about the Underground Railroad and the use of stars for navigation.	
<p>What is the teacher doing? Lead the class in a discussion (see discussion questions and suggested answers).</p>	<p>What are the students doing? Participate in the class discussion.</p>

Evaluate:

Students can be evaluated on their contributions to class discussion.

Required/Recommended Reading and Resources

University of Nebraska-Lincoln Rotating Sky Explorer:

- http://astro.unl.edu/naap/motion2/animations/ce_hc.html

Discussion Questions

1. How does the sky change over time?

Answer: Stars appear to move across the sky in the opposite direction from the Earth’s rotation. This is cause by the Earth spinning on its axis.

2. How does the sky look from different places on Earth?

Possible Answers: Depending on your latitude, the paths of stars will look more like circles in the sky or more like lines across the sky. You can see different stars and constellations in the northern hemisphere than you can in the southern hemisphere.

3. How would the directions in the song have had to be different if the slaves were in the southern hemisphere (below the equator)?

Answer: The directions wouldn’t have been able to reference the Big Dipper or the North Star because you can’t see those stars from the southern hemisphere. They would have needed to use stars that are visible from the southern hemisphere, like the Southern Cross.

4. How can the stars be used for navigation?

Possible Answers: Different constellations can point you in different directions. For example, the Big Dipper can point you to Polaris which is always to the north. Throughout the night, stars will appear to move from east to west.

Further Reading and Additional Resources

- Joel Bresler, "Follow the Drinking Gourd: A Cultural History," <http://www.followthedrinkinggourd.org/>
- Scholastic, "The Underground Railroad: Everything You Need," <http://www.scholastic.com/teachers/unit/underground-railroad-everything-you-need>
- Riddle, Bob. 2006. "Follow the Drinking Gourd." *Science Scope* 29, no. 5: 54-56. Education Research Complete, EBSCOhost (accessed August 27, 2014).
- Goldsmith, Donald. *Connecting with the Cosmos: Nine Ways to Experience the Wonder of the Universe*. Naperville, Ill: Sourcebooks, 2002.
- Christopher, Robin, and David Knight. *Underground Railroad Connections to freedom and science*. [Washington, D.C.]: NASA, 1999. NASA Documentary on Astronomy and the Underground Railroad.

Books on Harriet Tubman and the Underground Railroad:

- Schraff, Anne E. *The Life of Harriet Tubman: Moses of the Underground Railroad*. 2014.
- Bauman, Susan K. *Harriet Tubman: Conductor of the Underground Railroad*. 2014.
- Lantier, Patricia. *Harriet Tubman: Conductor on the Underground Railroad*. New York: Crabtree Publishing Co, 2010.

Extensions

Related AIP Teacher's Guides on Women and Minorities in the Physical Sciences:

- Follow the Drinking Gourd Lesson Plan for grades 9-12. The lesson plan for grades 9-12 covers the material from this lesson and also goes into latitude, longitude, right ascension and declination
- African Americans in Astronomy and Astrophysics

Make a Star Clock: <http://www.skyandtelescope.com/observing/make-a-star-clock/>. This activity, developed by Sky & Telescope, allows students to easily create a star clock which they can use to estimate the time of night using circumpolar stars. The website includes printable parts of the clock for easy assembly.

Common Core Standards

For more information on Common Core Standards, visit <http://www.corestandards.org/>.

Reading Literature	
CCSS.ELA-LITERACY.RL.6.2	Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.
CCSS.ELA-LITERACY.RL.6.4	Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of a specific word choice on meaning and tone.

CCSS.ELA-LITERACY.RL.7.2	Determine a theme or central idea of a text and analyze its development over the course of the text; provide an objective summary of the text.
CCSS.ELA-LITERACY.RL.7.4	Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama.
CCSS.ELA-LITERACY.RL.8.2	Determine a theme or central idea of a text and analyze its development over the course of the text, including its relationship to the characters, setting, and plot; provide an objective summary of the text.
CCSS.ELA-LITERACY.RL.8.4	Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
Language	
CCSS.ELA-LITERACY.L.6.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, choosing flexibly from a range of strategies.
CCSS.ELA-LITERACY.L.7.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grade 7 reading and content</i> , choosing flexibly from a range of strategies.
CCSS.ELA-LITERACY.L.8.4	Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on <i>grade 8 reading and content</i> , choosing flexibly from a range of strategies.
CCSS.ELA-LITERACY.L.6.5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
CCSS.ELA-LITERACY.L.7.5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
CCSS.ELA-LITERACY.L.8.5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
Science & Technical Subjects	
CCSS.ELA-LITERACY.RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
CCSS.ELA-LITERACY.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
CCSS.ELA-LITERACY.RST.6-8.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

Next Generation Science Standards

For more information on the Next Generation Science Standards, visit <http://www.nextgenscience.org/>.

<p>Dimension One: Practices</p>	<ol style="list-style-type: none"> 1. Asking questions (for science) and defining problems (for engineering) 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 8. Obtaining, evaluating, and communicating information
<p>Dimension Two: Crosscutting Concepts</p>	<ol style="list-style-type: none"> 1. Patterns. 4. Systems and system models. 7. Stability and change.
<p>Dimension Three: Disciplinary Core Ideas</p>	<p>Core Idea ESS1.B: Earth and the Solar System</p>