Year 5—Let's get moving (Forces)

Autumn 1 and 2 Knowledge Organiser

HeathfieldSchools'Partnership

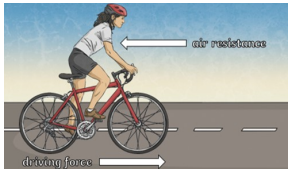
This Science unit follows on from previous studies of forces and magnets in Year 3. This unit will deepen the children's understanding of different forces and they will be able to identify the effects of air resistance, water resistance and friction, explaining how they can be helpful and unhelpful. They will learn about the benefits of streamlined objects and, using examples, explain how something is streamlined. As well as this, children will learn about the force of gravity, weight and mass and how Isaac Newton developed his theory. The children will also recognise different mechanisms and how they work to create an effect.

Key Knowledge

- Friction slows down moving objects and this can be helpful (soles of shoes creating friction with ground to stop slipping over) or unhelpful (bike chain so it is harder to pedal).
- The smoother a surface, the less friction there will be and the faster the object will move.
- The rougher a surface, the more friction there will be and the slower the object will move.

Useful effect of air resistance.

Unhelpful effect of air resistance.



Water resistance helps you to swim.

- Planes are streamlined as the pointed nose and smooth curved back allows the air to flow over and around it.
- Gravity keeps objects on the ground and causes objects to fall down if they are dropped.
- All objects have a gravitational pull, although the strength depends on the objects mass.
- The Earth's gravitational pull is very strong because it is a large object with extremely high mass.
- The Moon has a smaller mass than the Earth so the gravitational pull on the Moon is smaller. This is why astronauts 'float' on the moon. Jupiter's gravitational pull is much larger as its mass is greater.
- Pulleys make a small force lift a light load.
- Gears/cogs change the speed, force or direction of a motion. Gears turns in opposite directions.
- Levers are used to make a force lift a lighter load. A lever always rests on a pivot.

Key Vocabulary

Friction: Force that acts between two surfaces that are trying to move against each other.
Air resistance: A type of friction caused by air pushing against a moving object.
Water resistance: A type of friction caused by water pushing against a moving object.
Streamlined: Objects that do not experience much water or air resistance.
Gravity: Force that pulls objects towards the centre of the Earth.
Mass: How much matter is inside an object. Measured in kilograms (kg).
Weight: How strongly gravity is pulling an object down. Measured in newtons (N).
Mechanisms: Parts which work together in a machine. E.g. pulleys, gears/cogs and levers.

Key Questions

What is friction? What does it do?
When is friction helpful/unhelpful?
What surfaces have lots of friction? What does this mean?
What is air resistance? When is it helpful?
What is water resistance? What does water resistance help you do?
How can a shark be streamlined?
What does the force of gravity do for us?
How discovered gravity and how did he discover it?
What is mass/weight?
What is the gravitational pull like on Earth? Why is it like this?
What is the gravitational pull like on Jupiter? Why is it like this?
What are mechanisms?
What is a pulley used for? How does it work? Give an example of when a pulley is used.

Science—Enquiry Approaches

Knowledge Organiser

Heathfield Schools' Partnership

ambitious for the future

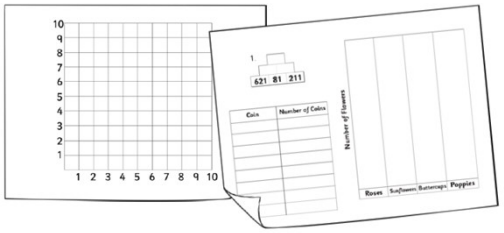
Scientific enquiry approaches are part of our science curriculum and are the different ways that we can carry out scientific investigations.

Observing over time

We measure events and changes in living things, processes or materials. These observations (using our senses) may take place over different periods of time; minutes, hours, weeks or months. several weeks or months.

How does the moon appear to change shape during a week?

Pattern Seeking



We conduct investigations where there are variables we cannot control (practically or ethically).

We don't look for cause and effect in Pattern Seeking, but possible relationships may be identified.

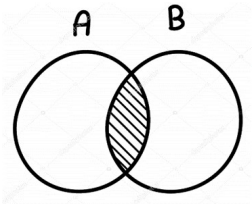
Do sounds get quieter the further away you are from the sound source?

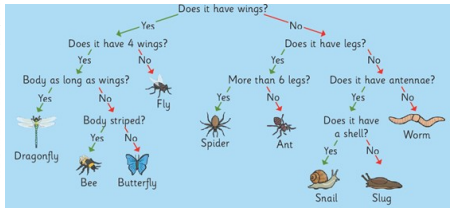
Researching using Secondary Sources

Sometimes we research when we ask questions that can not be answered practically. We can use secondary sources, such as books, the internet, or an expert.

What are the main parts of the circulatory system and what are their functions?

Identifying and Classifying





Identification: Naming things by looking at differences.

Classification: Organising things into group by making connections and looking at similarities or differences.

How can we classify animals using a classification key?

Fair testing

One variable (independent variable) is changed and all other variables must be controlled. The variable that is changed is quantitative (**numbered**).

How does the size of the parachute effect the time it takes to fall?

Comparative testing

One variable (independent variable) is changed and all other variables must be controlled. The variable that is changed is qualitative (**words**).

Which material is the best thermal insulator?