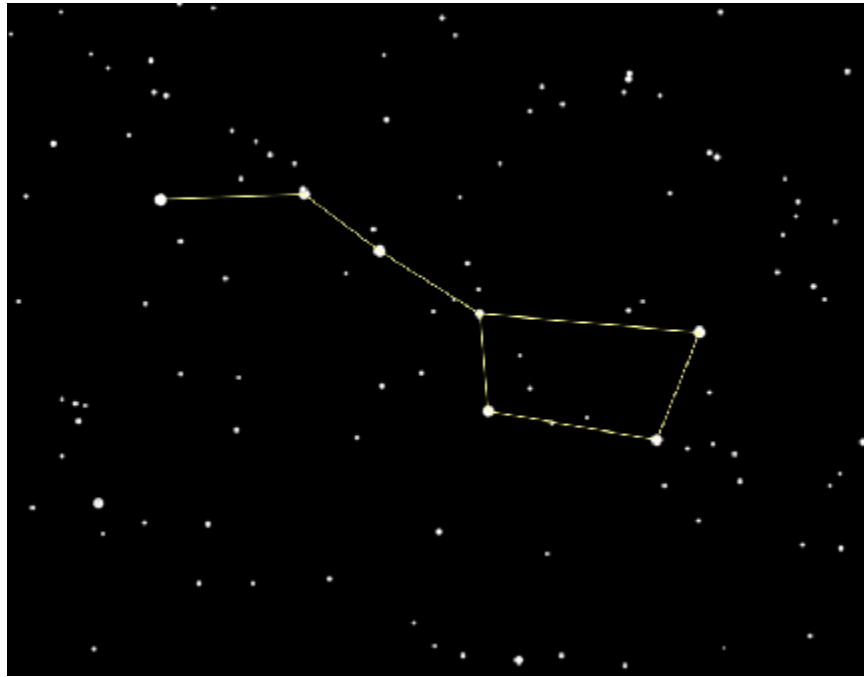


## Lesson Plan

### Follow the Drinking Gourd: Astronomy and the Underground Railroad

Adapted from the Northern Stars Planetarium "Follow the Drinking Gourd" Teacher's Guide, [http://www.northern-stars.com/Follow\\_theDrinking\\_Gourd.pdf](http://www.northern-stars.com/Follow_theDrinking_Gourd.pdf).



*The Big Dipper*

**Grade Level(s):** Activities for K-12, see below    **Subject(s):** History, Astronomy

Activity One: Connect the Stars! (Grade Level K-3)

Activity Two: Astronomical meaning of the song "Follow the Drinking Gourd" (Grade Level 6-8)

Activity Three: Find the Constellations (Grades 4-6)

Activity Four: Right Ascension and Declination (Grades 9-12)

Activity Five: Measuring the Big Dipper (Grades 9-12)

**In-Class Time:** See below

**Prep Time:** 10-15 min

Activity One: Connect the Stars! (30 min)

Activity Two: Astronomical meaning of the song "Follow the Drinking Gourd" (45-60 min)

Activity Three: Find the Constellations (30 min)

Activity Four: Right Ascension and Declination (90 min)

Activity Five: Measuring the Big Dipper (60 min)

## Materials

Materials needed depend on activities chosen.

## Objective

In this lesson plan, students will learn about how African Americans escaping slavery on the Underground Railroad used their knowledge of astronomy to find their way to freedom. Five activities are provided which allow students to explore what the Big Dipper, Little Dipper, and the North Star look like, learn about the geographic and equatorial coordinate systems, estimate angular distance, and more.

## 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 slaveowners. The era leading up to the Civil War was an extremely dangerous time for African Americans. In the 1840s, slaveowners 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 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*. 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 slaveowners. In fact, the 18<sup>th</sup> 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, we will examine one way that African Americans were connected to the stars through the Underground Railroad.

### Instructions/Activities

#### **Background:**

Students should be given some background about the early 19<sup>th</sup> century (see introduction) and the Underground Railroad. In order to introduce students to Harriet Tubman and the Underground Railroad, you can select from the list of recommended books for a range of ages (see below).

#### **Activity One: Connect the Stars! (Grade Level K-3)**

1. Give students copies of the “Connect the Stars!” handout.
2. Tell them to try to find the Big Dipper, Little Dipper, and the North Star when they go home that evening.

#### **Activity Two: Astronomical meaning of the song “Follow the Drinking Gourd”**

At first glance, the song “Follow the Drinking Gourd,” a song written by African Americans based on African traditions of communicating through song, may seem to make little sense. However, the song contains crucial information about astronomy and geography that assisted thousands of slaves on their journey to freedom in the northern United States and Canada.

1. Give students copies of the handout “Follow the Drinking Gourd Song Interpretation”
2. Play them the song Follow the Drinking Gourd (One possible link is at: [https://www.youtube.com/watch?v=pw6N\\_eTZP2U](https://www.youtube.com/watch?v=pw6N_eTZP2U)) and have them follow the lyrics. Pause after each verse to discuss the meaning.
3. Afterwards, have students practice writing a song that would describe a path from one place to another that would guide travelers but be vague enough to avoid suspicion.
4. Students can also imagine what it would have been like to travel the Underground Railroad with Harriet Tubman.

#### **Activity Three: Find the Constellations (Grades 4-6)**

1. Give students copies of the “Find the Constellations” handout and ask them to circle where the Big Dipper, the Little Dipper, and the North Star are.
2. Then, ask them to try to find where they are in the sky that night. Ask them to draw the orientation of the Big Dipper, Little Dipper, and North Star.

#### **Activity Four: Right Ascension and Declination (Grades 9-12)**

See supplemental handout.

#### **Activity Five: Measuring the Big Dipper (Grades 9-12)**

See supplemental handout.

### Required/Recommended Reading and Resources

#### Books on Harriet Tubman and the Underground Railroad:

##### Elementary School Grade Level (Grades Kindergarten-5)

- Weatherford, Carole Boston, and Kadir Nelson. *Moses: When Harriet Tubman Led Her People to Freedom*. New York: Hyperion Books for Children, 2006.
- Ringgold, Faith, and Faith Ringgold. *Aunt Harriet's Underground Railroad in the Sky*. New York: Crown Publishers, Inc, 1992.
- Winter, Jeanette. *Follow the Drinking Gourd*. New York: Knopf, 1988.

##### Middle School Grade Level (Grades 6-8)

- Schraff, Anne E. *The Life of Harriet Tubman: Moses of the Underground Railroad*. 2014.
- Baumann, 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.

### Discussion Questions

1. Can you imagine what it would have been like to travel on the Underground Railroad?
2. Why did African Americans flee North from the United States to Canada?
3. Why was important for slave-owners to prevent slaves from learning astronomy and geography? How did slaves keep their knowledge secret?
4. If you had to decide whether to join Harriet Tubman on the Underground Railroad, what kinds of things would you have considered?

### 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.

#### Related Resources from the AIP Teacher's Guide on African Americans in Physics, Astronomy, and Related Disciplines:

- Lesson Plans:
  - African Americans in Astronomy and Astrophysics
  - The Night Sky by another Name: Orion, Osiris, and African Mythologies

### Extensions

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/>.

History/Social Studies	
<a href="#">CCSS.ELA-Literacy.RL.1.1</a>	Ask and answer questions about key details in a text.
<a href="#">CCSS.ELA-Literacy.RL.1.2</a>	Retell stories, including key details, and demonstrate understanding of their central message or lesson.
<a href="#">CCSS.ELA-Literacy.RL.1.3</a>	Describe characters, settings, and major events in a story, using key details.
<a href="#">CCSS.ELA-Literacy.RL.1.7</a>	Use illustrations and details in a story to describe its characters, setting, or events.
<a href="#">CCSS.ELA-Literacy.RL.6.4</a>	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

### Next Generation Science Standards

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

<a href="#">Dimension One: Practices</a>	<ol style="list-style-type: none"> <li>Asking questions (for science) and defining problems (for engineering)</li> <li>Analyzing and interpreting data</li> <li>Using mathematics and computational thinking</li> <li>Constructing explanations (for science) and designing solutions (for engineering)</li> </ol>
<a href="#">Dimension Two: Crosscutting Concepts</a>	<ol style="list-style-type: none"> <li>Patterns.</li> <li>Systems and system models.</li> </ol>
<a href="#">Dimension Three: Disciplinary Core Ideas</a>	Core Idea ESS1: Earth’s Place in the Universe