

Activity I2: Solar System

PART A

1. The ratio of the diameter of an asteroid to the diameter of Pluto is 2 to 13. The diameter of Pluto is 1.43×10^3 miles. What is the diameter of the asteroid?

2. Sarah weighs fifty-one kilograms on Earth and fifty-seven and four tenths kilograms on Neptune. Benjamin weighs eighty kilograms on Earth. How much would Benjamin weigh on Neptune?

3. On average, Uranus is 2,875,000,000 kilometres from the sun. Jupiter is on average only 778,000,000 kilometres from the sun. On average and in scientific notation, how much further is Uranus from the sun?

4. Emma estimated the radius of Venus to be 5173 Km. The real diameter of Venus is 12030 Km. How close was Emma's estimate, as a percent of Venus' real diameter?

5. It takes Mars one and three hundredths Earth days for a complete rotation and six hundred eighty-six Earth days for a complete revolution. Daniel is sixty-one Earth years old. If Daniel had lived on Mars, how many years old would he be (to the nearest tenth)?

6. The mass of Earth is 5.97×10^{24} kg. The mass of Saturn is 5.68×10^{26} kg. How much larger is the mass of Saturn in scientific notation?

PART B

1. Two times John's Earth weight is eighty-four and four tenths kilograms more than his weight on Mercury. How much does John weigh?

2. The masses of two asteroids weigh 2.84×10^2 kilograms. The larger asteroid weighs twenty-six kilograms more than two times the weight of the smaller asteroid. What is the weight of the smaller asteroid?

3. It takes Jupiter forty-one hundred Earth days for a complete rotation and four thousand, three hundred twenty-nine Earth days for a complete revolution. Emma's age on Jupiter would be sixty-one and four tenths years less than her Earth age. How old is Emma in Earth years?

4. Two comets are 6.1×10^4 kilometres apart. The first comet is travelling at 6.1×10^4 kilometres per hour. The other comet is heading in the opposite direction at 1.11×10^5 kilometres per hour. If the current time is 11:40 a.m., when will the comets be 992,667 kilometres apart?

PART C – Choose the correct answer

1 Pluto

- A The use of mathematics facilitated the discovery of this planet.
- B How heavy an object is relative to its size; the ratio of mass to volume.
- C This planet has one moon, which is named Charon.
- D A straight line through the center of a circle, from one side to another.

2 Jupiter

- A This planet has one moon, which is named Charon.
- B The mixture of gases that surrounds a planet.
- C (2 Words) Mercury, Venus, Earth, and Mars.
- D Four of the moons of this planet are Io, Europa, Ganymede, and Callisto.

3 Inner Planets

- A The curved path in which a planet, satellite, or spacecraft revolves around another body.
- B The sun and the celestial bodies that orbit the sun, including planets, satellites, asteroids, comets, dust, and gas.
- C (2 Words) Mercury, Venus, Earth, and Mars.
- D A piece of rock or metal from space that enters the earth's atmosphere at high speed and burns up.

4 Rings

- A The only planet whose name is not derived from Greek or Roman mythology.
- B This planet is the second planet from the sun, having a diameter of about 7,500 miles and a dense, cloudy atmosphere.
- C Saturn has two of these that are very bright.
- D A gas with no color or odor that is a mixture of carbon and oxygen.

5 Solar System

- A The point in the orbit of a planet or other body at which it comes closest to the sun.
- B The warming of an atmosphere that is the result of gases such as carbon dioxide which prevent the sun's heat from escaping.
- C Any of thousands of celestial bodies with diameters between one and five hundred miles that revolve around the sun in orbits located mostly between those of Jupiter and Mars.
- D The sun and the celestial bodies that orbit the sun, including planets, satellites, asteroids, comets, dust, and gas.

6 Rotation

- A The act of turning on, or around, an axis. On Earth, this is equal to 23 hours, 56 minutes, and 4 seconds.
- B The nearest star to Earth and the center of the Solar System.
- C This planet is also known as the Red Planet.
- D The nine major celestial bodies that orbits the sun.

7 Outer Planets

- A (2 Words) Jupiter, Saturn, Uranus, and Neptune.
- B A relatively small, icy celestial body with a long tail of light that revolves around the sun.
- C The degree of heat or cold of a body or an environment.
- D Saturn has two of these that are very bright.

8 Meteors

- A The act of turning on, or around, an axis. On Earth, this is equal to 23 hours, 56 minutes, and 4 seconds.
- B Four of the moons of this planet are Io, Europa, Ganymede, and Callisto.
- C That point of a planet's or comet's orbit which is most distant from the sun.
- D A piece of rock or metal from space that enters the earth's atmosphere at high speed and burns up.

9 Comets

- A A relatively small, icy celestial body with a long tail of light that revolves around the sun.
- B A very large group of stars and planets that includes the Sun and its solar system.
- C (2 Words) Jupiter, Saturn, Uranus, and Neptune.
- D Pieces of rock or metal that have reached the Earth from outer space.

10 Diameter

- A The amount of physical matter that an object contains, usually measured in grams or ounces.
- B A straight line through the center of a circle, from one side to another.
- C This planet is named after the messenger of the gods (from Roman mythology).
- D This planet's blue color is the result of methane gas in the atmosphere.

11 Uranus

- A This planet's blue color is the result of methane gas in the atmosphere.
- B The outer atmosphere of a star.
- C Four of the moons of this planet are Io, Europa, Ganymede, and Callisto.
- D The mixture of gases that surrounds a planet.

12 Earth

- A The curved path in which a planet, satellite, or spacecraft revolves around another body.
- B The only planet whose name is not derived from Greek or Roman mythology.
- C A very large group of stars and planets that includes the Sun and its solar system.
- D The sun and the celestial bodies that orbit the sun, including planets, satellites, asteroids, comets, dust, and gas.

PART D

If you look up the word "solar" in your dictionary, you'll find its basic definition reads something like: "of the sun," or "relating to the sun." System is defined as: "a set of things or parts forming a whole." When you consider the meanings of these words, there is indication that the sun plays a major role among this group of celestial bodies we call the "solar system."

The sun is, in fact, at the center of this massive system. There are nine major planets and their satellites, asteroids, comets, dust and gases that are continually traveling around the sun. With a mass that is 750 times as great as that of all of the planets in the solar system combined, the sun has a strong gravitational pull that keeps the other objects in orbit around it.

As the planets revolve around the sun, the sun revolves around the center of the Milky Way Galaxy. The Milky Way, which has a circular shape, is made up of dust, gases, planets, and about 100 billion stars. The sun, planets, and other bodies and gases that make up our solar system are only a small speck in this huge galaxy!

The nine planets of the solar system can be divided into two groups referred to as the inner planets (also called terrestrial planets) and the outer planets (or major planets). The inner planets; Mercury, Venus, Earth, and Mars, are small and are composed of mostly rock and iron. Jupiter, Saturn, Uranus, and Neptune make up the outer planets, which are much larger and consist mainly of hydrogen, helium and ice. Because Pluto is the farthest planet from Earth, astronomers know very little about it. Some believe it should not even be considered as one of the major planets. More than 120 natural satellites (also called moons) orbit these various planets in our solar system.

Asteroids (also called planetoids) are small bodies that orbit the sun, mostly between Mars and Jupiter, in what is referred to as the Asteroid Belt or Main Belt. Astronomers first observed asteroids in the early 1800's with the aid of telescopes. There are more than 20,000 asteroids ranging in size from Ceres, which has a diameter of 623 miles, to bodies that are less than 1 mile in diameter. The Asteroid Belt also includes large amounts of dust that astronomers believe were created by collisions between asteroids.

Small chunks of iron and rock that break away from colliding asteroids are called meteoroids. Many meteoroids fall to the earth's atmosphere, but most are burned up by friction before they reach the earth's surface.

Meteoroids that fall through the atmosphere, appearing in the night as streaks of light, are called meteors or "shooting stars." Those that are found on the earth's surface are known as meteorites. As scientists have studied meteorites, they have learned valuable information about the ancient conditions of our solar system. The surfaces of Mercury, Mars, and several satellites of the planets (including the earth's moon) show signs of having been "attacked" by asteroids during the early history of the solar system.

- 1 What holds the planets and other bodies of our solar system in orbit around the sun?
 - The gravitational pull of the planets
 - The gravitational pull of the sun

- The rotation of the bodies
- The atmosphere

2 The sun revolves around the

- Solar System
- Milky Way Galaxy
- Planets
- The Universe

3 _____ is the farthest planet from the sun.

- Neptune
- Mercury
- Pluto
- Mars

4 Small bodies that orbit the sun between Mars and Jupiter are called

- Comets
- Asteroids
- Meteorites
- Meteors

5 Meteors are often called

- Shrinking stars
- Shining stars
- Sparkling stars
- Shooting stars

6 The word "interplanetary" means

- In the universe
- Collision of planets
- In between the planets
- Inside a planet

7 Comets basically have three parts. They are:

- _____
- _____
- _____
- _____

8 Solar wind occurs as gusts of wind on the sun, similar to strong wind gusts on the earth.

- True
- False

