YEAR 5: SPRING 2 – OCEAN SURVIVORS

SCIENCE: EARTH AND SPACE

UNDERSTAND, DESCRIBE AND EXPLAIN:

To describe the Sun, Earth and Moon as approximately spherical bodies

Stars	***Planets***	***Satellites***	***Spherical***	***Orbit***	***Rotate***	***Gaseous planets***	***Rocky planets***
Mercury	***Venus***	***Earth***	***Mars***	***Jupiter***	***Saturn***	***Uranus***	***Neptune***
Sun	***Moon***	***Orbit***					

Learning links:

Geography:

Y5: The poles, the Equator and the Tropics

Learning Links:

Science:

Y3 Forces and Magnets

Y3 Light and Dark

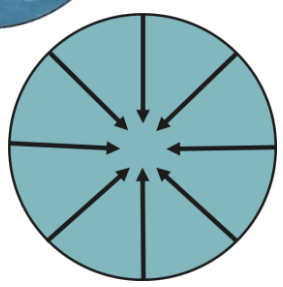
Y5 Forces

Our Solar System:

The ***Sun*** and ***eight planets*** make up our ***solar system***. There are many ***other objects*** in the solar system too, such as ***moons***, ***comets***, ***asteroids*** and ***dwarf planets***. You can use this mnemonic to remember the order of the planets (this one includes Pluto).

My	***Very***	***Easy***	***Method***	***Just***	***Speeds***	***Up***	***Naming***	***Planets***
Mercury	*Venus*	*Earth*	*Mars*	*Jupiter*	*Saturn*	*Uranus*	*Neptune*	*Pluto* *(Dwarf Planet)*

There are ***4 rocky planets*** (Mercury, Venus, Earth and Mars) and ***4 gaseous planets*** (Jupiter, Saturn, Uranus and Neptune).
Each planet is unique and, as far as we know, Earth is the only planet able to support life.



Planets as spherical bodies:

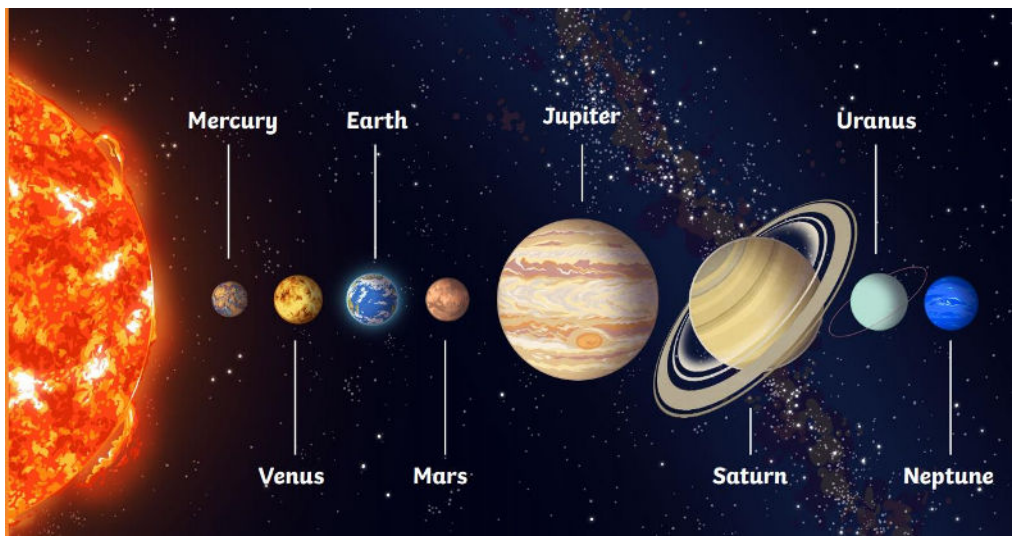
Planets are referred to as ***'spherical bodies'*** because, to be classed as a ***planet***, something has to:

- be ***roughly spherical***;
- ***orbit the Sun***;
- ***not orbit another planet***;
- be ***big enough*** to have cleared away any bits floating near to it.

This tick list fits for ***planets*** made out of ***rock*** as well as those made from ***gases***.
Stars and ***moons*** are also spherical objects but, because they ***do not meet ALL of the criteria***, they are ***not planets***.

Why are planets spherical?

The answer is… ***Gravity***! Because ***gravity pulls everything*** towards its ***centre*** and it ***pulls everything*** with the ***same force***, everything is going to be the ***same distance from the centre***, which in turn makes a ***sphere*** (see diagram).
Asteroids are all ***different shapes*** as they are ***not big enough*** to have ***gravity strong enough*** to ***pull them into a sphere***.



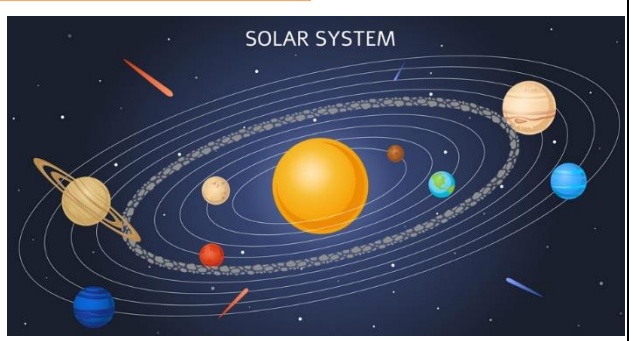
Our star – The Sun:

The ***sun*** is a ***star*** at the ***centre*** of our ***solar system***. That is why it is called a ***solar system***: The word ***'solar'*** means '***relating to the sun'***. The ***planets*** in our ***solar system*** stay together because the ***sun*** is so ***big*** that its ***gravity*** keeps us all ***locked in orbit***.
The ***sun provides*** almost all the ***energy***, ***light*** and ***heat*** needed on ***Earth*** mainly using ***hydrogen*** and ***helium***. ***Energy*** is ***made*** at its ***core*** (centre).
Around the ***core*** is a ***radiative zone***, which carries the ***energy*** to the next layer – the ***convection zone***. It takes about ***170,000 years*** for the ***energy*** to move from the ***core*** to the ***convection zone***. The ***photosphere*** is at the surface and the ***energy*** reaches here in large bubbles from the ***convection zone***. From the ***surface***, the ***energy escapes*** and some of it ***travels*** to Earth. It takes about ***8 minutes*** for ***heat*** from the ***sun*** to reach us on ***Earth***.

Did you know?
Surface temperature: 5505°C
Distance to Earth: 149.6 million km
Radius: 696,342 km
Circumference: 4,366,813 km (2,713,406 miles)
Mass: 1,989,000,000,000,000,000,000,000,000,000kg
(About 1.3 million Earths could fit inside the Sun)

What is an orbit?

Every ***planet*** in the ***solar system*** moves ***anticlockwise*** around the ***Sun***, following a ***curved path*** called an ***orbit***. Although it looks like some of them are ***orbiting*** in a circle, each planet's ***orbit*** around the ***Sun*** is shaped like an ***ellipse***.
When a planet makes ***one complete orbit*** around the ***Sun***, this is counted as ***one year*** on that planet. The time that it takes each ***planet*** to ***orbit once around the Sun*** depends on how ***fast*** the planet is ***travelling*** and how ***far away it is from the Sun***. This means that a ***year*** lasts for ***different lengths of time on different planets***. Which planet do you think has the longest year?



The ***planets orbit*** the Sun because they are caught by the ***Sun's massive gravitational force***.
Without the ***pull*** of the Sun's ***gravity***, the ***planets*** would no longer follow their ***paths*** around the Sun and would go ***flying off in a straight line*** into space. In the same way that each ***planet orbits*** the ***Sun***, most ***planets*** are also ***orbited*** by ***smaller objects*** that are ***caught*** by the ***planet's gravity***.
For example, ***Earth*** is ***orbited*** by the ***moon***. Some planets are orbited by lots of moons.

UNDERSTAND, DESCRIBE AND EXPLAIN:

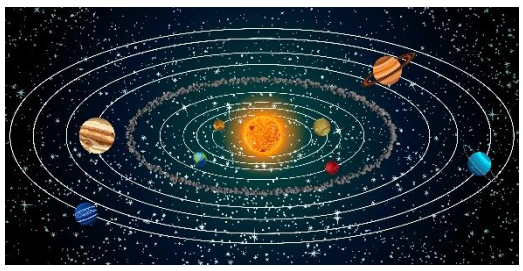
To describe the movement of the Earth, and other planets, relative to the Sun in the solar system

To use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky

To describe the movement of the Moon relative to the Earth

Year	***Orbit***	***Planets***	***Sun***	***Solar System***	***Spherical***	***Rocky***	***Gaseous***
Day	***Night***	***Rotate***	***Rotation***	***Axis***	***Gravity***	***Mass***	***Atmosphere***
Moon	***Natural satellite***	***New moon***	***Crescent moon***	***Half moon***	***Gibbous moon***	***Full moon***	***Months***

What is a year?

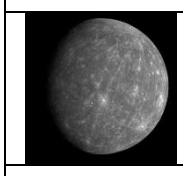
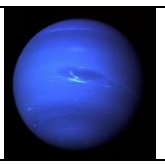


A ***year*** is the amount of ***time*** it takes for a ***planet to orbit*** once around the ***Sun***. On ***Earth***, a full ***orbit*** of the Sun takes ***365.26 days***. This is why, ***every four years***, we hold a ***'leap year'*** of ***366 days*** to make up for the ***quarter of a day that is missed*** the other years.

The ***time*** that it takes ***each planet*** to ***orbit*** once around the ***Sun*** depends on ***how fast*** the planet is ***travelling*** and ***how far away*** it is from the ***Sun***. This means that a ***year lasts*** for ***different lengths*** of time on ***different planets***.

Here is a ***table showing*** the ***length*** of a ***year*** on each ***planet*** in our ***Solar System***:

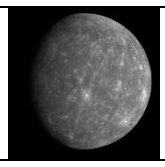
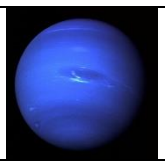
As you can see, the ***further away*** the ***planet*** is from the ***Sun***, the ***longer*** its ***year*** is. This is because its ***spherical orbit*** is much ***larger*** and so will take much ***longer***.

The Rocky Planets				***The Gaseous Planets (Gas Giants)***			
							
Mercury	***Venus***	***Earth***	***Mars***	***Jupiter***	***Saturn***	***Uranus***	***Neptune***
88 Earth days	*224.7 Earth days*	*365.26 Earth days*	*687 Earth days*	*11.9 Earth years*	*29.5 Earth years*	*84 Earth years*	*164.8 Earth years*

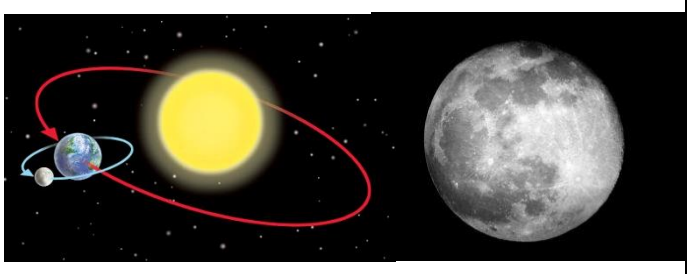
What is a day?

Each ***planet*** also ***spins*** on its ***axis*** as it ***moves***. A ***day*** is the ***amount of time*** it takes a ***planet*** to complete ***one full rotation*** on its ***axis***. In one ***full day***, we see ***the Sun rise***, ***set*** and ***rise*** again. On ***Earth***, one ***full rotation*** takes ***24 hours***.

It is ***daytime*** for the part of the ***planet*** that is ***facing the Sun*** and ***night-time*** for the part that is ***facing away***. As ***some planets spin faster*** than others do, the ***length of a day*** can ***vary greatly*** between different ***planets***. Here is a ***table showing*** the ***length*** of a ***day*** on each ***planet*** in our ***Solar System***:

The Rocky Planets				***The Gaseous Planets (Gas Giants)***			
							
Mercury	***Venus***	***Earth***	***Mars***	***Jupiter***	***Saturn***	***Uranus***	***Neptune***
59 Earth days	*243 Earth days*	*24 Earth hours*	*25 Earth hours*	*10 Earth hours*	*11 Earth hours*	*17 Earth hours*	*16 Earth hours*

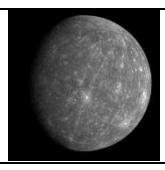
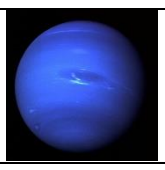
What about the Moon?



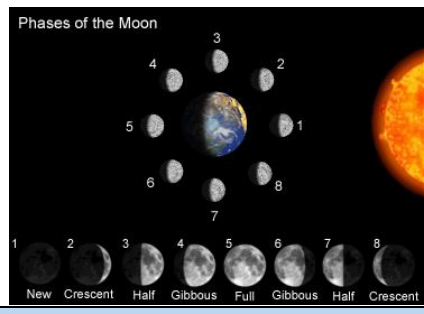
We now know that all ***planets orbit the Sun*** and that, because of the ***enormous mass and gravity*** of the ***Sun***, everything in our ***Solar System*** is ***held in orbit***. However, the ***planets*** are ***not the only things*** in ***orbit***. Each ***planet*** has its ***own gravitational force***. The ***greater the mass*** of the planet, the ***greater its gravitational force***.

Because of this ***gravitational pull***, ***planets*** are ***able*** to ***keep*** other things in ***orbit*** such as ***atmosphere***, ***satellites*** and ***moons***. The ***Moon*** is the ***Earth's*** only ***natural satellite*** (an object orbiting a larger object). It takes the ***Moon approximately 28 Earth days*** to ***orbit*** the ***Earth*** once. We call this a ***lunar month*** and is where our use of ***months*** came from.

Here is a ***table*** showing the ***number of moons*** each ***planet*** in our ***Solar System*** has:

The Rocky Planets				***The Gaseous Planets (Gas Giants)***			
							
Mercury	***Venus***	***Earth***	***Mars***	***Jupiter***	***Saturn***	***Uranus***	***Neptune***
0 moons	*0 moons*	*1 moon*	*2 moons*	*79 moons*	*82 moons*	*27 moons*	*14 moons*

The Phases of the Moon:



The ***Moon*** shines extremely ***brightly*** but is only ***reflecting the rays of the Sun***. The ***Moon can not make its own light*** as it is ***not a star*** like the Sun. The Moon ***appears to disappear*** from sight ***during the day*** but, actually, the ***Moon*** is still there but ***harder to see*** because of the ***brightness of daytime***.

During its ***orbit***, the ***angle*** between the ***Earth, Moon and Sun changes*** so the part of the Moon that is lit up ***can not always be seen by us*** on Earth. This is what gives us the ***phases of the moon*** and why it ***looks a different shape*** to us.

KEY ASSESSMENT QUESTIONS AND SCENARIOS:

EXS:

*Why are planets described as 'spherical bodies'?
*Can you name and order the planets in our Solar System?
*Explain why ____ is classified as a planet but Pluto is not.
*What is the difference between a day and a year?
*Explain why and how a day is different on varying planets.
*Explain why and how a year is different on varying planets.
*How is a moon different to a planet?
*Explain how and why the moon appears to change shape in the sky.
*__EXIT TASK__: Explain what a ***day*** is using the key words ***rotate*** and ***axis***. Explain what a ***year*** is using the key words ***orbit*** and ***gravity***. Using the key words: ***phases***, ***reflect***, ***new***, ***crescent***, ***half***, ***full*** and ***gibbous***, describe the movement of the Moon in relation to the Earth.

GDS:

*Why do we have a leap year?
*Does ____ take longer to orbit the sun than ___? Why?
*Why does the Sun rise in the east and set in the west?
*Which other planets have moons? Why do you think that Mercury and Venus do not have moons?
*What is the difference between a moon and a planet? What would a moon need to do to become a planet?
*__EXIT TASK__: Using ***ALL*** of the key words above (in the boxes) at least once, explain ***day***, ***night***, ***months***, ***years*** and the ***movement of the moon*** in relation to Earth.