# Science Y5 Autumn 2 Forces

In this unit of work the children will explore falling objects and raise questions about the effect of air resistance. They will experience forces which make things begin to move, speed up or slow down. They will also investigate the effects of friction on movement and find out how it slows or stops moving objects.

**In this unit children will:**

**Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object, through the effects of a parachute.**

**Identify the effects of air resistance, water resistance and friction that act between moving surfaces.**

**Recognise that some mechanisms including levers, pulleys, and gears, allow a smaller force to have a greater effect**

Label the direction of gravity and resistance on a picture.

Identify and label gravity and resistance force.

Explore and clearly demonstrate the effects of levers, pulleys and simple machines on movement.

Design and make a variety of parachutes and carry out fair tests to determine which designs are the most effective. Use their findings to make recommendations. Use stopwatches and record in tables.

**Prior Learning**

**F.S –** Know how to talk about how things work and why things happen.

**Year 3 –** Forces: Compare how things move on different surfaces. Know that magnetic forces can act at a distance and how magnets repel each other and attract some materials, but not others.

**Cross Curricular Links**

**Maths –** Time/Data handling

**Key Vocabulary**

**Gravity –** A force which tries to pull 2 objects close to each other.

**Water resistance –** It resists the penetration of water

**Friction –** The action of one surface or object rubbing against another.

**Levers –** A handle or bar that is attached to a piece of machinery and which you push or pull to operate the machinery.

**Pulleys –** A small, fixed wheel or a group of such wheels with a rope or chain in a grooved rim that is used to lift something up.

**Force** - A **force** is the push or pull on an object with mass that causes it to accelerate.

**Air resistance** - A**ir resistance** is a force that acts in the opposite direction of a moving object and is a type of **friction**.

## Key Knowledge

**Gravity** is a force which tries to pull two objects toward each other. Anything which has mass also has a **gravitational** pull.

The more massive an object is, the stronger its **gravitational** pull is.

Earth's **gravity** is what keeps you on the ground and what causes objects to fall.

When **forces** are balanced an object doesn't move e.g. while a book will push onto a bookcase because it is being pulled down by the gravitational pull of the earth, the bookcase is providing resistance, therefore pushing back.

As the forces are balanced, the objects don't move.

All objects upon earth experience a force of **gravity** that is directed "downward" towards the centre of the earth.

Greater speeds and bigger cross-sectional areas = increased **air resistance**.

Do you remember how difficult was it to walk through water, if you have tried to walk in a pool, a river or the sea?
This is because the particles of water are pushing back against you, **resisting** your movement.

Air resistance always tries to slow a moving object down. The faster you move, the greater the resistance. ***The faster the vehicle -moves, the bigger the air resistance becomes.*** Like friction, air resistance acts in the opposite direction to the movement of the object.

## Key Questions

What is the key factor that makes a parachute effective?

How will you make your testing fair?

Why do you think many bikes have over 20 gears?

How do bike gears help cyclists and the forces they need to speed up or slow down?

What forces might act on you when you are cycling?