

April 27th - May 1st

Name _____ Date _____

Benchmark Review
SC.5.E.5.1

SC.5.E.5.1 Recognize that a galaxy consists of gas, dust, and many stars, including any objects orbiting the stars. Identify our home galaxy as the Milky Way.

Stars and Galaxies

Stars

Stars may look like point of light in the night sky, but stars are actually huge balls of hot, glowing gases. They produce their own heat and glow with their own light.

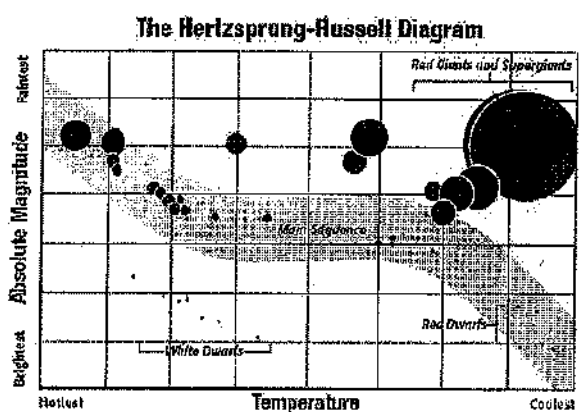
Stars form when gravity causes clouds of gas and dust in space to squeeze together. These particles are squeezed together under great pressure. Over time, energy stored in the particles is released as heat and light. A star is born. All stars give off heat and light, but they are not all the same. Some are cooler, and some burn hotter. They can have various colors.

Stars are classified by their color, size, temperature, and brightness. The color of a star can tell us about its temperature. The hottest stars burn blue, while cooler stars are red in color.

Stars have a wide range of sizes. White dwarf stars can be as small as a planet. Giant and supergiant stars are many times bigger than the average star. Larger stars tend to be brighter than smaller stars, because their larger size allows them to give off more light. A star's brightness is related to the amount of visible light it gives off.

Our own sun is a star. Even though it is a medium-sized yellow star, the sun appears much larger than other stars because it is so much closer to Earth.

Scientists use a **Hertzsprung-Russell diagram** to show how stars vary in size, color, temperature, and brightness.



Galaxies

Stars are not distributed evenly in space. They are found together in groups of billions of stars, called **galaxies**, which are held together by gravity. Galaxies are made of stars, objects that orbit these stars, and clouds of gas and dust. There are billions of galaxies in the universe, with huge expanses of empty space in between them.

Our home galaxy is called the Milky Way, and it appears as a faint band of glowing clouds in the night sky. Galaxies are classified by their shape: spiral galaxies, barred spiral galaxies, elliptical galaxies, and irregular galaxies. Spiral galaxies have pinwheel-like groups of stars. Barred spiral galaxies have a center shaped like a long bar. Recent evidence suggests that the Milky Way is a barred spiral galaxy.

Student-Response Activity

1 How does the sun compare to other stars? Describe its similarities and differences.

2 What is the relationship of our own solar system to the Milky Way galaxy?

3 What does the Milky Way galaxy look like from Earth? Based on what you know about the Milky Way galaxy, why don't people on Earth see its spiral shape?

4 Circle the objects in the list below that give off their own light.

- Earth
- moon
- planets
- stars
- sun

Benchmark Assessment SC.5.E.5.1

Fill in the letter of the best choice.

- 1 Which describes our sun?
- (A) hot compared to other stars
 - (B) very large compared to other stars
 - (C) cool and small compared to other stars
 - (D) medium-sized compared to most other stars
- 2 A star is blue in color. How does a star compare to the sun?
- (F) It is hotter than the sun.
 - (G) It is cooler than the sun.
 - (H) It is closer to Earth than the sun.
 - (I) It looks brighter to Earth than the sun.
- 3 Which is true of the Milky Way?
- (A) The Milky Way galaxy cannot be seen from Earth.
 - (B) The Milky Way galaxy is the only galaxy in space.
 - (C) The Milky Way galaxy contains the planet Earth.
 - (D) The Milky Way galaxy is very near to Earth's galaxy.
- 4 How are all galaxies alike?
- (F) All galaxies are the same size.
 - (G) All galaxies are the same shape.
 - (H) All galaxies are made up of many stars.
 - (I) All galaxies are very close together in space.
- 5 Why does the sun look larger and brighter than other stars?
- (A) The sun is closer than other stars.
 - (B) The sun is hotter than other stars.
 - (C) The sun is larger than other stars.
 - (D) The sun is cooler than other stars.

SC.5.E.5.3 Distinguish among the following objects of the Solar System — Sun, planets, moons, asteroids, comets — and identify Earth's position in it.

Our Solar System

The Planets

A solar system is made up of a star and the planets and other space objects that revolve around it. Our solar system consists of the sun, eight planets, many moons, many dwarf planets, an asteroid belt, comets, meteors, and other space objects. A **planet** is a large, round body that revolves around a star in its own orbit. The planets, in order from the sun, are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

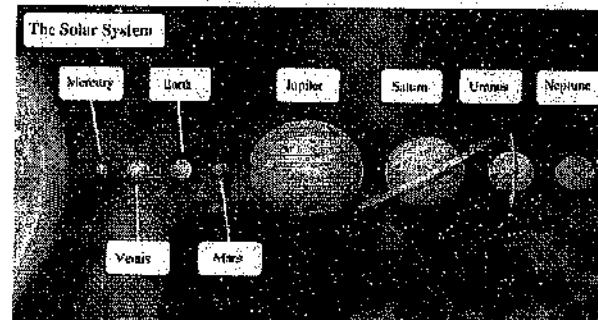
The sun is the center of our solar system and is also the largest object in the solar system. The sun makes up more than 99% of the solar system's mass! All other objects that are in the solar system revolve around the sun.

Inner Planets vs. Outer Planets

Planets in our solar system can be classified based on distance from the sun. The inner planets are closest to the sun. The inner planets—Mercury, Venus, Earth, and Mars—are relatively small. They are very rocky and have thin atmospheres. The inner planets have large, solid cores at their centers. They have few or no moons.

The outer planets are farther from the sun. In general, the farther a planet is from the sun, the colder it is. The outer planets—Jupiter, Saturn, Uranus, and Neptune—are huge, mostly gaseous, and have rings. These planets are called gas giants, because they are composed mainly of hydrogen and helium. They do not have a solid surface, and their cores are very small. The outer planets also have many moons and ring systems.

Between Mars and Jupiter is the **asteroid belt**, a ring-shaped area where there are many asteroids. Asteroids are small bodies in space made of rock or metal. There are other areas of asteroids, too, but this is the main belt. Some of the particles are left over from the formation of the solar system. Other bodies have been added as they break off planets or enter our solar system.



Pluto was once considered to be the ninth planet in our solar system. Scientists decided to classify Pluto as a dwarf planet in 2006. A **dwarf planet** is a nearly round body whose orbit crosses the orbit of other bodies. Eris, Ceres, Haumea, and Makemake are four other dwarf planets in our solar system. These objects are very far away and hard to study.

The Inner Planets

Mercury, is the smallest planet in our solar system and is also the closest to the sun. It is less than half the size of Earth. Like the moon, Mercury has almost no atmosphere and a surface covered with craters and dust.

Venus is the brightest object in the night sky, after the moon. This planet is about the same size as Earth, and it is rocky. Its atmosphere is made up mostly of carbon dioxide. Venus can become very hot, reaching about 460°C (860°F). It is even hotter than Mercury because thick clouds surround its atmosphere keeping heat from escaping.

Earth, the third planet from the sun, is our home. It has an atmosphere made of mostly nitrogen, oxygen, and carbon dioxide. About three-fourths of the surface of our planet is covered with oceans of liquid water. This makes Earth unique among the planets and gives our planet the nickname "the blue planet."

Mars is called "the red planet" because of its red, rocky surface. Its atmosphere is mostly carbon dioxide. Scientists have evidence that liquid water once existed on Mars. Mars has the largest volcano in the solar system, and it has dust storms that can last for months.

The Outer Planets

Jupiter is the largest planet in the solar system. It has rings and dozens of moons. There is a huge storm on Jupiter that has lasted for more than 400 years. The storm, like a hurricane, has a name—the Great Red Spot.



Saturn is best known for its rings, made of ice, dust, boulders, and frozen gas. The rings stretch about 136,200 km (84,650 mi) from the center of the planet! Like Jupiter, Saturn has dozens of moons.

Uranus also has many moons and rings. This planet rotates on an axis that is tilted much more than those of the other planets. Uranus looks like a top that has fallen over but is still spinning.

Neptune has many rings and moons and the fastest winds in the solar system. The winds can reach 2,000 km/hr (1,200 mi/hr)! These winds blow Neptune's Great Dark Spot around the planet. This spot is a storm about the size of Earth that is known to vanish and reform!

Moons

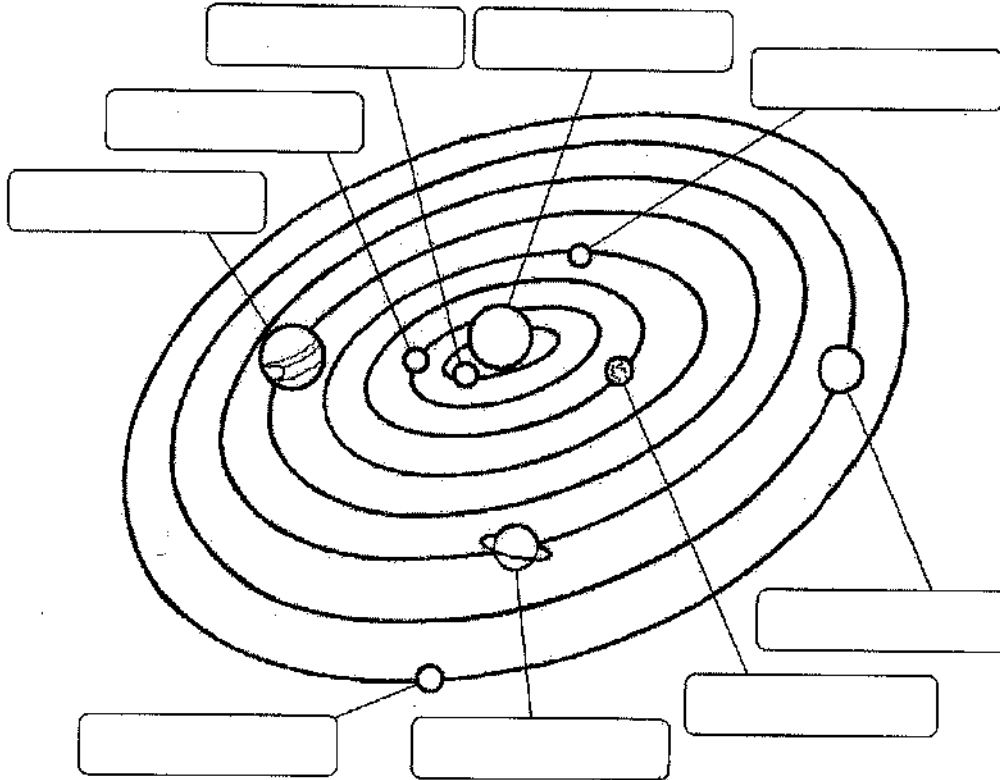
Some objects do not revolve directly around the sun. **Moons** are small natural objects that revolve around other objects. Many planets have moon. Earth only has one that revolves around it about every 27 days.

Comets

Comets also revolve around the sun. A comet is a chunk of frozen gases, rock, ice, and dust. Comets have long orbits around the sun. As comets pass close to the sun, part of their frozen surface begins to break away and turn into gases and dust. These particles reflect the sun's light and become visible as long tails. A comet's tails always point away from the sun.

Student-Response Activity

1 Label this diagram of our solar system.



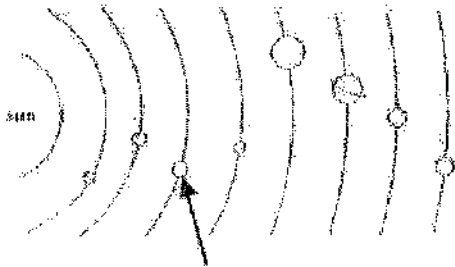
2 How is the solar system diagram not to scale?

3 What other objects are part of our solar system?

Benchmark Assessment SC.5.E.5.3

Fill in the letter of the best choice.

1 Look at the diagram of our solar system.



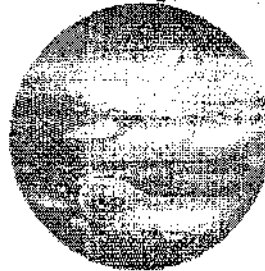
Which planet is the arrow pointing to?

- (A) Earth
 - (B) Jupiter
 - (C) Neptune
 - (D) Saturn
- 2 Which planet has the shortest path around the sun?
- (F) Earth
 - (G) Mercury
 - (H) Neptune
 - (I) Venus
- 3 Which planet has a rocky surface?
- (A) Jupiter
 - (B) Mars
 - (C) Neptune
 - (D) Saturn

4 Which planet is a gas giant?

- (F) Mars
- (G) Mercury
- (H) Saturn
- (I) Venus

5 Look at this picture of Jupiter.



Which is **not** true?

- (A) The planet has more moons than Earth.
 - (B) The planet is many times larger than Earth.
 - (C) The planet's surface is much like Earth's surface.
 - (D) The swirl you can see is a giant storm called the Great Red Spot.
- 6 Why is Pluto no longer considered to be a planet?
- (F) It does not orbit the sun.
 - (G) It has too many moons.
 - (H) It is not large enough to have cleared its orbit of debris.
 - (I) It is too large to be classified with the inner and outer planets.