

Space Science: Starry, Starry Night

Teacher’s Guide

Subject: Integrated Science (Earth-Space)

Topic: Astronomy

Summary: Students will observe the night sky, noting constellations, major stars, and obviously the phases of the moon. This lab will be held in the evening at FWHS, therefore participation will be strictly voluntary. As such, parents will have to bring students and are encouraged to attend, and assessment must be flexible. Other classes will be invited to participate, as well as Mr. Lassiter and Mustapha Kane from LCCC, astronomy professor. Students will take a hands-on look at the moon, getting acquainted with telescopes and observing the phase of the moon (which will be nearly full), as well as constellations.

After completing the field lab, students will be able to:

- Objective(s):**
1. Know the different phases of the moon
 2. Use a simple refracting telescope
 3. Use a planisphere to help identify and locate various constellations
 4. Appreciate the vastness of the universe
 5. Understand the role in navigation, tides, fishing, etc. that the moon and stars have historically played.

Ecosystem(s): Lakes/Rivers/Springs

Equipment:

<ul style="list-style-type: none"> • Telescope(s) • Data sheets • night-sky map • flashlights w/ red lens covers 	<ul style="list-style-type: none"> • moon-phase flip sheets • GPS • Planisphere-student-made • compass 	<ul style="list-style-type: none"> • Constellation wheel sheet • Telescope diagram/manual • 9-v battery • Laptop w/ software
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Background:

- **Vocabulary:** lunar, constellation, nebula, Polaris/North Star, phase, (waxing, waning, gibbous), equinox, neap tide, spring tide, satellite, solar system, spectrum, Doppler effect (blue shift/red shift), magnitude, refracting telescope, reflecting telescope, universe, wavelength, Messier, astronomy/astrology, meteor/meteorite, celestial sphere, eclipse (solar/lunar),
- **Reference Material:** McDougal/Littell 7th Grade Unit 6 pg 661-807; pg 681;pg 725;pg 744; pg 791; pg 796 ; appendix ppg 833-839. Build a planisphere in class, or give sheets to those anticipating to attend; and remind students to bring with them.
- **Equipment Training:** telescope, planisphere
- Alternate days should be arranged in case of inclement weather. Additional days of observation of constellations when the moon is new should be available.
- Send home invitations and permission slips, since this lab will obviously be hands-on at night, and thus voluntary.
- Set up telescope at the school, on the football field or any other wide, level location away from any bright lights that can accommodate the students.

Procedure (Engage; Explore; Explain)

1. Imagine you have gone fishing off the coast near Steinhatchee. You are twenty miles out to sea at dusk when your engine, radio, and cell phone fail. How could you use the stars to navigate back home with a paddle?
2. Engage the students by asking a specific question that gets to the heart of the activity: How important are the moon and stars to man?. Use the students' answers to ascertain what they already know, clarify any misconceptions, and then ask them to formulate their own hypothesis relating to their own expectations of the outcome of the lab. One common misconception is that the crescent of the moon is caused by the earth blocking or eclipsing the moon from the sun. The moon appears to shine because of its composition and thus reflection of the sun's rays. Moon phases and star locations are predictable with a somewhat high degree of certainty
3. Send home invitations and permission slips, since this lab will obviously be hands-on at night, and thus voluntary.
4. Set up telescope at the school, on the football field or any other level location away from any bright lights that can accommodate the students.
5. Brief introduction and welcome. **Never look directly at the Sun through binoculars, telescopes, etc., as this will cause permanent damage to the eyes!** Discuss vocabulary, parts and use of telescope, and use of a planisphere. Galileo was the one who popularized the crude toy telescope, enabling man to see into the heavens.
6. Acquire GPS reading. Record time.
7. Ask the students to formulate a hypothesis and write it down. What would happen if we had no moon? How important is the moon to us?
8. View the moon through the preliminary viewfinder, compare to moon phase chart to determine exact phase.
9. Locate, observe, and identify various constellations and major stars using planisphere (which students should have constructed and brought with them.
10. Locate, observe, and identify any planets in the night sky. Record observations.
11. After completing the lab, allow the students to answer the discussion questions as a group and explain their answers relating them to the concepts, processes and skills associated with the activity. Students should record their answers individually. At this time, facilitators can introduce/explain the specific concepts and explanations in a formal manner.

Sunshine State Standards:

Science: SC.C.1.3.1; SC.C.2.3.1; SC.E.1.3.1-4; SC.E.2.3.1; SC.H.1.3.1-4; SC.H.2.3.1

Language Arts: LA.B.2.3.1

Mathematics: MA.B.4.3.1-2; MA.C.3.3.2

Social Studies: SS.B.1.3.1

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Student Data Sheet

General Information

Full Name:		Date:	
School (teacher):		Time:	
Latitude:		Longitude:	

Field Observations/Measurements/Data

Moonrise (from chart) time	
Direction of moon's ascent (origin from the horizon)	
What percent do you think is visible?	
Is moon getting fuller (waxing) or darker (waning)?	
Phase of the moon	
How soon will the moon be full/ how long ago was it full?	
Feature (you choose) visible to naked eye (Draw and label what you see)	
Same feature as detected through telescope (Draw and label what you see)	

<p>Lunar features identified from atlas (draw and label)</p>	
<p>List constellations you already knew about or had located before</p>	

Can you locate the following? Circle the check box next to the object viewed.

- | | | |
|--|---|--|
| <input checked="" type="checkbox"/> Polaris, the North Star | <input checked="" type="checkbox"/> Rigel | <input checked="" type="checkbox"/> Cancer |
| <input checked="" type="checkbox"/> Ursa Major (the Big Dipper) | <input checked="" type="checkbox"/> Sirius (<u>not</u> the satellite service!) | <input checked="" type="checkbox"/> Taurus |
| <input checked="" type="checkbox"/> Ursa Minor (the Little Dipper) | <input checked="" type="checkbox"/> Orion | <input checked="" type="checkbox"/> Aries |
| <input checked="" type="checkbox"/> Aldebaran | <input checked="" type="checkbox"/> Gemini | <input checked="" type="checkbox"/> Orion Nebula |
| | <input checked="" type="checkbox"/> Leo | <input checked="" type="checkbox"/> Betelgeuse |
| | | <input checked="" type="checkbox"/> Other |

Names of family members in attendance tonight with you, comments, suggestions:

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Assessment

1. What is the current lunar phase? What percent is the moon full?

2. If the lunar cycle is about every 28 days, and the moon is now three days from full, when will the next full moon be?

3. What is the relationship between a lunar month and our calendar?

4. How would the moon appear to someone on Mt. Everest, which, by the way, is about on the opposite side of the earth from Ft. White?

5. How different would life be here on Earth without the moon? Why is the moon so important? (sailors, sea turtles, fishermen, etc.)

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Reference Charts

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