

Year 5—Let's get moving (Forces)  
Autumn 1 and 2 Knowledge Organiser



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.

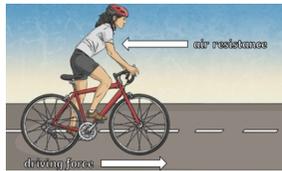
**Key Knowledge**

- 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 turn 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.