

WEEK 1

1. **Explain the difference between mass and weight?**

Mass is the amount of matter in an object and weight is the amount of force exerted onto an object

2. **What is a lightyear?**

The distance light travels in one year

3. **What is momentum?**

Momentum is the product of an object's mass and velocity

4. **Why are there two high tides per day on Earth?**

There are two high tides per day on earth because the moon pulls the water away from Earth and it also pulls Earth along as well creating another bulge on the other side. The other side lags a little behind the Earth. There are two times in the day where high tides form. When the moon is above your head and when the moon is on the other side below your feet.

5. **Explain any one of Newton's laws and give an example?**

Newton's third law says that for every force, there must be an opposite and equal reaction force. This means that a force applied on an object will exert the same force back in the opposite direction. For example, when we jump off the floor and land on our feet again, that little feeling slight pain is the ground exerting an equal and opposite force against our feet

6. **Write down the equation of gravity and explain what each of the variables represents.**

$F = Gm_1m_2/d^2$ G is the constant of gravity. As the mass of the two objects are bigger, the stronger gravity gets. As the distance of the two objects increase, the weaker gravity gets. The m_1 and m_2 stand for the masses of the two objects. d stands for distance

7. **What happens to the force of gravity if the distance between two objects increases?**

If the distance between the two objects increase, gravity gets weaker

8. **Explain conservation of angular momentum.**

the angular momentum of a system remains constant unless acted on by an external torque. But in reality there is always friction and air resistance.

9. **What is the difference between the "solar system" and "galaxy"?**

Our solar system includes our sun and our planets and other comets, moons, asteroids, and other materials. There are billions of stars like the sun in the milky way galaxy.

10. **How many people are there in all of history who have seen "the entire circle of the Earth"?**

24 people in the entire world who have seen the full circle of Earth

WEEK 2

1. Name the two types of planets in our solar system and list the names of the planets that belong to each of the two types.

Terrestrial planets (**Mercury, Venus, Earth, and Mars.**)

Jovian planets (**Jupiter, Saturn, Uranus, and Neptune**)

2. List at least three differences between the two types of planets.

Terrestrial planets: small, rocky, and close to the Sun, no rings, few moons, high density

Jovian planets: large, gassy, and far from the Sun, rings, many moons, low density

3. Why do all planets orbit the Sun in the same direction?

The orbits of the planets are coplanar because during the Solar System's formation, the planets formed out of a disk of dust which surrounded the Sun. Because that disk of dust was a disk, all in a plane, all of the planets formed in a plane as well.

4. Why and how are planets inside of the frost line different from those outside the frost line in our solar system?

Inside frost line: too hot for hydrogen compounds to form ices (solids).

Outside frost line: cold enough for ices (solids) to form

Terrestrial planets are located within the frost line

Jovian planets are located outside the frost line

5. Explain why the planetesimals beyond the frost line were initially able to grow larger than those inside the frost line.

icy/rocky cores have much more mass than terrestrial planets. More mass means more gravity. Icy/rocky cores are able to capture lots of gas! the

Jovian planets have larger sizes than terrestrial planets due to their gaseous compositions and stronger gravitational fields, which help pull objects to their surfaces

6. Why didn't the terrestrial planets acquire a thick atmosphere of H and He gas?

Radiation pressure from the sun blew most of the hydrogen and helium beyond the frost line.

However, the low mass of the terrestrial planets is also a factor. Low gravity of the terrestrial planets cannot hold on to helium.

7. What are the main two types of objects in the solar system that may collide with the Earth?

1. Earth-crossing asteroids -formed inside the frost line (rock) found in the Asteroid Belt

2. Comets-formed outside the frost line (icy rock)

8. a) Where do comets spend most of their lives? b) What do they look like when they are at that location?

- a.) outer solar system or beyond the frostline toward the end of the solar system (Kuiper Belt and Oort Cloud
- b.) dirty snowball

9. What are meteor showers and what is their origin?

A meteor shower is a celestial event in which a number of meteors are observed to radiate, or originate, from one point in the night sky. These meteors are caused by streams of cosmic debris called meteoroids entering Earth's atmosphere at extremely high speeds on parallel trajectories.

The earth cross the comet path.

10. How large does a meteorite that hits the earth have to be to cause a global catastrophe?

Larger than 1 km

11. What happened in Chelyabinsk, Russia, on February 15, 2013?

100 meter in the middle of nowhere

A ~20 meter meteorite traveling at about 40,000 mph exploded about 15 km above the city of Chelyabinsk in Russia. More than 1000 people were hurt. Dozens of cameras captured the event. This is the largest impact in the last 100 years, and the best documented event.

12. What is NASA's Near Earth Object (NEO) project? (you may have to look up the website that I gave in class if you don't remember)

The purpose of the Near-Earth Object Program is to coordinate NASA-sponsored efforts to detect, track and characterize potentially hazardous asteroids and comets that could approach the Earth.

13. Why does the Moon have many more craters than the Earth?

[Because the Earth has

- Atmosphere
- Plate tectonics
- Remote regions
- Erosion
- Foliage
- Fall into a forest
- Splash into an ocean