



# Big Question:

## How can moving objects be slowed down?



### Key Vocabulary:

Forces: *Pushes or pulls*

Gravity: *The force that attracts things towards the centre of the Earth, or towards any other physical body having mass.*

Weight: *The measure of the force of gravity on an object.*

Mass: *A measure of how much matter (or stuff) is inside an object.*

Friction: *A force that acts between two surfaces or objects that are moving or trying to move, across each other.*

Air Resistance: *A type of friction caused by air pushing against any moving object.*

Water Resistance: *A type of friction caused by water pushing against any moving object.*

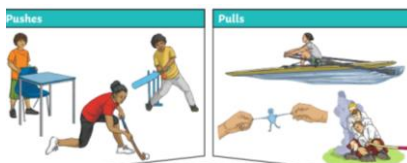
Streamlined: *When an object is shaped to minimise the effects of air or water resistance.*

Attraction: *A force that pulls objects together.*

Repulsion: *A force that pushes objects away.*

### Knowledge from Y3 that will help me answer the big question:

A force is a push or pull in a direction.



Forces will change the motion of an object. They will either make it start to move, speed up, slow down or even make it stop.

An object will not move unless a pushing or pulling force is applied.

Some forces act directly on an object (e.g. pushing) and some act at a distance (e.g. magnetic force).

Friction is a force between two surfaces as they move over each other. Friction slows down a moving object. Smooth surfaces usually generate less friction than rough surfaces.

### New knowledge that will help me answer the big question:

Pulleys can be used to make a small force lift a heavier load. The more wheels in a pulley, the less force is needed to lift a weight.



Gears or cogs can be used to change the speed, force or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.



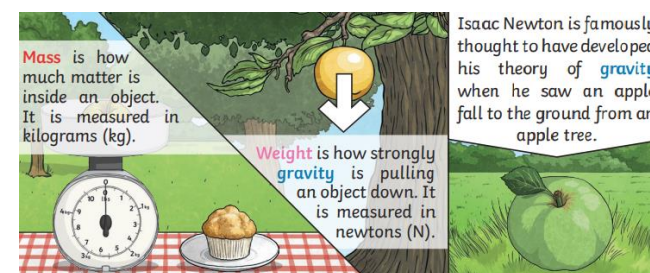
Levers can be used to make a small force lift a heavier load. A lever always rests on a pivot.



### New knowledge that will help me answer the big question:

Gravity is a force of attraction. Anything with a mass can exert a gravitational pull on another object.

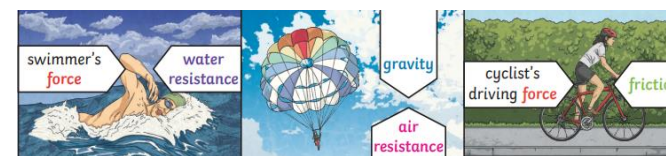
The Earth's large mass exerts a gravitational pull on all objects on Earth, making dropped objects fall to the ground.



Air resistance and water resistance are types of friction. They oppose motion and slow down moving objects.

Friction is sometimes a useful force, such as bike brakes to slow a bike down (friction) or parachutes to stop skydivers hitting the ground (air resistance).

Sometimes we want to reduce the effects of friction, including air resistance and water resistance, such as streamlining boats and planes to move through water or air more easily.



As a scientist, the essential knowledge I need to answer the big question is:	Date
Gravity is a force of attraction. Anything with a mass can exert a gravitational pull on another object. The Earth's large mass exerts a gravitational pull on all objects on Earth, making dropped objects fall to the ground.	
Specialised equipment is used to take measurements in standard units.	
Friction, air resistance and water resistance are forces that oppose motion and slow down moving objects. These forces can be useful, such as bike brakes and parachutes, but sometimes we need to minimise their effects, such as streamlining boats and planes to move through water or air more easily, and using lubricants and ball bearings between two surfaces to reduce friction.	
Mechanisms, such as levers, pulleys and gears, give us a mechanical advantage. A mechanical advantage is a measurement of how much a simple machine multiplies the force that we put in. The bigger the mechanical advantage, the less force we need to apply.	
Questions can help us find out about the world and can be answered using a range of scientific enquiries.	
A prediction is a statement about what might happen in an investigation based on some prior knowledge or understanding.	