TMS Science Launchpad - Year 2023/2024
Year 5 - Physics: Earth & Space

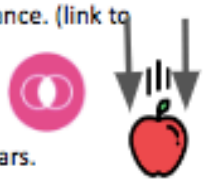
Substantive knowledge:

The sun is the star at the centre of our solar system.
The solar system has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
The Sun, Earth and Moon are approximately spherical bodies.
Stars produce vast amounts of heat and light.
All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.

Stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance. (link to forces learning)

Objects with larger masses exert bigger gravitational forces.

Smaller mass objects like planets orbit large mass objects like stars.



Celestial objects like planets, moons and stars spin.
The Earth orbits (goes around) the Sun and it takes 1 year to complete its orbit.
The Earth is held in its orbit around the Sun by the Sun's gravitational pull.
The other planets in our solar system also orbit the sun but at different speeds so their 'year's are different lengths to ours.

A moon is the celestial body that orbits a planet
The Earth has one moon; Jupiter has four Moons and numerous small ones
The Moon orbits the Earth and it takes about 28 days for the Moon to complete its orbit.
The Moon is held in its orbit by Earth's gravitational pull.
The moon DOESN'T change shape. It appears to change shape because we cannot always see the side of the Moon that's in sunlight or we can only see part of the sunlit side of the Moon as it orbits Earth.

The Earth spins on its own axis and takes 24 hours (1 day) to completely rotate.
The side of the Earth facing the Sun is in daytime and the side of the Earth facing away from the Sun is night time.
The Sun doesn't move – it is us that moves. The solar system is heliocentric but in the past we thought it was geocentric.
Because the Earth is rotating, the sun appears to move across the sky as the day goes on. *(link to y3 light)*

Vocabulary:
Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation, waxing, waning, crescent, gibbous. Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, planets, solar system, day, night, rotate, orbit, axis, spherical, geocentric, heliocentric.

Disciplinary knowledge

Identify and classify	Pattern seeking	Observation over time	Comparative tests
How could you organise all the objects in the solar system into groups? (observe closely)	Is there a pattern between the size of a planet and the time it takes to travel around the Sun? (to make a prediction)	Can you observe and identify all the phases in the cycle of the Moon? (ask scientific questions)	How does the length of daylight hours change in each season? (draw conclusions)

Research

What unusual objects did Jocelyn Bell Burnell discover?
How do astronomers know what stars are made of?
How have our ideas about the solar system changed over time?