

# Unit 4: Astronomy

Content Area: **Science**  
Course(s): **Science**  
Time Period: **Generic Time Period**  
Length: **Weeks**  
Status: **Published**

## Unit Overview

---

In the *Astronomy* unit, the students will explore and understand the relationships between the celestial bodies found in our solar system. They will observe and explain the patterns of the sun and moon as they change in position over periods of time. They will conduct experiments and work collaboratively to measure, gather, evaluate and share evidence using tools and technologies. They will investigate the forces that govern gravity here on earth.

## Standards

---

SCI.3-4.5.1.4.A.1	Demonstrate understanding of the interrelationships among fundamental concepts in the physical, life, and Earth systems sciences.
SCI.3-4.5.1.4.A.2	Use outcomes of investigations to build and refine questions, models, and explanations.
SCI.3-4.5.1.4.A.3	Use scientific facts, measurements, observations, and patterns in nature to build and critique scientific arguments.
SCI.3-4.5.1.4.B.1	Design and follow simple plans using systematic observations to explore questions and predictions.
SCI.3-4.5.1.4.B.2	Measure, gather, evaluate, and share evidence using tools and technologies.
SCI.3-4.5.1.4.B.3	Formulate explanations from evidence.
SCI.3-4.5.1.4.B.4	Communicate and justify explanations with reasonable and logical arguments.
SCI.3-4.5.1.4.C.1	Monitor and reflect on one's own knowledge regarding how ideas change over time.
SCI.3-4.5.1.4.C.2	Revise predictions or explanations on the basis of learning new information.
SCI.3-4.5.1.4.C.3	Present evidence to interpret and/or predict cause-and-effect outcomes of investigations.
SCI.3-4.5.1.4.D.1	Actively participate in discussions about student data, questions, and understandings.
SCI.3-4.5.1.4.D.2	Work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories.
SCI.3-4.5.2.4.E.1	Demonstrate through modeling that motion is a change in position over a period of time.
SCI.3-4.5.2.4.E.4	Investigate, construct, and generalize rules for the effect that force of gravity has on balls of different sizes and weights.
SCI.3-4.5.4.4.A.1	Formulate a general description of the daily motion of the Sun across the sky based on shadow observations. Explain how shadows could be used to tell the time of day.
SCI.3-4.5.4.4.A.2	Identify patterns of the Moon's appearance and make predictions about its future appearance based observational data.
SCI.3-4.5.4.4.A.3	Generate a model with explanatory value that explains both why objects roll down ramps as well as why the Moon orbits Earth.
SCI.3-4.5.4.4.A.4	Analyze and evaluate evidence in the form of data tables and photographs to categorize

and relate solar system objects (e.g., planets, dwarf planets, moons, asteroids, and comets).

## **Essential Questions**

---

How do objects in the solar system relate to one another?

How is life on earth affected by earth's placement in the solar system?

How does earth's movement through the solar system create patterns here on earth?

How does gravity affect objects here on earth?

## **Application of Knowledge and Skills...**

---

## **Students will know that...**

---

- 1. The students will know that one rotation of the earth takes one day (24 hours).
- 10. The students will know that the effect of gravity will change depending on an object's size and weight.
- 11. The students will know that the sun is the closest star to earth.
- 12. The students will know that many different objects can be found in our solar system.
- 13. The students will know the characteristics of the different planets in the solar system.
- 14. The students will know the order of the planets in our solar system.
- 2. The students will know that the rising and setting of the sun gives us day and night.
- 3. The students will know that it takes about 365 days for the earth to revolve (orbit) around the sun.
- 4. The students will know that the solar system consists of the sun, the planets and other objects that revolve or orbit around the sun.
- 5. The students will understand that shadows change depending on the position of the sun.
- 6. The students will understand that gravity is an invisible force that pulls two bodies of matter together.
- 7. The students will know that the moon revolves around the earth.
- 8. The students will know that the lunar cycle repeats itself about every 29 days.
- 9. The students will know the names for the phases of the moon.

## **Students will be able to...**

---

- a. tell the length of time it takes for the earth to rotate once;

- b. explain how earth's rotation from west to east creates day and night;
- c. tell the length of time it takes for the earth to revolve around the sun once;
- d. demonstrate how the objects in our solar system revolve around the sun;
- d. identify the objects (planets, moons, dwarf planets, asteroids and comets) in our solar system;
- e. demonstrate and explain how the position of the sun affects the length and direction of shadows;
- f. explain that gravity is an invisible force that pulls two objects together;
- g. explain why the Moon orbits Earth (gravity);
- h. demonstrate how objects roll down ramps (gravity);
- i. name the phases of the moon;
- j. describe and predict moon phases based on the pattern of the lunar cycle;
- k. tell the length of time it takes for the lunar cycle to complete its pattern;
- l. demonstrate how size and weight affect the pull of gravity on objects;
- m. identify the sun as the star closest to the earth;
- n. name the objects in the solar system;
- o. describe the characteristics of the planets in our solar system;
- p. name the planets in order in our solar system.

## Assessments

---

Diagnostic: Other written assessments

Solar Cumulative Test or Splash Activity 5.1.4.A.1; 5.1.4.A.3; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1

Formative: Other written assessments

The Planet Earth worksheet 5.1.4.A.1; 5.1.4.A.3; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.D.1

Formative: Other written assessments

Gravity Comprehension Questions, Magnet Comprehension Questions 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.D.1

Formative: Other written assessments

Understanding Gravity worksheet 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.D.1

Formative: Other written assessments

What Causes Earth's Seasons assessment 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.A.4; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.2.4.E.1; 5.2.4.E.4; 5.4.4.A.1

Formative: Other written assessments

Solar System Scramble and Review Riddle 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.B.1; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.D.1; 5.1.4.D.2

Summative: Other written assessments

Unit Review and Test Prep worksheet 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.A.4; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.2.4.E.1; 5.2.4.E.4; 5.4.4.A.1; 5.4.4.A.2; 5.4.4.A.3; 5.4.4.A.4

Summative: Other written assessments

Grade 3 Benchmark: "Astronomy" Unit 5.1.4.A.1; 5.1.4.A.2; 5.1.4.A.3; 5.1.4.A.4; 5.1.4.B.1; 5.1.4.B.2; 5.1.4.B.3; 5.1.4.B.4; 5.1.4.C.1; 5.1.4.C.2; 5.1.4.C.3; 5.1.4.D.1; 5.1.4.D.2; 5.2.4.E.1; 5.2.4.E.4; 5.4.4.A.1; 5.4.4.A.2; 5.4.4.A.3; 5.4.4.A.4

## **Activities**

---

1. \* Solar Cumulative Test or Splash Activity
2. Sunrise Sunset Chart(s)
3. Moon Log
4. Day/Night Think questions
5. The Planet Earth reading selection
6. \*The Planet Earth worksheet
7. Shadow activities
  - What Do You Know About Shadows?
  - Shadows At Play
  - Measuring Shadows
8. "What Causes Earth's Seasons?" reading selection
  - Earth Orbits the Sun
  - Out-Of-This-World Orbits
  - Orbit and Spin, book, worksheet and lab
  - Gravity: The Invisible Force reading selection
    - \*Gravity Comprehension Questions
  - We Live On a Giant Magnet reading selection
    - \*Magnet Comprehension Questions
  - Understanding Gravity reading selection
    - \*Understanding Gravity worksheet
    - The Pull of Gravity experiment
    - Ramp and Balls experiment
    - Craters experiment
  - \*"What Causes Earth's Seasons?" assessment
9. "How Do Earth and the Moon Interact?" reading selection (with optional eclipse reading)
  - Moon Log (continued)
  - "The Moon's Phases" experiment
  - "Moon In My Room" activity and worksheet
  - "We See Our Moon" worksheet
  - "Moon Phases" booklet project
  - "Birthday Moons"
  - Phases of the Moon worksheets (may choose one)
    - On the Move

- The Phases of the Moon
- (The following are optional)
  - Modeling Moon Phases activity
  - Moon Phase Tester
  - Moon Shapes activity
  - "The Moon in Motion" flipbook
  - "Moon Jumping"

10. "What Is the Solar System?" reading selection

- "The Planets" data table activity
- "The Planets Are Moving"
- "Ellipse"
- "Planetary Orbits Are Not Circles"
- "Our Sun" worksheet
- "Our Fiery Star" worksheet
  - (optional- My Sun Book)
  - "What's In Our Solar System?" worksheet
- "A Strip of Space" activity sheet
- Great Planetary Graph

11. \*Solar System Scramble

12. \*A Review Riddle

13. \*Unit Review and Test Prep worksheets

14. \*Grade 3 Benchmark Test: "Astronomy" Unit

(Optional Activities)

"My Book About the Planets"

"My Book of the Planets"

"Our Solar System" booklet activity

"So Far Apart" worksheet

"The Solar System" Fact Card Booklet

"Meet the Solar System" readers' theater

"Interesting Moons"

"Scale Model of the Solar System"

"If I Were An Astronaut" essay

Scale and Relative Size

Constellations

Make Your Own Star Clock

Star Patterns

"Introducing An Alien" essay

### **Activities to Differentiate Instruction**

---

Provide vocabulary cards/lists

Study Guides for assessments

Preprinted worksheets

Visual Aids for Instruction

Assigned lab partners/lab groups

Instruction for using measurement tools

Read tests aloud

Resource supplements (i.e. books from library) available for further research

Computer websites for further research

Blank booklets provided for student research

### **Integrated/Cross-Disciplinary Instruction**

---

Language Arts connections:

When the Moon Is Full, by Penny Pollack

Postcards From Pluto, by Loreen Leedy

The Planets, by Gail Gibbons

The Moon Book, by Gail Gibbons

Is There Life in Outer Space?, by Franklyn M. Branley

Our Solar System, by Seymour Simon

## **Resources**

---

Solar System, Delta Science Modules, Delta Education, 2003

HSP New Jersey Science, Harcourt School Publishers, 2009

Solar System, Delta Science Readers, 2003

Earth, Moon and Sun, Delta Science Readers, 2003

A Tour of the Planets, Newbridge Educational Publishing, 1994

Astronomy For Every Kid, by Janice Pratt VanCleave, John Wiley and Sons, 1991

Instant Science Lessons, by Barbara and Sue Gruber, Frank Schaffer Publication, 1986