Lesson Plan
The Night Sky by Another Name

Star formation in the constellation Orion as photographed in infrared by NASA’s Spitzer Space Telescope. Image courtesy of Wikimedia Commons.

Grade Level(s): 9-12
Subject(s): History, Astronomy

In-Class Time: 55-60 Minutes
Prep Time: 10 Minutes

This lesson can be taught over one or two class periods, with the Explore section of the lesson as optional homework.

Materials
- Board for writing students answers
- Copies of the myths handouts, one story for each student (see the Supplemental Materials)
- Student internet/library access either at school or at home

Objective
In this lesson, students will learn about the way different African cultures have understood what we know as the Orion constellation. This lesson helps students understand European and American worldviews of science and invites them to think about different ways to understand the Earth and the universe.
Introduction

When we learn about the stars, we usually learn the names of constellations such as Aries, Cancer, Gemini, Capricorn, Sagittarius, Leo, Libra, Pisces, Orion, and others. Many of these constellations are based on Greek mythology and are just one way that people have learned to organize the stars. Across the Earth, different peoples have looked into the stars and seen different patterns and different stories.

People throughout history and all over the world have devised their own way of understanding the world around them. Myths, or traditional stories that may involve magic or magical beings, often express these views. Members of different societies tell their own myths and ascribe aspects of these mythologies to the stars. The stars in the constellation that we recognize as Orion are no different.

Orion is one of the most recognizable constellations in the night sky. To the ancient Greeks, this constellation resembled the giant hunter who was placed, by the Greek god Zeus, among the stars. To the Egyptians, however, this constellation resembled the god Osiris, the Egyptian Lord of the Underworld. When a Pharaoh died, his soul was judged by the god Osiris. If he was judged to be good, his soul would rest peacefully among the stars in the west. However, if he was found to be bad, his soul would be sent north where he would be forced to eternally circle the North Star with other beasts. The three stars that make up Orion’s belt were seen as a stairway of the world’s structure by the Dogon people and as three zebras that had been hunted by a god to the Ju/Wasi of Southern Africa.

In this lesson, students will learn about the universal human experience of finding figures in the stars and assigning meaning to them. They will learn some of the figures that members of different African cultures have assigned to the stars and hear the stories associated with them, as well as learn about the cultures themselves. During this lesson, students should be prompted to consider that different groups of people have different ways of understanding the stars and the world around them, even the students themselves have a specific point of view that shapes how they understand the world. They will also be asked to question why they have more personal experience with some points of view than others.

Note: This lesson pairs well with the AIP Teacher’s Guides on Women and Minorities in the Physical Sciences: “Follow the Drinking Gourd: Astronomy and the Underground Railroad” for grades 9-12. That lesson examines the lyrics of an African American folksong that directed escaped slaves on how to use the stars to navigate their way north. It utilizes a website to help students understand how the night sky changes over time and how it looks different from different places on Earth, and teaches about the coordinate systems of the Earth and the sky.

Instructions

Engage: 5 Minutes

To begin this activity, students will be asked to recall their previous knowledge about constellations and the connections that constellations have to cultural stories and beliefs.

What is the teacher doing?
Ask your students what they know about constellations. By the end of this section your students should know that constellations are groups of stars forming a recognizable pattern.

What are the students doing?
Recall their previous knowledge about constellations.
that is traditionally named after its apparent form or identified with a mythological figure.

Prompt your students to list all of the constellations that they can. Make a list on the board of the constellations that they can name.

Ask your students if they know where the names came from. They might know that they are named for figures in mythology, or may be able to name the culture of origin (Greek, Native American, etc.).

Recall the names of as many constellations as they can.

Recall the origins of the constellations they were able to name.

Explore: 20-25

This portion of this lesson can either be done in class or completed as a homework assignment. People throughout history and all over the world have looked into the sky and tried to connect the stars into figures. In this portion of the lesson, the students will each learn about one figure that was identified by members of a different African culture and the mythology around that figure. They will also do independent or group research into the culture that produced that mythology.

What is the teacher doing?

Divide the class into 4 groups. Give each group a different mythological story (see the Myths handout in the supplemental materials).

In class: Give the students a few minutes to read their story and then discuss it within the group.

For homework: Instruct the students to read their story for homework. Have them discuss it within their groups at the start of the next class period.

Students should research the peoples who produced the myths that they read. This can be done either in groups or individually.

In class: Allow your students to access the internet or a library to research the peoples that produced the myth that they read (Ancient Greeks, Ancient Egyptians, Dogon, Ju/Wasi). As a group, they should be able to share at least 5 facts about their given cultural group.

For homework: Students should individually research the peoples that produced the myth that they read (Ancient Greeks, Ancient Egyptians, Dogon, Ju/Wasi). At the start of the next class period, the students should get back into their groups and discuss both the myths they read and the information they found about their assigned cultural group. As a group, they should

What are the students doing?

In class: Read their given myth silently to themselves. Talk within their groups about the story that they all read.

For homework: Read their given myth. Discuss it with the other members of their group at the start of the following class period.

In class: Use the internet or a library to research, as a group, the cultural group that produced the myth they read. Prepare at least 5 facts to share about their given cultural group.

For homework: Research, individually, the cultural group that produced the myth they read. At the start of the following class period, they should get back into their groups and discuss both the myths they read and the information they found about their assigned cultural group. As a group, they should be able to share 5 facts about their given group.
be able to share at least 5 facts about their given group.

**To aid in research:** The teacher may share the resources for each society listed under “Required/Recommended Reading and Resources.” The teacher should be aware that students researching the Dogon and the Ju/Wasi will have far fewer sources to learn from. The Ju/Wasi group’s research will be complicated by the fact that they are referred to by many names. It could be helpful to inform those students that: The singular of Ju/Wasi is Ju/Wa, also spelled Ju/hoan. They are one of the five groups that make up the San people, also called Bushmen. They speak the !Kung language and are sometimes referred to as the !Kung people.

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<th>Explain: 20 Minutes</th>
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<tr>
<td>The students will recount the stories that they read, identify the constellation on the sky and share what they learned about the relevant culture with the rest of the class.</td>
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<th>What is the teacher doing?</th>
<th>What are the students doing?</th>
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<tr>
<td>Go around the class and have representatives from each group retell the myth they read, identify the constellation on the sky and share what their group learned about the relevant culture with the rest of the class. Each group can have 1-3 representatives, one person explaining each portion of the given information, or multiple people sharing the responsibilities.</td>
<td>The representative(s) from each group will retell their story, identify the constellation and share what their group learned about the relevant culture with the rest of the class. When not presenting, the students will listen carefully to their classmates as they recount their tales and teach about the cultural group.</td>
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<th>Elaborate: 10 Minutes</th>
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<td>Students are often taught from a Eurocentric/Western point of view. It is important to discuss global points of view and understand the commonalities between people across the globe. By discussing the different views and interpretations of the skies students can see that there are different ways of looking at things and that people all over the world have wondered about the cosmos throughout history. The students should also become aware that their culture influences their own point of view and that although they are often taught history and science from a specific point of view, there are many other points of view that could be worth considering.</td>
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<td>Leading the students in a discussion about the broader impacts of what they’ve done in this lesson. See possible discussion questions and answers below.</td>
<td>Making connections about the different stories they learned in this lesson and the different people they heard about. Considering the influence of point of view in what they learn and how they understand the world around them.</td>
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Evaluate:
The students can be evaluated on their retelling of the myth and the facts they were able to share about their given cultural group, as well as their participation in the discussion.

Required/Recommended Reading and Resources

Required Reading:
- Myths Handout (see Supplemental Materials)

Recommended Resources:
- Dr. Jarita Holbrook is an African American filmmaker, astrophysicist, and author who has written extensively on African astronomy. She has produced films on African Americans in physics. For more information, visit her website at http://jaritaholbrook.com/.

Resources about each society:
- **Ancient Greece:**
  - http://www.ngkids.co.uk/history/10-facts-about-the-ancient-greeks
  - http://www.historyforkids.net/ancient-greece.html
- **Ancient Egypt:**
  - http://www.ngkids.co.uk/history/ten-facts-about-ancient-egypt
- **Dogon:**
- **Ju/Wasi:**
  - The Old Way: A Story of the First People by Elizabeth Marshall Thomas (Book, sections available for free through google books)
  - The Tale of the Bushmen, Directed by Pierre Mann (Documentary, available for free on cultureunplugged.com)
Discussion Questions

1. Why is it important to know that there are different mythologies around the stars?
   Possible answers: It shows that people all over the world and throughout time have wondered and thought about space and the stars. It reminds us that there are different ways of understanding the world around us and that any given point of view is influenced by culture. In some situations, like when identifying constellations, one viewpoint is just as valid as another.

2. Did you know of these constellations/myths before this lesson? Why do you think you’ve heard of some of them but not others?
   Possible answers: Yes. We are more exposed to a European or Western point of view, so the Greek myths and constellations are more common in our culture. Students could also compare their experience trying to research the different cultural groups, it was probably easier for the groups researching Greece and Egypt to find information than it was for the groups researching the Dogon, and how that connects to the focus of what they are taught in school.

Further Reading and Additional Resources

N/A

Extensions

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

- “Follow the Drinking Gourd: Astronomy and the Underground Railroad”

Common Core Standards

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

Reading: Literature

| CCSS.ELA-LITERACY.RL.9-10.6 | Analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States, drawing on a wide reading of world literature. |

Speaking & Listening

| CCSS.ELA-LITERACY.SL.9-10.1 | Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively. |

<p>| CCSS.ELA-LITERACY.SL.11-12.1 | Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively. |</p>
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<tr>
<td>CCSS.ELA-LITERACY.RH.9-10.6</td>
<td>Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.</td>
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<td>CCSS.ELA-LITERACY.RH.11-12.6</td>
<td>Evaluate authors' differing points of view on the same historical event or issue by assessing the authors' claims, reasoning, and evidence.</td>
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<td>CCSS.ELA-LITERACY.RH.11-12.7</td>
<td>Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.</td>
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<td>CCSS.ELA-LITERACY.RH.11-12.9</td>
<td>Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.</td>
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<td>Subject Writing</td>
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<td>CCSS.ELA-LITERACY.WHST.9-10.6</td>
<td>Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.</td>
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<tr>
<td>CCSS.ELA-LITERACY.WHST.9-10.8</td>
<td>Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.</td>
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<td>CCSS.ELA-LITERACY.WHST.9-10.9</td>
<td>Draw evidence from informational texts to support analysis, reflection, and research.</td>
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<td>CCSS.ELA-LITERACY.WHST.11-12.6</td>
<td>Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</td>
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<td>CCSS.ELA-LITERACY.WHST.11-12.8</td>
<td>Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</td>
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**Next Generation Science Standards**


| Dimension One: Practices | 1. Asking questions (for science) and defining problems (for engineering)  
3. Planning and carrying out investigations  
8. Obtaining, evaluating, and communicating information |
| --- | --- |

| Dimension Two: Crosscutting Concepts | 1. Patterns  
2. Scale, proportion, and quantity  
3. Systems and system models |

| Dimension Three: Disciplinary Core Ideas | Core Idea ESS1: Earth’s Place in the Universe  
Core Idea ETS2: Links Among Engineering, Technology, Science, and Society |