

Chapter Resources

The Solar System and Beyond

Includes:

Reproducible Student Pages

ASSESSMENT

- ✓ Chapter Tests
- ✓ Chapter Review

HANDS-ON ACTIVITIES

- ✓ Lab Worksheets for each Student Edition Activity
- ✓ Laboratory Activities
- ✓ Foldables—Reading and Study Skills activity sheet

MEETING INDIVIDUAL NEEDS

- ✓ Directed Reading for Content Mastery
- ✓ Directed Reading for Content Mastery in Spanish
- ✓ Reinforcement
- ✓ Enrichment
- ✓ Note-taking Worksheets

TRANSPARENCY ACTIVITIES

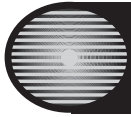
- ✓ Section Focus Transparency Activities
- ✓ Teaching Transparency Activity
- ✓ Assessment Transparency Activity

Teacher Support and Planning

- ✓ Content Outline for Teaching
- ✓ Spanish Resources
- ✓ Teacher Guide and Answers



Glencoe



Overview

The Solar System and Beyond

Directions: Complete the concept map using the terms in the list below.

225 million years

Earth

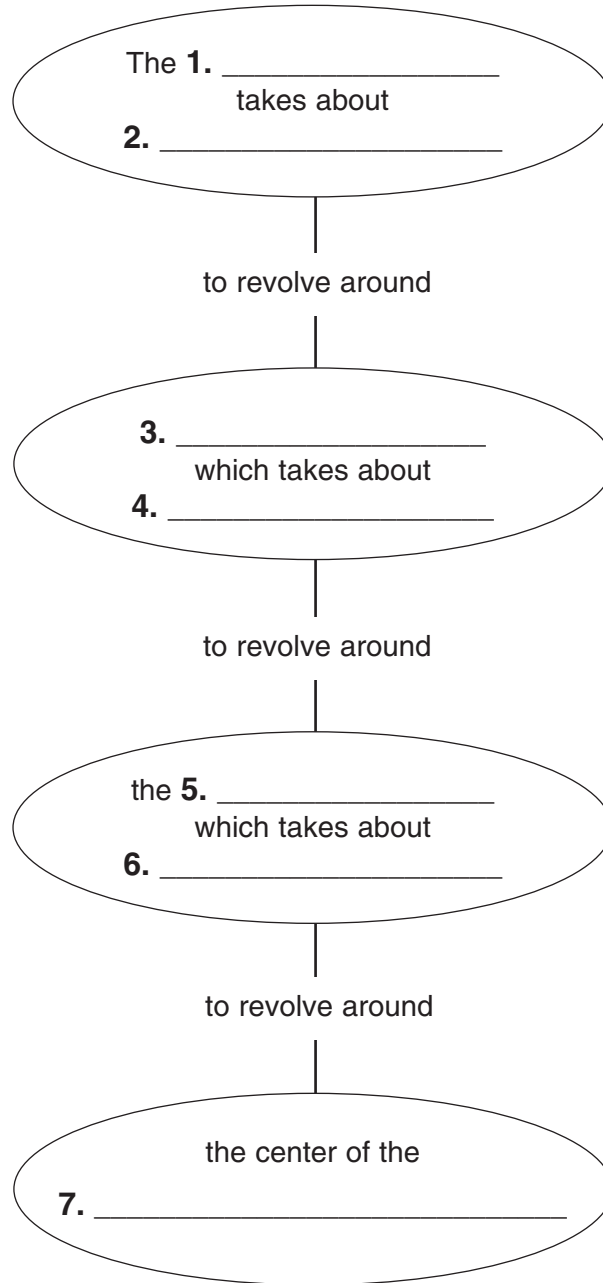
27.3 days

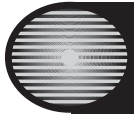
Moon

Sun

365 days

Milky Way galaxy





Directed Reading for
Content Mastery

**Section 1 ■ Earth's Place
in Space**

Directions: Use the illustration below to identify the phases of the Moon as **new, waxing, full, or waning**. Write the correct phase on the lines provided.



1



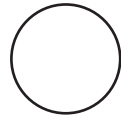
2



3



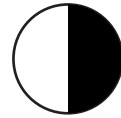
4



5



6



7



8

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

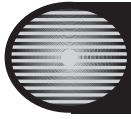
Directions: Answer the following questions on the lines provided.

9. How long does it take the Moon to revolve around Earth?

10. What is the spinning of Earth on its axis called?

11. What season is it when your part of Earth is tilted away from the Sun?

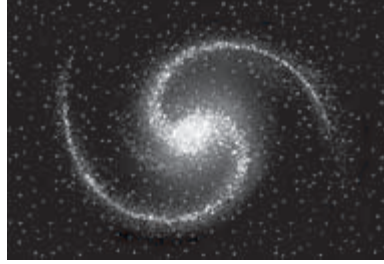
12. Place the Moon and Earth in the spaces below as they would line up during a solar and a lunar eclipse.
 - a. Solar eclipse SUN → _____ → _____
 - b. Lunar eclipse SUN → _____ → _____



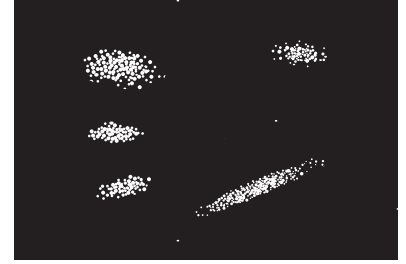
Directions: *Identify and describe each type of galaxy below.*



1.



2.



3.

1. Type: _____

Description: _____

2. Type: _____

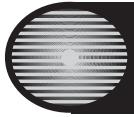
Description: _____

3. Type: _____

Description: _____

Directions: *Complete the following sentences using the correct terms.*

4. Our _____ is made up of the nine planets and other objects that orbit the Sun.
5. The _____ is at the center of our solar system.
6. A(n) _____ is a group of stars, gas, and dust held together by gravity.
7. Our solar system is in the _____ galaxy.
8. The Milky Way is a _____ galaxy.
9. The distances between the planets are measured in _____.



Directed Reading for
Content Mastery

Key Terms

The Solar System and Beyond

Directions: Complete the following sentences using the terms listed below.

astronomical unit

comet

light-year

constellations

meteorites

revolution

supernova

eclipse

rotation

solar system

orbit

1. The spinning of Earth on its axis is called _____.
2. It takes a year for Earth to make one _____ around the Sun.
3. When the moon blocks all or part of the Sun, it is called a solar _____.
4. A(n) _____ is equal to 150 million km and is used to measure long distances.
5. Our _____ is made up of nine planets and numerous other objects that orbit the Sun.
6. Groups of stars that form patterns in our sky are _____.
7. A(n) _____ is the distance light travels in a year—about 9.5 trillion km.
8. Earth moves around the Sun in a regular, curved path called a(n) _____.
9. After a(n) _____ occurs, for a few days it might shine more brightly than a whole galaxy.
10. A large body of frozen ice and rock that travels toward the center of the solar system is a(n) _____.
11. Chunks of rock and metal from space that fall to Earth are known as _____.

SECTION
1

Reinforcement

Earth's Place in Space

Directions: Match the cause in Column I with its effect in Column II by writing the correct letter in the space provided.

Column I

- _____ 1. revolution of Earth around the Sun
- _____ 2. rotation of Earth
- _____ 3. tilt of Earth's axis
- _____ 4. position of Earth, the Sun, and the Moon
- _____ 5. new moon and half moon

Column II

- a. night and day
- b. eclipses
- c. Moon phases
- d. seasons
- e. years

Directions: For each cause-and-effect pair that you matched above, write one or two complete sentences explaining the relationship. The first one is done for you.

6. It takes one year for Earth to revolve all the way around the Sun.

7. _____

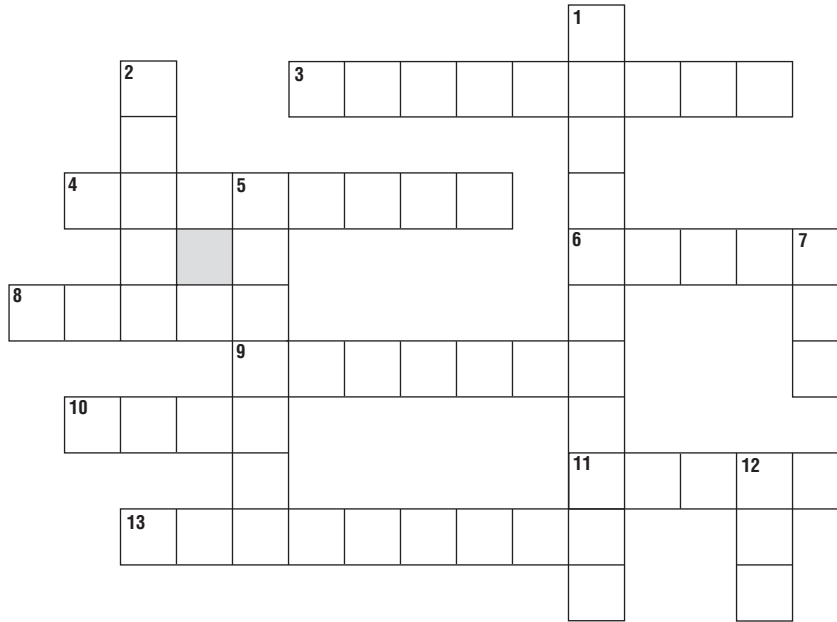
8. _____

9. _____

10. _____

SECTION
2
Reinforcement
The Solar System

Directions: Use the clues below to complete the crossword puzzle.


Across

3. These pieces of rock form a belt that separates the inner planets from the outer planets.
4. Pluto is the _____ planet in size.
6. Saturn is known for its dazzling _____.
8. Jupiter, Saturn, Uranus, Neptune, and Pluto make up the _____ planets.
9. This force holds the objects in the solar system in place.
10. This is the number of planets that are in our solar system.
11. Earth is the _____ planet from the Sun.
13. A piece of rock or metal that plunges through the atmosphere and falls to Earth is called a(n) _____.

Down

1. This is made up of the nine planets and numerous other objects that orbit the Sun.
2. This large body of frozen ice and rock sometimes forms what appears to be a bright, glowing tail when it gets near the Sun.
5. Jupiter is the _____ planet in size.
7. This is what we call the star in the center of our solar system.
12. Mars looks _____ because the rocks on its surface contain iron oxide.

SECTION
3**Reinforcement****Stars and Galaxies**

Directions: *Explain the relationship among the following groups of words. Use complete sentences.*

1. star's color, temperature, cool, medium, hot

2. supergiant, supernova, neutron star, black hole

3. giant, white dwarf, black dwarf

4. elliptical, spiral, irregular, Milky Way

5. astronomical units, light-years

6. huge clouds of gas and dust, gravity, fusion

7. Milky Way, galaxies, universe

SECTION**1****Enrichment****A Day on Earth**

When you think of a day on Earth, you probably think of 24 hours. However, if you had lived millions of years ago, a day on Earth would have been much shorter. For example, 900 million years ago, the length of Earth's day was about 18 hours.

Earth's Slowing Rotation

You already know that Earth rotates about its axis. But Earth hasn't always rotated at the same speed. It used to rotate much faster. Scientists know that since about 1600, Earth has rotated about 0.002 s slower every 100 years. Scientists don't have accurate data about Earth's rotation before 1600, but they assume that Earth's rotation has been slowing from its original speed. The length of a day is the time it takes Earth to rotate once, so as Earth rotates more slowly, days last longer.

Earth and Its Moon

As the Moon orbits Earth, its gravity pulls ocean water back and forth, causing tides. The water flowing across the ocean floor produces enough friction to slow Earth's rotation.

Meanwhile, Earth's oceans, as they go through the tides, have enough mass to form their own gravitational pull on the Moon. Some energy is transferred from Earth's tides to the Moon. As a result, the Moon speeds up in its orbit about Earth, causing it to move a little farther away. The distance from the Moon to Earth increases by about 3 or 4 cm every year.

1. Scientists have calculated that the Moon's revolution around Earth is increasing by about 0.015 s per century. At this rate, how long would it take the length of a month to increase by one full day?

2. Do you think Earth's slowing rotation affects the length of a year? Why or why not?

3. How is the Moon's orbit around Earth changing?

SECTION
2

Enrichment

Life in Other Worlds?

For centuries, people have wondered if we were alone in the universe. Many people once thought there might be life on Mars. We know now that at best, bacteria may have lived there once. But another place offers more hope than Mars does.

Conditions for Life

People used to think that life required two things: water and sunlight. In 1977, though, a discovery on Earth changed everything. Life was found on the bottom of the ocean, far from any sunlight. All along the seafloor, volcanoes and vents send heat and certain chemicals into the water. Microbes, fish, and even giant clams thrive there.

If life can exist without sunlight on Earth, it might exist somewhere else, too. Are there any places in the solar system that might have a heated ocean?

By Jupiter!

The best bet seems to be Europa. Europa is the fourth largest of Jupiter's 61 moons.

It is about the size of Earth's Moon, and it is covered with ice. Scientists used to think it was made of solid ice, but they have learned it is not.

Cracks in the Ice

The spacecraft *Galileo* has sent back information about Jupiter. When *Galileo* passed Europa, it took pictures of the moon. Those pictures show a crust of cracked ice. The patterns of cracks look as though ice is floating on liquid water. The surface temperature of Europa is -145°C . If there is water below the surface, it might have been melted by volcanic heat. Io, the moon nearest Europa, has many volcanoes. Europa may also.

It is still too early to say anything for sure. Europa may have an ocean beneath its ice. In that ocean, conditions may be right for life to exist. Some scientists think that brownish areas around some of Europa's cracks may be made of carbon-bearing molecules. On Earth, life is based on such molecules.

1. Scientists used to think two conditions were necessary for life as we know it. What were they?

2. What changed their minds?

3. Europa is far from the Sun, and its surface is very cold. How could there be liquid water there?

SECTION

3

Enrichment

Constellation History

In 1922, astronomy's governing body, the International Astronomical Union, adopted and recognized 88 constellations in the northern and southern hemispheres. If you were to count the number of objects in the sky, however, you would find more than 88. That's because some constellations include more than one object or creature. For example, the star pattern you're most likely to recognize is the Big Dipper. But the Big Dipper is not, by itself, a constellation. It's part of Ursa major, a constellation named by the Greeks meaning "the great bear."

Early Star Gazers

Although the Greeks are credited with inventing our modern-day constellation system, astronomers have traced their origin back to the Babylonians and Sumerians.

And almost half of the 88 constellations weren't even added by European astronomers until the 17th and 18th centuries.

Guided by the Stars

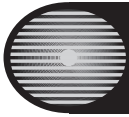
Regardless of when and how they were named, constellations have been used for centuries by people needing help in finding their way through oceans and across deserts. They've also been used to help people decide when the time was right for planting and harvesting of crops. Further, people also used constellations, such as the Summer Triangle, to mark the passing of the seasons. That's because the stars of the Summer Triangle are only seen in the nighttime skies of summer. Although the constellations no longer serve as a celestial calendar, one thing has stayed the same. Constellations continue to be a source of wonder, enjoyment, and imagination.

Directions: Use resources from the library to help you answer the following questions.

1. How many constellations represent men and/or women? How many represent birds? How many represent dragons?

2. Throughout the centuries, many other cultures have seen the star pattern we know as the Big Dipper. List four other names or descriptions for the Big Dipper along with their cultural origin.

3. Ancient Arabs said that "summer came on the wings of birds." Explain how the Arab saying is related to the Summer Triangle.

**Note-taking
Worksheet**

The Solar System and Beyond

Section 1 Earth's Place in Space

- A. Earth _____, even though it appears that the Sun does.
1. **Rotation**—spinning of Earth on its _____, which occurs once every 24 hours
 2. Earth moves around the Sun in a regular, curved _____ called an **orbit**.
 3. It takes one year for Earth's _____ around the Sun.
 4. _____ occur due to Earth's tilted axis and its revolution around the Sun.
- B. The Moon _____ around Earth every 27.3 days.
1. The Moon's changing shapes are known as _____ of the Moon.
 2. The Moon's phases are caused by the _____ of Earth, the Moon, and the _____.
 - a. When the Moon changes from new to full, it is called _____.
 - b. When the Moon changes from full to new, it is called _____.
 3. A solar _____ occurs when the Moon is between the Sun and Earth and the Moon's shadow falls on Earth
 4. A _____ eclipse occurs when Earth is between the Moon and the Sun and Earth's shadow falls on the Moon.

Section 2 The Solar System

- A. _____—the Sun, its nine planets, and other objects that orbit the Sun
1. _____ in space are so vast they require different units of measurement than are used to measure things on Earth.
 2. An _____ is about 150 million km, the mean distance from Earth to the Sun.

Note-taking Worksheet (continued)

B. Inner planets are _____, with minerals similar to those on Earth.

1. _____—second-smallest planet and closest to the Sun
 - a. Little atmosphere, resulting in extremes of temperature
 - b. Heavily cratered surface
2. _____—second-closest to the Sun
 - a. Heavy cloud layer
 - b. Clouds trap solar energy, making the planet extremely hot—about 470° Celsius.
3. _____—third planet from the Sun
 - a. Atmosphere allows life to flourish
 - b. Water exists as a solid, liquid, and gas.
4. _____—fourth planet from the Sun
 - a. Has seasons and polar ice caps
 - b. May have water shaping its surface
5. The _____ separates the inner and outer planets.

C. Outer planets—most are huge balls of _____

1. _____—fifth planet from the Sun and largest
 - a. Has 61 moons
 - b. Great Red Spot is a giant storm on the planet's surface.
2. _____—sixth planet from the Sun
 - a. Has at least 31 moons
 - b. Several broad rings of ice and dust
3. _____—seventh planet from the Sun
 - a. Axis makes the planet spin nearly sideways
 - b. Has rings and at least 21 moons
4. _____—eighth planet from the Sun
 - a. A gas planet with rings and at least 11 moons
 - b. Methanes in its atmosphere gives planet a blue color.

Note-taking Worksheet (continued)

5. _____—smallest planet and farthest from the Sun
 - a. Rocky and frozen crust
 - b. One moon
6. _____—large body of frozen ice and rock that travels toward the center of the solar system
7. _____—fragments of space material that land on Earth's surface
 - a. Pieces may be iron, rock, or both
 - b. Age (4.5 billion years) provides a clue to the Solar System's age

Section 3 Stars and Galaxies

- A. _____—groups of stars that form a pattern in the sky
- B. A star has a _____ that depends on its size.
 1. Stars begin as huge clouds of dust and gas that contract and heat up to the point of _____.
 2. Small stars shine _____ than larger stars.
 3. A medium-sized star ends up as a black dwarf, while a larger star explodes as a _____ that could eventually become a black hole.
- C. _____—group of stars, gas, and dust held together by gravity
 1. _____-shaped galaxies are most common.
 2. _____ galaxies look something like a pinwheel.
 3. _____ galaxies are smaller and less common than other galaxies.
 4. Earth is located in the _____ Galaxy.
 5. A _____ is the distance light travels in a year, approximately 9.5 trillion km.
 6. The _____, containing billions of galaxies, seems to be expanding.