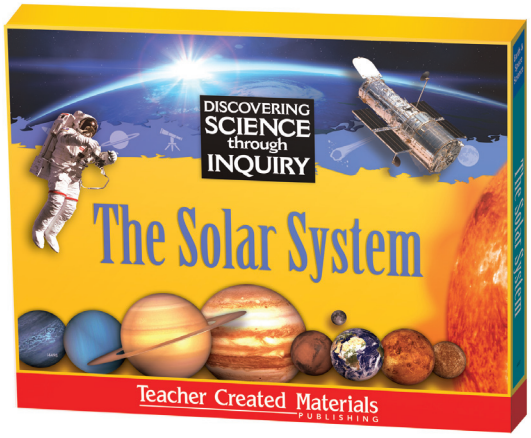
Teacher Created Materials
PUBLISHING

Sample Pages from

Discovering Science through Inquiry: The Solar System



The following sample pages are included in this download:

- Teacher's Guide Cover, Table of Contents, and Lesson 5: Earth lesson plan
- Inquiry Handbook Cover and Lesson 5: Earth student activity sheets
- Inquiry Card for Lesson 5: Looking for Habitable Zones

For correlations to Common Core and State Standards, please visit http://www.teachercreatedmaterials.com/correlations.

DISCOVERING SCIENCE through INQUIRY

The Solar System

Teacher's Guide

Teacher Created Materials PUBLISHING

Table of Contents

Introduction and Research

About Inquiry-based Learning 4
- Inquiry-based Learning for the 21st Century 4
- Qualities of an Inquiry-based Classroom 5
- Making the Transition to Inquiry-based Instruction 6
- Using the 5 Es in a Science Classroom 7
- Asking Good Questions 9
- Teaching Scientific Vocabulary 10
- Differentiating Science Instruction 11
- Using Technology in the Inquiry-based Classroom 14
- Assessment 15

How to Use This Product 18
- Why Use Discovering Science through Inquiry? 18
- Teacher's Guide 18
- Inquiry Handbook 25
- Inquiry Cards 26
- Teacher Resource CD 27
- Using the Video Clips 27
- Sample Pacing Plans 29

Standards Correlation 31

Content Overview 34

Lessons

- Lesson 1: Our Solar System 35
- Lesson 2: The Sun 43
- Lesson 3: Mercury 51
- Lesson 4: Venus 59
- Lesson 5: Earth 67
- Lesson 6: Mars 75
- Lesson 7: Asteroids and Comets 83
- Lesson 8: Jupiter 91
- Lesson 9: Saturn 99
- Lesson 10: Uranus 107
- Lesson 11: Neptune 115
- Lesson 12: Dwarf Planets 123
- Lesson 13: Constellations 131
- Lesson 14: Stars 139
- Lesson 15: The Planets and Their Moons 147
- Lesson 16: Beyond Our Solar System 155

Culminating Activity: Galactic Summit . . 163

Appendices

- Appendix A: References Cited 167
- Appendix B: Differentiation Suggestions 168
- Appendix C: Contents of the Teacher Resource CD 174

Earth

Standards

Content Standard

Knows that Earth is one of several planets that orbit the sun; knows that the moon orbits Earth

Process Standard

Knows that scientific investigations involve asking and answering a question and comparing the answer to what scientists already know about the world

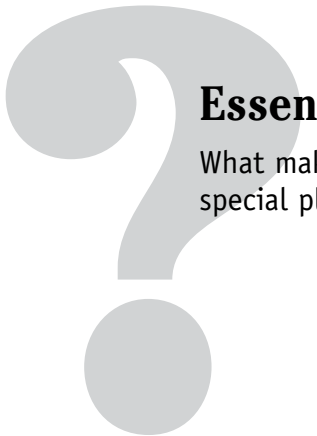
Vocabulary

equatorial diameter: the length across the center of the planet from one side of the equator to the other

oblate: flattened at the poles; having an equatorial diameter greater than the distance between poles

orbital period: the time it takes an object to make one complete orbit about another object, such as Earth around the sun

polar diameter: the length of a planet from pole to pole



Essential Question

What makes Earth a unique and special place for life?

Overview

Engage

In this section, students learn about how scientists study Earth and other planets from space through space exploration.

Explore

In this section, students will learn about Earth's oblate shape and the difference between its polar diameter and equatorial diameter.

Explain

In this section, students learn more about the planet Earth.

Elaborate

In this section, students learn about habitable zones and the search for planets outside our solar system that could support Earth-like life.

Evaluate

In this section, students examine the Essential Question of the lesson and reflect on their learning. Students also take the Earth Assessment.

Earth

Background Information for the Teacher

Earth is the most unique planet in the solar system for at least two very important reasons. First, it is the only known planet in the universe that supports life. Secondly, it is also the only known planet that has an abundance of water, which is essential for all life. In fact, as much as 70% of Earth's surface is covered with water.

Earth is the third planet from the sun and the fifth largest planet in the solar system. Its diameter is only a few hundred kilometers (miles) larger than Venus. As one of the four terrestrial planets (which include Mercury, Venus, and Mars), Earth is made up of a hard, rocky material. Its atmosphere, however, is quite different from the other planets. It consists of nitrogen (78%), oxygen (21%), and 1% of other ingredients, including carbon dioxide (0.03%). The atmosphere on Venus and Mars, on the other hand, is more than 95% carbon dioxide.

Like the other planets in the solar system, Earth is not perfectly round. Its *polar diameter*, the length of a planet from pole to pole, is 12,713.5 km (7,897 mi.). But, its *equatorial diameter*, the distance across the center of the planet or other celestial object measured at the equator, is 12,756.3 km (7,923 mi.). The difference is only 42.8 km (26.6 mi.), which is too tiny to be seen in pictures of Earth from space. Earth's rotation and density cause the *oblateness* of the planet. The planet has the shape of an oblate spheroid, which means it is flattened at the poles and has an equatorial diameter greater than its polar diameter.

Earth has one moon, which is the brightest object in the night sky. On average, the moon is about 384,400 km (238,758 mi.) from Earth. It completes its orbit around Earth once every 27.3 days. The moon rotates on its axis in about the same amount of time. As a result, we always see the same hemisphere of the moon (the near side) while the other hemisphere (the far side) is always turned away from Earth.

© Teacher Created Materials

Earth

More to Know

Additional Vocabulary

altitude: a high place or region

atmosphere: the layer of gases that surrounds a planet or other celestial body

axis: the imaginary line running through a planet from the North Pole to the South Pole, around which the planet rotates

meteorology: the study of Earth's atmosphere

planetologist: a scientist who studies the physical features of the planets

rotation period: the time it takes an astronomical object to make one complete revolution around its axis of rotation

sphere: a perfectly round, three-dimensional shape

Earth At-a-Glance

Planet	Average Distance from Sun	Average Diameter	Surface Area	Period of Rotation	Orbital Period	Average Surface Temp.
Earth	149.6 million km (93 million mi.)	12,756 km (7,923 mi.)	510 million km² (197 million mi.²)	24 hours	365.2 days	15°C (59°F)

Interesting Facts About Earth

- The hottest temperature ever recorded on Earth—58°C (136°F)—was in Libya in 1922.
- Earth is the only planet in the solar system known to have life.
- Earth is the only planet that did not get its name from Greek and Roman gods. The name *Earth* is an Old English word.

Earth

Engage

In this section, students learn about how scientists study Earth and other planets from space through space exploration.

Materials

- Earth (*bluemarble.jpg*)
- Vostok 1 (*vostok.jpg*)

Procedure

1. Begin the lesson by showing students the image Earth found on the Teacher Resource CD. Tell them that this photograph was taken on December 7, 1972 by the crew of the *Apollo 17* spacecraft. Explain that the photo has become one of the most widely distributed photographic images of Earth.
2. Explain that the astronauts gave the photo a special name. Ask the class if anyone can guess what that name is. Tell students it is called *The Blue Marble*. Ask students if they think it is an appropriate name for the picture, and if they do, why is it a good name. Ask them what they think the photo tells us about Earth's atmosphere. Point out the white swirls, and blue, green, and tan areas.
3. Explain to students that space exploration involves using technology to explore space and launch spacecraft and people into space. Tell them that since spacecrafts and people began traveling to space, scientists have learned a great deal about Earth, the solar system, and the other planets.
4. Tell students that it has not been very long since the first person traveled into space. Explain that the Russian spacecraft *Vostok 1* took the first human astronaut into space in 1961. Show students the image *Vostok 1* found on the Teacher Resource CD. Tell students *Vostok 1* orbited around Earth in an hour and forty-eight minutes before returning.
5. Explain that after that first human spaceflight, other countries, like the United States, raced to send the next person into space; and the United States won this space race.
6. Facilitate a discussion about how sending spacecraft into space changed how scientists studied Earth and other planets. Write key points from the discussion on the board.
7. Conclude the lesson by telling students that they are going to learn a lot more about Earth and its atmosphere in this unit.

© Teacher Created Materials

Earth

Explore

In this section, students will learn about Earth's oblate shape and the difference between its polar diameter and equatorial diameter.

Materials

- Inquiry Handbook: Earth's Shape (page 43)
- beach ball or other sphere-shaped object
- oval-shaped pumpkin or other oval-shaped object
- black permanent marker
- newspaper
- modeling clay
- thin wooden dowels
- rulers

Procedure

Note: Prepare the pumpkin (or other oval-shaped object) by labeling its north and south poles, as well as drawing a thick black line around it to represent Earth's equator.

1. Begin this lesson by asking students to raise their hands if they think Earth is flat. Ask how many think that Earth is round. Ask students if they would be surprised to learn that Earth is neither flat nor round.
2. Write the term *oblate spheroid* on the board. Ask students if anyone knows what a sphere is. Show students the beach ball and the oval-shaped pumpkin. Tell them that one is a sphere and one is an oblate spheroid. Ask them if they can guess which is which. Explain that an oblate spheroid is a three-dimensional figure similar to the shape of an egg.
3. Explain to the class that the word *oblate* in astronomy means flattened at the poles. Tell students to pretend the pumpkin is Earth (but make sure to indicate that Earth is not as flat at the poles as the pumpkin). Point to its north and south poles. Tell students that the *polar diameter* is the length of the planet from pole to pole.
4. Point to the black line on the pumpkin representing the equator. Explain that the length across the center of the planet from one side of the equator to the other is called the *equatorial diameter*.
5. Distribute copies of the Earth's Shape activity sheet to students. Allow time for students to read the directions and ask any questions they may have about the experiment. Have students formulate their hypotheses and conduct their experiments. Have them record their observations during the experiment.
6. Provide each student with a set of materials.
7. Have students record their conclusions. Discuss students' hypotheses and conclusions as a class.

Earth

Explain

In this section, students learn more about the planet Earth.

Materials

- Inquiry Handbook:
  Home Sweet Home (page 44)
  Earth Planet Wheel (page 45)
  Earth Vocabulary (page 46)

Procedure

1. Ask students to tell what they know about Earth. Ask students what they would like to know about Earth.
2. Distribute copies of the background page Home Sweet Home to students. Ask someone to read the title of the article aloud. Ask students what they think they will learn by reading this text. Ask them why the author might have titled this text *Home Sweet Home*.
3. Tell students that as they read, they should look for the main ideas and details of the text. Allow time for students to read the text independently, in pairs, in small groups, or as a whole class.
4. Distribute copies of the Earth Planet Wheel activity sheet to students. Allow time for students to complete the activity individually or in pairs. Students should use the background information to aid in completion of the activity.
5. Begin a discussion about the reading by asking students the following questions:
   - How much of the planet Earth is covered by water? *(70%)*
   - How long is Earth's orbital period? *(365 days)* What is Earth's rotation period? *(24 hours)*
   - Why is Earth's atmosphere unique among the planets? *(It has the right mixtures of gases that are essential to human life, including nitrogen and oxygen.)*
6. Write the vocabulary words and definitions on the board and go over them with students. Distribute copies of the Earth Vocabulary activity sheet to students and allow them time to complete it. Encourage them to discuss possible answers with their peers.

© Teacher Created Materials

Elaborate

In this section, students learn about habitable zones and the search for planets outside our solar system that could support Earth-like life.

Materials

- Inquiry Card: Looking for Habitable Zones
- Inquiry Handbook: Looking for Habitable Zones (page 47)

Using the Card

1. Display the Inquiry Card Looking for Habitable Zones and distribute copies of Looking for Habitable Zones from the *Inquiry Handbook*.
2. Have the students examine the images on the card and write down any initial observations they have. Allow them to share their observations in small groups.
3. Have students read the information on the back of the Inquiry Card aloud. Tell students to take notes on their copies of the Inquiry Card.
4. Use the Inquiry Discussion Questions to further the discussion and analysis of the illustration on the Inquiry Card. Students should understand the significance of finding other habitable zones in our galaxy.
5. Assign an Analyzing Science question to each student, using the differentiation suggestions.
6. Allow students time to complete the Nonfiction and Fiction Writing Prompts as well as the Scientific Challenge. These activities can be completed in centers or work stations, if desired.

Inquiry Discussion Questions

- Why are habitable zones special?
- What can we learn from searching for the habitable zones of the galaxy?
- What should scientists do once they collect information about planets located in habitable zones?

Differentiation

Above-Level Learners

Have students complete the triangle Analyzing Science question.

On-Level Learners

Have students complete the square Analyzing Science question.

Below-Level Learners

Have students complete the circle Analyzing Science question.

English Language Learners

Have students write *too hot* next to Venus, *too cold* next to Mars, and *just right* next to Earth on their copies of the Inquiry Card. Then, explain the concept of habitable zones again to students. Then, have them complete an Analyzing Science question that is appropriate for their abilities.

Earth

Evaluate

In this section, students examine the Essential Question of the lesson and reflect on their learning. Students also take the Earth Assessment.

Materials

- Inquiry Handbook:
  Earth Journal (page 48)
  Earth Assessment (pages 49–50)

Procedure

1. Allow students to share what they have learned about the planet Earth and its atmosphere.
2. Discuss the Essential Question (page 67) of the lesson as a class. Students should be able to discuss various reasons why Earth is a unique planet in the solar system.
3. Distribute copies of the Earth Journal activity sheet to students and have them complete it as a way to reflect on the lesson and synthesize the major concepts studied. This can also serve as a review for the final assessment.
4. Distribute copies of the Earth Assessment to students and allow them time to complete it. Answers for the assessment as well as the other activity sheets used in this lesson are provided below.

Answer Key

Earth's Shape (page 43)

The equatorial diameter is longer.

Earth Planet Wheel (page 45)

moons: one; atmosphere: made up of gases including nitrogen, oxygen, and carbon dioxide; orbital period: 365 Earth days; rotation period: 24 hours; other facts: will vary; average surface temperature: 15°C (59°F); composition: hard and rocky with a solid core

Earth Vocabulary (page 46)

See page 67 of this book for definitions.

Sentences and illustrations will vary.

Earth Journal (page 48)

Responses and illustrations will vary.

Earth Assessment (pages 49–50)

1. A
2. A
3. C
4. B
5. B

Open Response

Responses will vary, but should include an explanation of *oblate*.

© Teacher Created Materials

DISCOVERING SCIENCE through INQUIRY

The Solar System

Inquiry Handbook

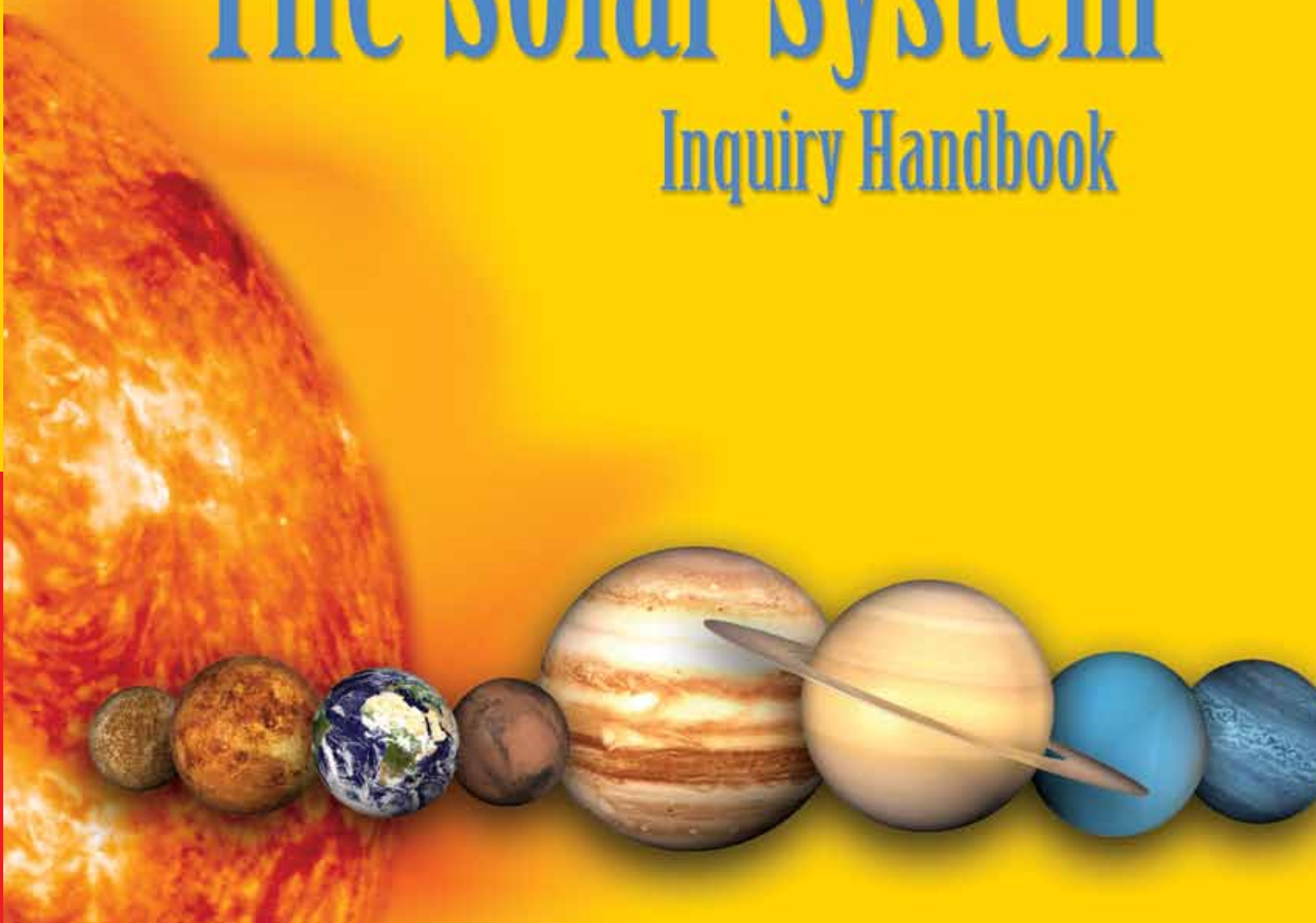


Table of Contents

Diagnostic Pre-test 5

Lesson 1: Our Solar System
- You Be the Astronomer. 11
- Our Wondrous Solar System 12
- Types of Planets. 13
- Our Solar System Vocabulary 14
- How Big Is Our Solar System? 15
- Our Solar System Journal 16
- Our Solar System Assessment 17

Lesson 2: The Sun
- You Be the Solar Astronomer. 19
- Our Star—the Sun 20
- About the Sun. 21
- The Sun Vocabulary 22
- Layers of the Sun 23
- The Sun Journal 24
- The Sun Assessment 25

Lesson 3: Mercury
- You Be the Planetologist. 27
- Blast Off for Mercury. 28
- Mercury Planet Wheel. 29
- Mercury Vocabulary 30
- Space Probes to Mercury 31
- Mercury Journal 32
- Mercury Assessment. 33

Lesson 4: Venus
- Atmospheres 35
- The Hottest Planet in the Solar System. 36
- Comparing Venus and Earth. 37
- Venus Vocabulary 38
- Venus' Greenhouse Effect 39
- Venus Journal. 40
- Venus Assessment 41

Lesson 5: Earth
- Earth's Shape 43
- Home Sweet Home. 44
- Earth Planet Wheel 45
- Earth Vocabulary. 46
- Looking for Habitable Zones 47
- Earth Journal 48
- Earth Assessment 49

Lesson 6: Mars
- Gravity and Mass 51
- The Red Planet. 52
- Mars Planet Wheel. 53
- Mars Vocabulary 54
- Landforms on Mars 55
- Mars Journal. 56
- Mars Assessment. 57

Lesson 7: Asteroids and Comets
- Making Craters. 59
- A Look at Asteroids and Comets 60
- Asteroids and Comets Fact Sheet 61
- Asteroids and Comets Vocabulary. . . . 62
- Meteoroids, Meteors, and Meteorites. 63
- Asteroids and Comets Journal. 64
- Asteroids and Comets Assessment . . . 65

Lesson 8: Jupiter
- Jupiter's Stripes 67
- The King of the Solar System 68
- Jupiter Planet Wheel 69
- Jupiter Vocabulary 70
- Planetary Tilt 71
- Jupiter Journal 72
- Jupiter Assessment 73

Lesson 9: Saturn
- Will It Float or Sink?. 75
- Jewel of the Solar System 76
- Saturn Planet Wheel 77
- Saturn Vocabulary. 78
- The Density of the Planets 79
- Saturn Journal 80
- Saturn Assessment 81

Table of Contents

Lesson 10: Uranus
- You Discover a Planet 83
- A Year on Uranus 84
- Uranus Planet Wheel 85
- Uranus Vocabulary 86
- The Rings of Uranus 87
- Uranus Journal 88
- Uranus Assessment 89

Lesson 11: Neptune
- The Bright Blue Planet 91
- A Trip to the Planet Neptune 92
- Neptune Planet Wheel 93
- Neptune Vocabulary 94
- Measuring Distances in Space 95
- Neptune Journal 96
- Neptune Assessment 97

Lesson 12: Dwarf Planets
- Why Are There Dwarf Planets? 99
- Dwarf Planets vs. Planets 100
- Dwarf Planets Fact Sheet 101
- Dwarf Planets Vocabulary 102
- To Be or Not To Be...a Planet 103
- Dwarf Planets Journal 104
- Dwarf Planets Assessment 105

Lesson 13: Constellations
- Constellations Expert 107
- Pictures in the Sky 108
- Constellations Concept Map 109
- Constellations Vocabulary 110
- Constellations and Asterisms 111
- Constellations Journal 112
- Constellations Assessment 113

Lesson 14: Stars
- Magnitude of Stars 115
- Classifying Stars 116
- Types of Stars 117
- Stars Vocabulary 118
- The Life Cycle of a Star 119
- Stars Journal 120
- Stars Assessment 121

Lesson 15: The Planets and Their Moons
- Moons 123
- The Moon: Our Nearest Neighbor . . . 124
- Earth's Moon 125
- The Planets and Their Moons Vocabulary 126
- The Phases of the Moon 127
- The Planets and Their Moons Journal 128
- The Planets and Their Moons Assessment 129

Lesson 16: Beyond Our Solar System
- You Be the Cosmologist 131
- 100 Billion Galaxies and Counting . . . 132
- Three Types of Galaxies 133
- Beyond Our Solar System Vocabulary 134
- The Local Group of Galaxies 135
- Beyond Our Solar System Journal . . . 136
- Beyond Our Solar System Assessment 137

Culminating Activity: Galactic Summit
- Scientist Planning Sheet: Developing Your Topic 139
- Scientist Planning Sheet: Planning Your Project 140
- Developing and Presenting Your Project 141
- Project Rubric 142
- Performance Rubric 143

 © Teacher Created Materials

Name_____

Earth

Earth's Shape

Directions: Read the question below and formulate a hypothesis. Use the materials your teacher has provided to test your hypothesis. Make your observations and draw a conclusion. Create a record of your experiment on a separate sheet of paper.

Question

Which is longer in an oblate planet like Earth: its polar diameter or equatorial diameter?

Hypothesis

Formulate a hypothesis. (What is the answer to the question?) Record your hypothesis.

Experimental Design

1. Use a handful of modeling clay to form the shape of an oblate spheroid similar to your teacher's example.
2. Assume your oblate spheroid shape is a planet.
3. Carefully insert the wooden dowel through the planet from pole to pole. This is its polar diameter.
4. Use a pencil to mark how far the dowel went into the modeling clay.
5. Remove the wooden dowel. Use a ruler to measure the part of the dowel that was inside the planet.
6. Record your findings on a separate sheet of paper.
7. Carefully insert the wooden dowel through the planet from one side of its equator to the other. This is its equatorial diameter.
8. Repeat steps 4–6.

Observation

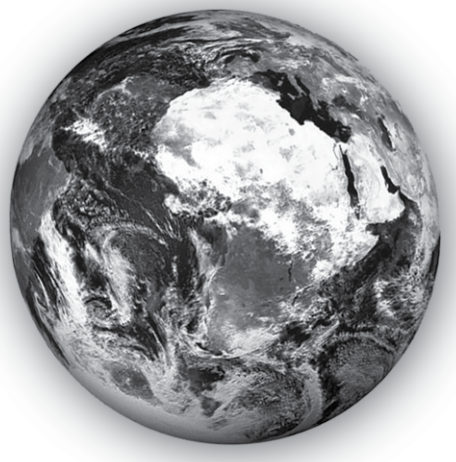
Compare the lengths of the planet's polar diameter and equatorial diameter. Record your observations.

Conclusion

Do your findings support your hypothesis? What did you learn from your research? Write your conclusion.

Earth

Home Sweet Home



Earth is our home sweet home. It is the only known planet in the universe that supports life. It is the only planet in the solar system known to have water. Water is vital for all life. More than 70 percent of Earth is covered by water. The atmosphere is the air around us. It is made up of gases. It is made of nitrogen (N_2) and oxygen (O_2), with just a little carbon dioxide (CO_2). Carbon dioxide is a gas that traps heat. Too much of it would trap too much heat. It could make Earth boiling hot, like Venus. Too little carbon dioxide would leave the planet freezing cold, like Mars. Lucky for us, Earth's atmosphere is just right. Its average surface temperature is 15°C (59°F).

In some ways, Earth is similar to the other terrestrial planets—Mercury, Venus, and Mars. They all are hard, rocky planets. They have a solid inner core. They have similar features too, like canyons, craters, mountains, and volcanoes.

Like most of the planets, Earth is not perfectly round. It is shaped like an *oblate spheroid*. *Oblate* means flattened at the poles. Scientists can tell that Earth is flattened at the poles by measuring its diameter. There are two kinds. Earth has a *polar diameter*. That is the length of the planet from pole to pole. Earth also has an *equatorial diameter*. That is the length across the center of the planet from one side of the equator to the other. One diameter is shorter than the other, but not by much. That is why you cannot see the difference in pictures of Earth from space. It looks perfectly round even though it is not.

Earth is the third planet from the sun. Its *orbital period* around the sun is 365 days long. That means it takes a year for Earth to travel around the sun one time. A day on Earth takes about 24 hours. That is the amount of time it takes the planet to spin once around its axis. This period is called a *rotation period*.

Unlike many planets, Earth has only one moon. But our moon is impressive. It is the second brightest object in the night sky. On average, it is only 384,400 km (238,855 mi.) from Earth. The moon orbits Earth every 27.3 days. This is about the same amount of time that it takes the moon to rotate once on its axis.

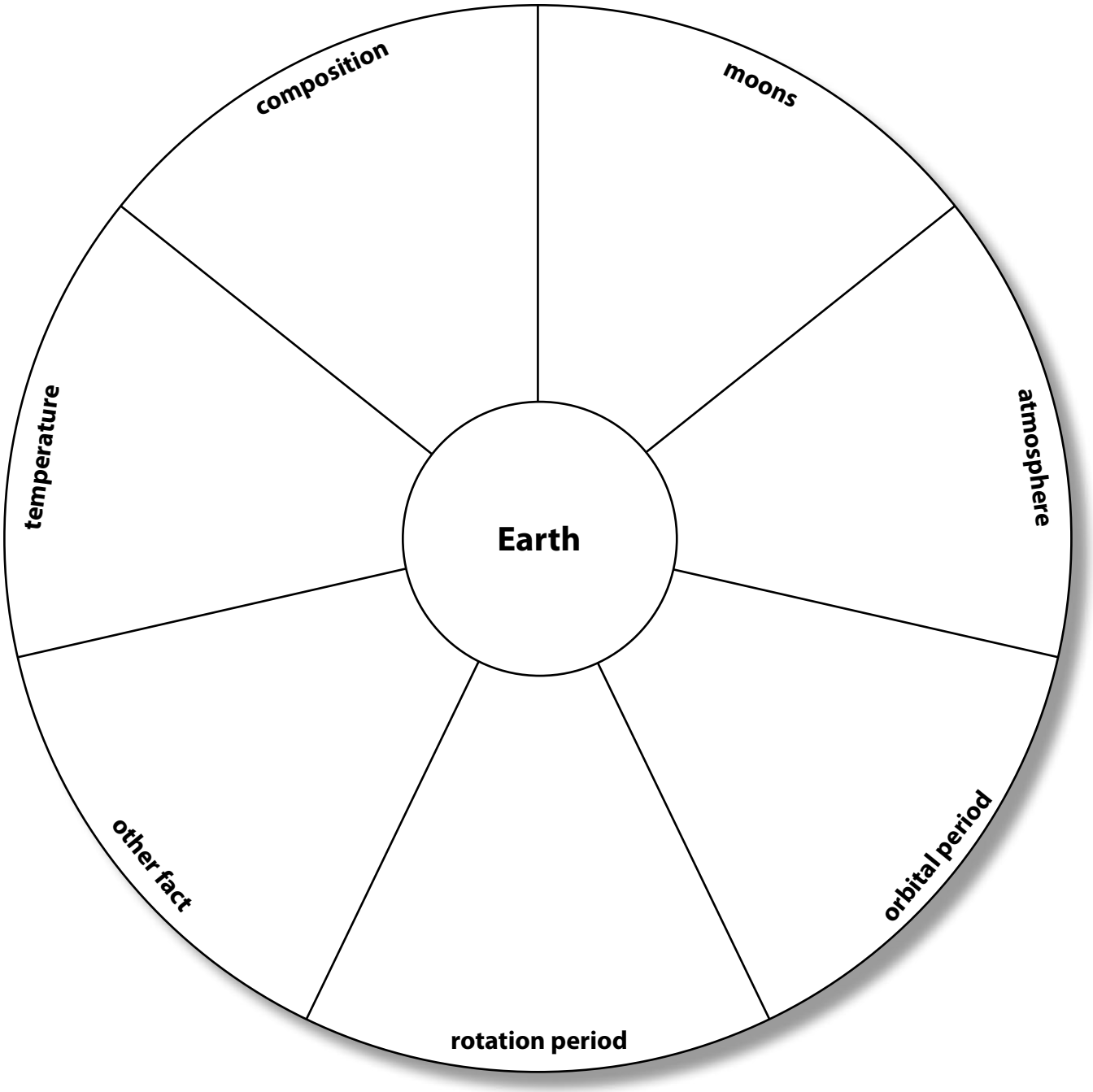
 © Teacher Created Materials

Name_____

Earth

Earth Planet Wheel

Directions: Think about the information you read on the previous page. Write one fact about the planet Earth in each of the spokes of the Planet Wheel.



Name_____

Earth

Earth Vocabulary

Directions: Use each of the following words to form a sentence about the planets. Use the "Home Sweet Home" background page to help you.

equatorial diameter: _____

_____

oblate: _____

_____

orbital period: _____

_____

polar diameter: _____

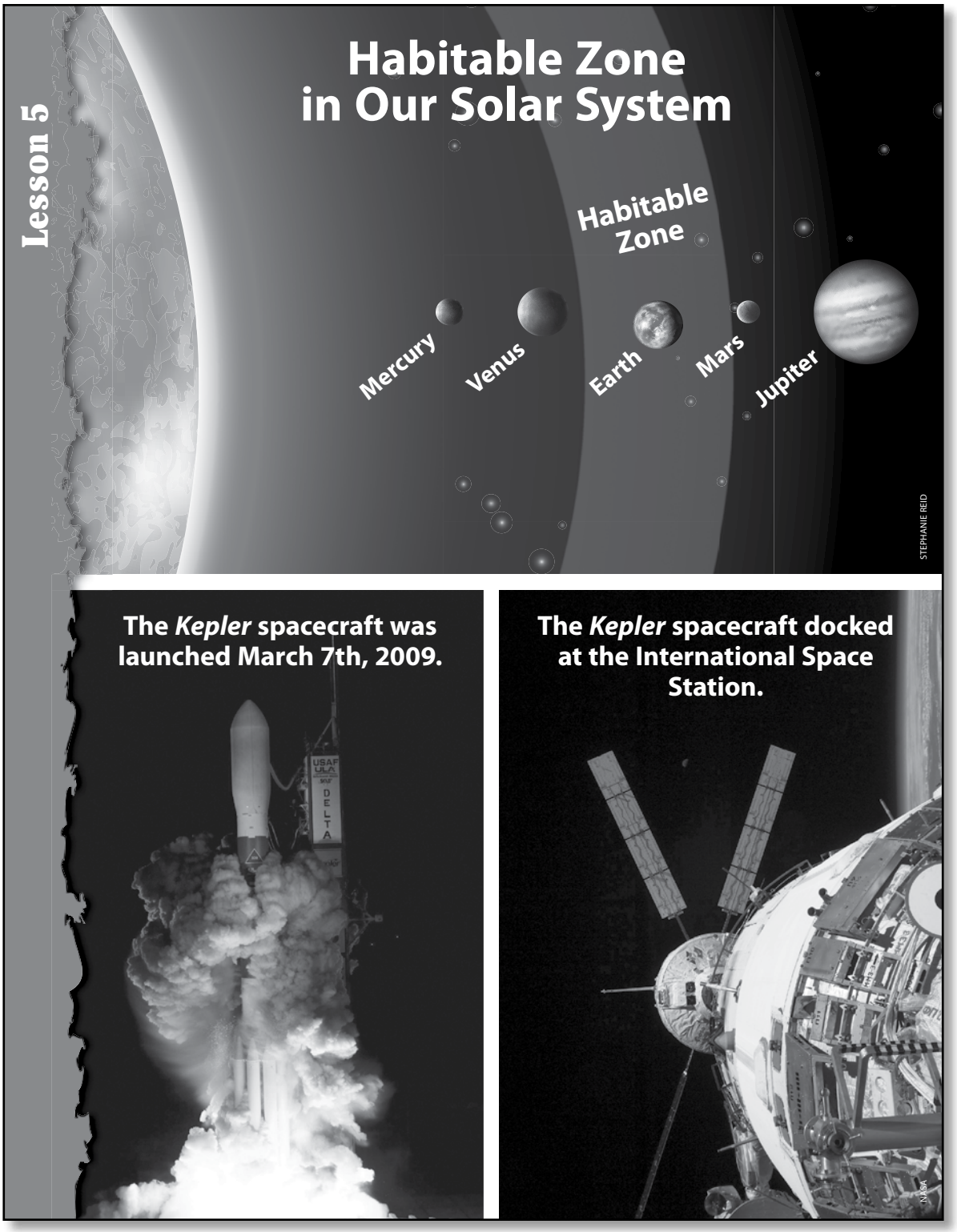
_____

Directions: Illustrate a picture of a planet with an oblate shape. Label its equatorial diameter and its polar diameter.

 © Teacher Created Materials

Earth

Looking for Habitable Zones



Name_____

Earth

Earth Journal

Questions and Notes

Directions: Write any questions you have about Earth here.

_____

_____

_____

Finish this sentence about Earth.

I would like to know more about:

_____

_____

_____.

Thinking About Earth

Question: What did you learn in this lesson about the planet Earth that surprised you?

_____

_____

_____

_____

_____

_____

_____

Drawings and Illustrations

Directions: Draw and label the layers of Earth's atmosphere.

 © Teacher Created Materials

Name_____

Earth

Earth Assessment

Multiple Choice

Directions: Fill in the bubble next to the correct answer for each question below.

1. Which of the following statements about the planet Earth is true?

- Ⓐ Earth is the third planet from the sun.
- Ⓑ Earth has two moons.
- Ⓒ Earth has a gaseous core.
- Ⓓ Earth is a perfect sphere.

2. More than _____ of Earth's surface is covered in water.

- Ⓐ 70 percent
- Ⓑ 75 percent
- Ⓒ 80 percent
- Ⓓ 85 percent

3. Earth orbits our sun at just the right distance to support life. It orbits in the:

- Ⓐ livable zone.
- Ⓑ growing zone.
- Ⓒ habitable zone.
- Ⓓ warm zone.

Comprehension

Directions: Read the paragraph below. Then answer questions 4 and 5. Fill in the bubble next to the correct answer for each question.

The Hubble Space Telescope

The Hubble Space Telescope is a big telescope in space. NASA sent it into space in 1990. Hubble was named after Edwin P. Hubble. He was an astronomer who studied planets, stars, and space. He found many galaxies in space in the 1900s. The Hubble telescope is about the length of a school bus and weighs as much as two elephants. It is fast. It travels around Earth at about 3 km (5 mi.) per second. It has seen the birth and death of stars. We have many pictures of planets, stars, and galaxies thanks to the Hubble space telescope. It has also helped scientists estimate the age and size of the universe.

Earth

Earth Assessment *(cont.)*

Comprehension *(cont.)*

4. Which statement is true about the Hubble Space Telescope?

- (A) It is about the length of a house.
- (B) It weighs as much as two elephants.
- (C) It was sent into space in 1890.
- (D) It travels very slowly.

5. The Hubble Space telescope was named after:

- (A) an elephant.
- (B) a scientist.
- (C) a galaxy.
- (D) how fast it travels around Earth.

Open Response

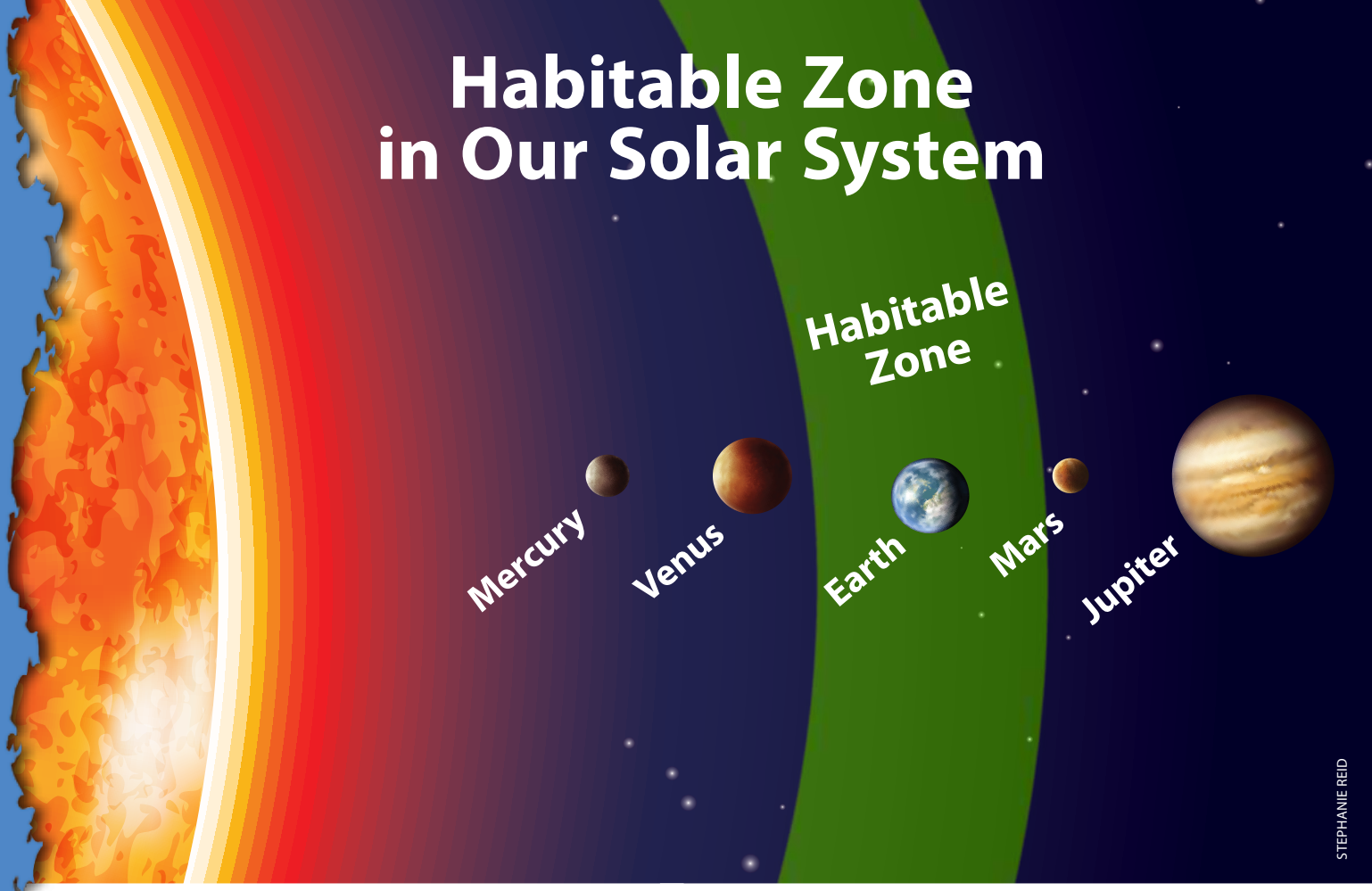
Directions: Read the questions below and respond on the lines provided.

Is Earth a perfect sphere? Why or why not?

 © Teacher Created Materials

Lesson 5

Habitable Zone in Our Solar System



STEPHANIE REID

The *Kepler* spacecraft was launched March 7th, 2009.

The *Kepler* spacecraft docked at the International Space Station.

NASA

Looking for Habitable Zones

Background Information

Earth is special. It is the only planet that we know of that contains life. Earth sits in the perfect place in our solar system to support life. If Earth were closer to the sun, say next to Venus, it would be too hot to support life. If it were farther away, next to Mars, it would be too cold. Earth sits in perfect balance between hot and cold in an area scientists call the *habitable zone*. The habitable zone is a place in a solar system or galaxy where planets are able to maintain liquid water. It is a place where Earth-like life can be supported.

Searching for habitable zones across the galaxy has been a goal of many astronomers. This goal continues with NASA's Kepler mission. The Kepler mission is NASA's first mission capable of finding planets similar to Earth. This is achieved using the *Kepler* spacecraft. This spacecraft has a telescope that stares at one part of space. It records the brightness of over 100,000 stars and any planets that may orbit them. When an orbiting planet moves in front of a star, the brightness of the star changes slightly. The *Kepler* telescope records how the planets move and finds planets that could be in a habitable zone.

That is when telescopes, such as the *Hubble* and *Spitzer* telescopes, take over. Using these telescopes, scientists can check the orbits and atmospheres of the planets that the *Kepler* finds. Planets in the habitable zone should have a similar orbiting time to Earth. That means one year on these planets is similar to one year on Earth.

Planets in habitable zones may be able to support life. That is still an exciting prospect for scientists. How about you?

Analyzing Science

- ● What is a habitable zone?
- ■ How are scientists at NASA searching for habitable zones?
- ▲ Why is discovering planets that could support life important to scientists?

Nonfiction Writing Prompt

Write a newspaper article about the Kepler mission. Use information that can be found on NASA's website to give your readers the Who, What, Where, When, and Why of the Kepler mission.

Fiction Writing Prompt

Write a story about a group of astronauts that is traveling to a planet that is in a habitable zone. What will they find there? How will this planet compare to Earth? Include these details in your story.

Scientific Challenge

Scientists have already found some planets that orbit around a star in a habitable zone. Research to find out the name of one of these planets. Create a poster to display facts and data about this planet.