9 Science (10FI)

Learning Opportunities

June 8 – 12

The solar system

Each planet in the solar system is unique. They have different sizes, temperatures, amounts of gravity and are made of different substances.

What we call the Sun is a star at the center of our solar system. The paths the planets follow around the Sun are called orbits. Earth's revolution around its orbit takes 365.25 days.

Even though the planets are made of different combinations of elements, there are four elements they all have in common. These are hydrogen, helium, oxygen and carbon.

Plumb, D. A. (1999). *Science 9*. Scarborough, Ontario: Nelson Canada. Page 419

Table 1 Properties of the Planets in the Solar System

Properties	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
average distance from Sun ($\times 10^6$ km)	57.9	108	150	228	778	1427	2870	4497	5900
orbital period	88.0 d*	224.7 d	365.26 d	687 d	11.9 a**	29.5 a	84.1 a	164.8 a	247.7 a
average diameter (km)	4880	12 100	12 750	6790	142 800	120 700	50 800	48 600	2300***
time for one rotation	59 d	243 d****	24 h	24 h 39 min	9 h 50 min	10 h 39 min	17 h 18 min****	15 h 40 min	153 h 18 min****
main substances in the atmosphere	none	carbon dioxide, nitrogen	nitrogen, oxygen	carbon dioxide, nitrogen	hydrogen, helium, methane	hydrogen, helium, methane	hydrogen, helium, methane	hydrogen, helium, methane	none
mean surface temperature (°C)	–180 to 426	470	–85 to 58	–120 to 30	–160	–180	–210	–220	–220
density (g/cm^3)	5.44	5.25	5.52	3.95	1.31	0.70	1.18	1.66	1.1***
surface gravity (Earth = 1)	0.39	0.90	1.0	0.38	2.58	1.11	1.07	1.4	0.08***

*The symbol "d" stands for day. It means one Earth day.
**The symbol "a" stands for year (from annum, the Latin word for year). It means one Earth year.
***This is an estimate. Little is known about Pluto.
****The rotation is in the opposite direction to that of other planets.

Answer these questions using the table above:

1. Name two planets that scientists think have no atmosphere.
2. Which planets appear to be most like Earth? Explain.
3. Which planets could be grouped as those that are least like Earth? Explain
4. Which planet seems to fit into a category by itself?
5. Which planets have densities much lower than Earth? What can you conclude about these planets?
6. Would the atmosphere on the four largest planets support Earth-type life forms? Explain.
7. Create a mnemonic sentence to help you remember, in order, the names of the planets.

Inner Planets

The inner planets are those closest to the Sun. They are Mercury, Venus, Earth and Mars. These planets are called terrestrial planets and are made of rocky materials and minerals.

Outer Planets

The 5 planets furthest from the Sun are known as the **outer planets:** Jupiter, Saturn, Uranus, Neptune and Pluto.

The first 4 of these planets are also known as the **Gas Giants**. Their atmosphere consists mainly of hydrogen and helium. These planets have soupy surfaces that get denser as you sink to the middle.

Read pages 424 – 428 and answer questions #1 – 7 – a scanned copy of the pages are attached

https://www.youtube.com/watch?v=htOtW0pD92Y - planets video (28:41)

Other Objects in the Solar System

Planetary moons are large natural objects that revolve around planets are called satellites or moons. Earth has 1 moon and Mars has 2. The outer planets can have several moons.

Asteroids are small rocky objects that move through space. There is an asteroid belt of several asteroids that orbits the Sun between Mars and Jupiter.

Meteoroids are lumps of rock or metal that get caught in Earth's gravity and are pulled into the atmosphere. Friction with the atmosphere causes meteoroids to become hot, vaporize and causes the air to glow. This makes a bright streak called a meteor. If a meteor hits the ground before completely vaporizing, it is called a meteorite. When meteorites hit the Earth, they can cause craters.

Comets are chunks of frozen matter that travel in a very long orbit around the Sun. Tails of comets can be millions of kilometers long.

Question:

Why are meteorites less common than meteors?