PHYSICS — Forces, Gravity, and Space — KS3

Forces	Weight	Solar System	Days and Night, and the Seasons	The Moon	Stars	Universe	Check 20

Key Words

Key Word	Definition
Force	An interaction between two object.
Contact force	A force between two object physically touching
Non-contact force	A force between two object physically separated
Planets	• orbit a **star** • are so big that their gravitational pull makes them a sphere • are so big that their gravity has cleared their orbit of similar sized objects
Orbit	To travel around a central object. e.g. Moon orbits Earth, Earth orbits Sun
Day	One full rotation (Earth day = 24 hours)
Year	One full orbit of the Sun (Earth year = 365.24 days)
Nuclear Fusion	When two smaller nuclei (of atoms) join to make one larger nucleus.

Misconceptions

Weight is a force due to gravity.

Mass is to do with the number of particles that make up matter.

The seasons is caused by the tilt of the Earth towards or away from the Sun.

In UK winter, Earth is closer to the Sun than in summer.

A day is caused by the Earth rotating about its axis.

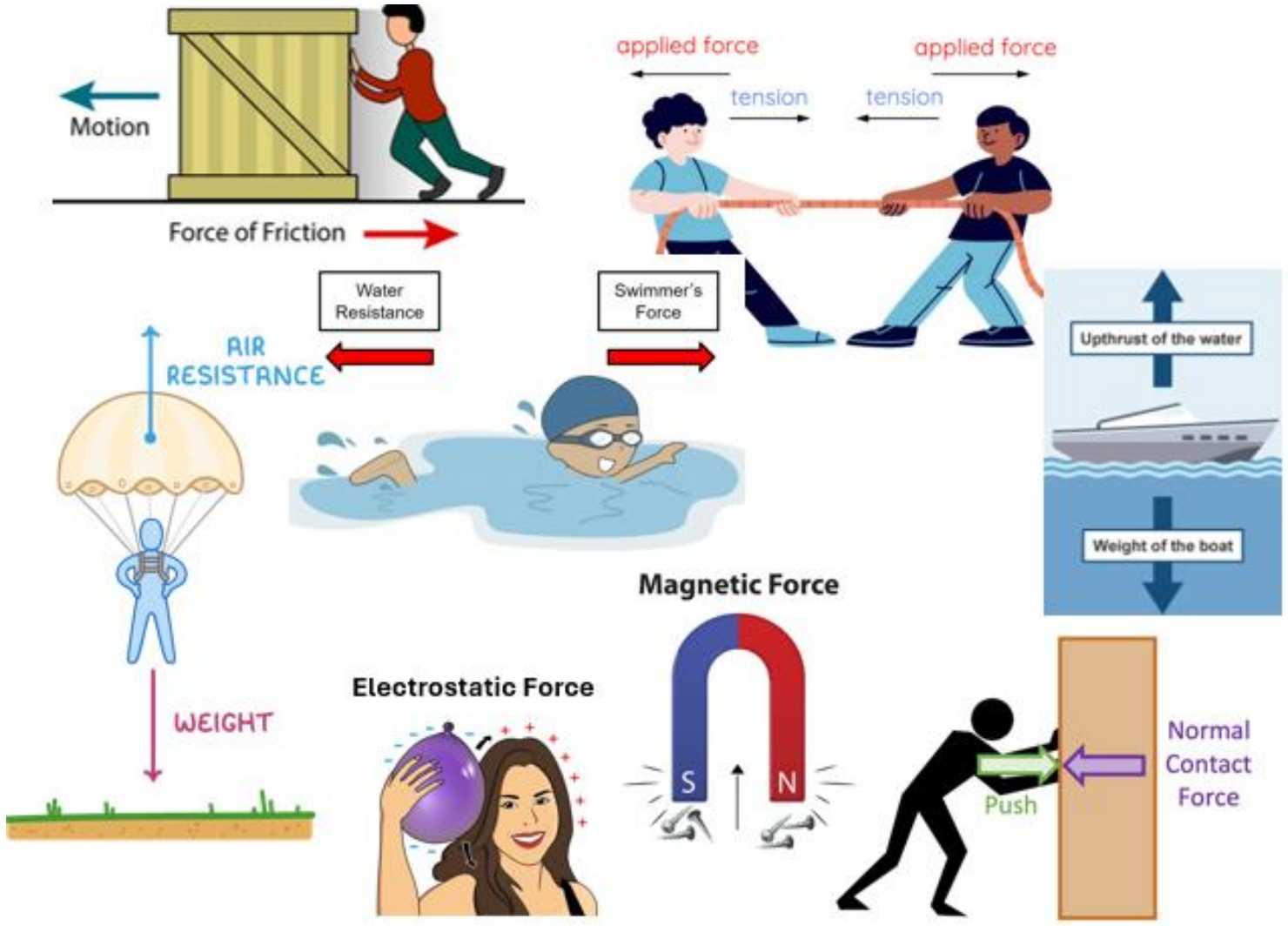
It is NOT caused by the Earth orbiting the Sun.

Light does NOT travel infinitely fast.
It travels at a speedy 300,000,000 m/s.

Key questions

Forces

Forces are interactions between objects that can cause changes in speed, direction, or shape. Forces can be categorised into two types; contact and non-contact forces.



Weight and Gravity

$$Weight = mass \times gravitational\ field\ strength$$

What is the weight on Earth?

Mass = 56 kg, g = 10 N/kg

C: ----------

F : W = mg

I : W = 56 x 10

F: ----------

A : W = 560 N

CONVERT
FORMULA
INSERT VALUES
FINE TUNE (condensing or rearranging)
ANSWER (with units)

My WEIGHT on Earth is around 560N

My WEIGHT on the moon is around 90N

My MASS is always 56kg!!

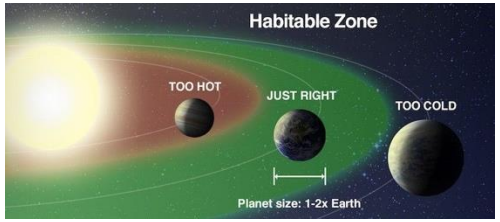
Mass doesn't change but your weight force can, depending on the strength of gravity.

Physics — Forces, Gravity, and Space — KS3

Solar system

Our solar system is made up of:

- A star
- Eight orbiting planets
- Dwarf planets
- Moons
- Asteroid belt and Kuiper belt



There is an area a certain distance from stars where the temperature is just right for life. It is called the habitable zone.

The Universe

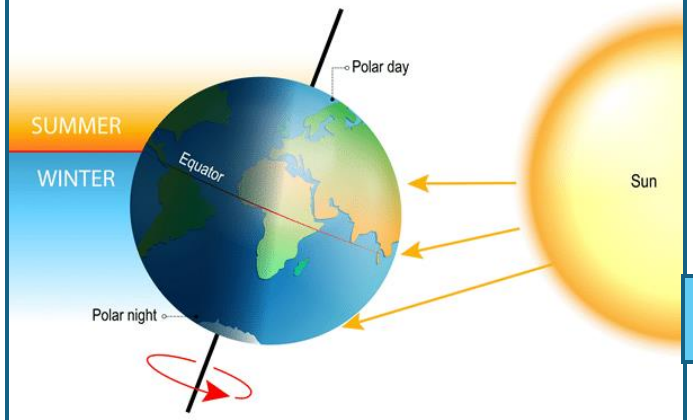
The Universe is made up of

- Galaxy clusters
- Galaxies
- Solar Systems
- Stars, planets, moons

The Universe is expanding. Galaxies have been observed to be moving away from each, meaning the space in between them is getting bigger.

Night, Day, and the Seasons

The Earth orbits about its axis.
We have **daytime** when we are on the side **facing towards** the Sun.
We have **nighttime** when we are on the side **facing away** from the Sun.



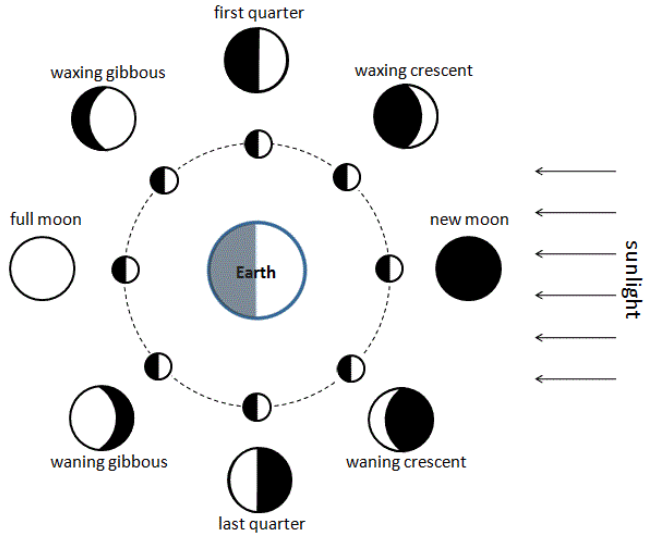
Because the **axis is tilted**, we experience seasons.
When **tilted towards** the Sun, the rays from the Sun are more concentrated so the Northern hemisphere experiences **Summer**.
Half a year later, the Earth travels to the other side of the Sun. Now it is **tilted away** from the Sun where the Sun's rays can now spread out. The Northern Hemisphere experiences **Winter**.

The Moon

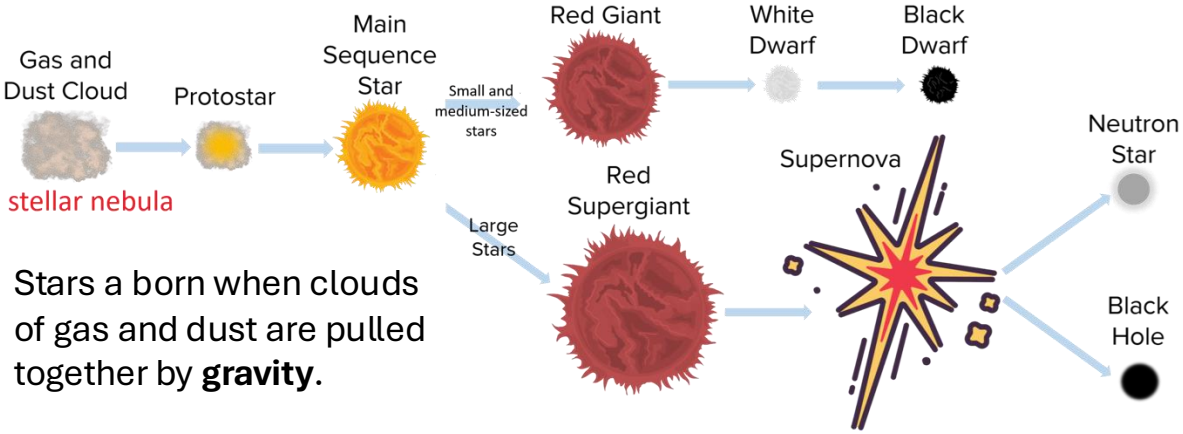
The moon orbits Earth completely every 28 days.

Half of the moon is always lit, the other is in darkness

Because the angle changes between Moon-Earth-Sun, we see different parts of the moon lit up – known as phases.



Stars



Stars a born when clouds of gas and dust are pulled together by **gravity**.

Stars are powered by the nuclear **fusion** of **hydrogen**.
When the hydrogen runs out, stars begin the end of their lives.
There are different outcomes depending on the mass of the star.