Starquest Unit Plan

Unit Overview

Unit Title

Starquest

Unit Summary

For ages, people all over the world searched for patterns in the heavens and related them to daily life and beliefs. Celestial study guided early travelers, and sightings of celestial objects helped determine when to plant and harvest food. In this study, students choose a celestial body or constellation and study how it has been explained and interpreted across cultures and time. Students present their learning using technology-enhanced displays and dramatic interpretations during a culminating star party.

Subject Area

Science, Language Arts

Grade Level

6–8

Higher-Order Thinking Skills

Interpretation, Comparison, Creativity

Approximate Time Needed

2–3 weeks

Unit Foundation

Targeted Content Standards and Benchmarks

Targeted National Science Standards

Develop descriptions, explanations, predictions, and models using evidence

- Recognize and analyze alternative explanations and predictions
- Understand Earth in the solar system
- Understand that different cultures have made and continue to make contributions to science and technology

Targeted English Standards

Multicultural Understanding

- Students develop an understanding of and respect for diversity in language use, patterns, and dialects across cultures, ethnic groups, geographic regions, and social roles.

Communication Strategies

- Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

National Educational Technology Standards (NETs)

Students will be able to:

- Use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works
- Use technology to locate, evaluate, and collect information from a variety of sources
- Use a variety of media and formats to communicate information and ideas effectively to multiple audiences

Student Objectives/Learning Outcomes

Students will be able to:

- Identify the features of myths that explain natural phenomena
- Compare scientific views of the universe and alternative interpretations from various cultures
- Use an effective creative/writing process to develop a technology-based product, such as a wiki, multimedia presentation, or newsletter, that incorporates traditional mythic elements and scientific phenomena
- Analyze the role that culture plays in the interpretation of natural phenomena through writing, discussion, and the development of products.

Curriculum-Framing Questions

Essential Question	What can we learn from the night sky?
Unit Questions	• How has the night sky been explained and interpreted across cultures and time? • What impact has this had on modern astronomy? • Why is the study of stars important to us today?
Content Questions	• What are constellations, and what stories are associated with them? • What is the difference between a star and a planet? • Who invented the constellations we know today?

Student Assessment Plan

Assessment Summary

Discussion and questioning strategies, such as Pair and Share groupings, are used throughout the unit to help students explore important questions, stimulate thinking, and reflect on learning. Review student discussion notes and questions in student journals to assess content knowledge and understanding. Refer back to the K-W-L chart throughout the unit to add new questions and learnings. Have students use the checklist on the syllabus to help them keep track of the various project requirements. Throughout project work, conduct student conferences to ensure that students are on track. Review planning outlines of students' projects and provide feedback. Provide students with the constellation story rubric, dramatization rubric, and scoring guide to help guide them while they work on their original story, dramatic interpretation, and final project. Ask groups to use the collaboration rubric to self-assess their group processes. Use a reflective discussion at the end of the project to revisit the Curriculum-Framing Questions and assess growth over time.

Assessment Timeline

Before project work begins		Students work on projects and complete tasks		After project work is completed	
• Discussion • Questioning • Journals	• K-W-L Chart	• Syllabus • Story Rubric • Scoring Guide • Conferences	• Collaboration Rubric • Dramatization Rubric	• Scoring Guide • Collaboration Rubric	• Reflective Discussion

Unit Details

Prerequisite Skills

- Basic knowledge of research skills using print and electronic sources
- Familiarity with presentation and desktop publishing software
- Understanding of Internet search engines
- Understanding of source citation

Instructional Procedures

Introducing the Unit

Ask students to describe the objects they see in the sky and what they have observed about them. Have students hypothesize about what they think the sky may have looked like thousands of years ago. Pose the Essential Question, *What can we learn from the night sky?* Have students discuss the question in a Pair and Share grouping. Bring the discussion back to the whole group and have students share what they discussed. Lead a discussion on ancient concepts about the sky and the ways that celestial objects could have enabled ancient peoples to tell time or to navigate. Have students write notes and questions in their journals during discussion periods.

Developing Understanding

Have students begin to develop a Know-Wonder-Learn (K-W-L) chart about astronomy. Prompt questioning during this process, and record student responses. (Sample prompt questions include the following: *What are constellations, and what stories are associated with them? What is the difference between a star and a planet? What is our current concept of the universe?*) Throughout the unit, come back to the K-W-L chart before and after each activity, and add new information. Explain to students that people tend to see patterns formed by different groups of stars, which they often name. These patterns are called *asterisms*. Some asterisms, called *constellations*, were broadly recognized and became important to entire cultures.

Help students appreciate how other cultures see the sky by organizing a cooperative sky-gazing project with teachers and students in other parts of the world. Search for a class wanting a partner class to study astronomy at the ePALS Web site*. If none exists, set up a project proposal. If you have nonnative speakers in your class, try to locate ePals in countries that speak their native language. Do this as far in advance as possible. Have students pair with assigned ePALS partners and discuss with other students what they see in the night sky at their respective latitudes and longitudes.

Decide what kinds of records the students will keep and the frequency with which they communicate with each other. For example, students may note positions of stars and constellations at a given hour, and maintain maps and other records of differences and similarities in the night sky on a global scale. Set aside time to talk about and record students' thoughts on chart paper for the whole class to view.

Looking at Constellations and Writing Myths

Explain to students that people all over the world have tried to make sense of the sky. Share the Unit Questions, *How has the night sky been explained and interpreted across cultures and time? What impact has this had on modern astronomy?* and *Why is the study of stars important to us today?* Explain that students explore these questions by choosing a celestial body or constellation and studying it. Distribute copies of the unit syllabus, which includes a checklist and outlines expectations for the unit.

Distribute the Create a Constellation pattern to each student. This has the group of stars interpreted by the ancient Greeks as Ursa Major, which means the Great Bear. Tell students that different cultures looked at the same skies and created different stories. Present myths from different cultures based on this star pattern. Have students use this set of stars to invent their own constellation and write a short myth or story that explains its significance or write a new myth about an existing constellation. Have students share their short stories with the class. Discuss similarities and differences among students' interpretations and those of different cultures. Use a Venn diagram to model this. Next, have students find at least two myths from different cultures that relate to a different constellation. Have them highlight the similarities and differences using a Venn diagram.

Introduce the Creative Constellations activity, and hand out the constellation creator instructions and story rubric. This activity requires a homework session on a cloudless night, so it may be assigned on another date within the project. Consult the Clear Sky Clock* for your area for a forecast of sky conditions. This site also provides lists of astronomy clubs and other resources that may provide volunteers and other assistance in organizing the unit's culminating star party. Volunteers often bring their own telescopes to such events. Set aside time so students can present their creations to the class. Engage ePALS partners in the activity, and have students share their constellations with their partners. Ask students to provide peer feedback using the story rubric.

Creating Projects

Distribute the constellations and celestial body list. Divide students into small groups (some students may choose to work alone). Those students working in groups use the collaboration rubric to help them work together successfully. Each group or individual is responsible for the following tasks:

- After choosing a celestial body or constellation, complete research using print and electronic sources to:
    - Learn about the current scientific understanding of astronomy as it relates to the constellation as well as associated myths and folklore
    - Address the Unit Questions, *How has the night sky been explained and interpreted across cultures and time? What impact has this had on modern astronomy?* and *Why is the study of stars important to us today?*
    - Create a presentation (slideshow, newsletter, or wiki)
- Choose at least two stars in the constellation to investigate. See the student newsletter and wiki samples. Ask students to use the scoring guide to help them create a high-quality project.
- Develop and present a dramatization of one of the explanations associated with the constellation (past or present). Submit an outline of the script, setting, roles, plot, and background information. Use the dramatization rubric to develop this.

Remind students to revisit their collaboration rubric, dramatization rubric, and scoring guide throughout their project work. Conduct student conferences to ensure that students are on track.

After students complete their projects, have them answer the Starquest questions, and be prepared to discuss and debate the answers with the class.

Concluding the Unit

Have students organize all their assignments in a portfolio. Host a star party or "Starquest Night" and invite other students, parents, guardians, and community members to share in the students' learning

during the unit. The event could include guest speakers, stargazing, and the presentation of students' original myths, presentations, and dramatizations. Invited guests can provide feedback to students.

As a final reflection activity, conduct a summary group discussion around the Curriculum-Framing Questions and the following topics:

- *Why do you think people through time have needed to study and interpret the night sky?*
- *How has the science of modern astronomy today changed our culture and view of our place in the universe? How will this continue to change in the future?*
- *What advances in astronomy do you think have been most important (telescopes, computer imaging, satellite exploration, manned space flight, or other advancement)?*
- *How is the study of the stars important to our culture today?*
- *What aspects of modern astronomy thought do you think may be redirected, developed, or changed in the near and distant future?*
- *Do you think there is any "truth" of astronomy that we will, one day, find to be in error?*
- *What theoretical and practical advances should astronomy science pursue into the future?*

What can we learn from the night sky?

Accommodations for Differentiated Instruction

Special Needs Student	• Assign specific tasks (art, research, and word processing) during group work, and enlist peer support • Develop a daily "To Do" list to aid organization and work completion • Replace syllabus activities with alternative activities specifically designed for the interest and ability of the student • Allow oral responses to the Starquest questions
Nonnative Speaker	• Have the student act as an expert, researching and presenting myths from the student's native culture • Have the student work with the ELL teacher to develop a glossary of terms in English and the student's first language • Allow the student to write in the student's first language for later transcription, or allow for dictated responses to essay questions
Gifted / Talented Student	• Have the student illustrate how the view of the sky varies from time to time or place to place (for example, how does it change in 2 hours, in a month, in a year, and in thousands of years? or address what an observer near the equator sees differently from an observer near the North or South Pole) and have the student explain why the sky varies in the illustration • Have the student learn about the Southern Hemisphere and how the skies were viewed in ancient times—explain that many of the cultural interpretations relate to the views from the Northern Hemisphere • Encourage the student to study an astronomical topic, such as auroras, telescopes, comets (Halley, Shoemaker-Levy 9, Hale-Bopp, and others), meteors (Leonids, Perseids, Barringer Meteor Crater, Tunguska, and others), natural satellites (such as the moon or Titan), asteroids, Saturn's rings, Jupiter's great red spot, sunspots, multiple stars, variable stars, supernova, galaxies, or another topic of interest

Materials and Resources Required For Unit

Technology – Hardware (Click boxes of all equipment needed)

☐ Camera	☐ Laser Disk	☐ VCR
☒ Computer(s)	☐ Printer	☐ Video Camera
☐ Digital Camera	☐ Projection System	☐ Video Conferencing Equip.
☐ DVD Player	☐ Scanner	☐ Other
☒ Internet Connection	☐ Television	

Technology – Software (Click boxes of all software needed.)

☐ Database/Spreadsheet	☐ Image Processing	☐ Web Page Development
☐ Desktop Publishing	☒ Internet Web Browser	☒ Word Processing
☒ E-mail Software	☒ Multimedia	☐ Other
☐ Encyclopedia on CD-ROM		

Printed Materials

- Allen, R. (1899, 1965). *Star names: Their lore and meaning*. Mineola, NY: Dover Book Reprint.
- Burnham, R., Jr. (1996). *Burnham's celestial handbook*. Mineola, NY: Dover Publications, Inc.
- Krupp, E. (1991). *Beyond the blue horizon: Myths and legends of the sun, moon, stars, and planets*. London: HarperCollins Publishers.
- Pasachoff, J. & Mexel, D. (1992). *Field guide to the stars and planets*. Boston, MA: Houghton Mifflin Company.
- Proctor, P. (1972). *Star myths and stories*. New York: Exposition Press.
- Ray, H. A. (1980). *The stars: A new way to see them*. Boston, MA: Houghton Mifflin Company.
- Ridpath, I. (1998). *Star tales*. Vancouver, Canada: Universe Books.
- Sanford, J. (1989). *Observing the constellations: An a–z guide for the amateur astronomer*. New York: Simon & Schuster Inc.

Supplies	• Disks for each student • Markers • Transparency film • Planisphere
Internet Resources	• NASA: The Vision for Space Exploration www.nasa.gov/www.nasa.gov* Videos about Earth, Moon, Mars, and beyond • Digital Images of the Deep Sky www.allthesky.com/www.allthesky.com* Articles and images of constellations, celestial objects, and observatories • Myths and Legends http://home.comcast.net/~chris.s/myth.html* Many links to sites about myths and legends organized by region and language group • The Constellations www.dibonsmith.com* Information about all 88 constellations • Telescopes in Education http://telescopesineducation.com* Live astronomy from Mount Wilson to the classroom • StarDate Online www.stardate.org* Broadcasts 2-minute StarDate radio programs and provides other great resources for teachers and students • Earth & Sky www.earthsky.com* Broadcasts Earth & Sky radio programs • International Dark-Sky Association www.darksky.org* Information about the natural nighttime environment and modern lighting • SkyTalk www.whyy.org/news/skytalk.html* Broadcasts SkyTalk radio programs • SkyTour www.whyy.org/skytour* Broadcasts SkyTour radio programs, displays sky maps, and provides other resources • ABC NewsRadio's Astronomy, Space Sciences, and Cosmology program www.abc.net.au/newsradio/programs/STARSTUFF.htm* Broadcasts Australian Broadcasting Corps radio programs • BBC Science and Nature: Space www.bbc.co.uk/science/space* BBC articles about space • Astronomical Society of the Pacific: Education www.astrosociety.org/education.html* Astronomy resource for teachers • Kids Astronomy www.kidsastronomy.com* Astronomy resources for students and teachers
Other Resources	