

<u>Science</u> <u>Forces & Mechanisms - Advent 1</u>

<u>Forces</u>

A force is a push or a pull that makes something move, change speed or change shape. Forces act in pairs that oppose each other. A force can be either a contact force or a non-contact force.

Gravitional force or gravity

All objects have gravity because all objects have mass. Usually, the gravitational force between two objects is very weak because the objects are small. Gravitational force becomes larger as an object's mass increases. Gravity gives an object weight.

Earth's gravity pulls objects towards its centre. Earth's gravitational force is strong because Earth has a large mass. Gravity keeps objects on the surface of the Earth and pulls all unsupported objects to the ground.





The force of gravity is weaker on the Moon than on the Earth because the Moon has less mass. Gravity on the Moon is about one-sixth of that on Earth

Mass and weight

Many people commonly mix up and misuse the words mass and weight, even though they have different meanings and units of measurement.

Mass is the amount of matter that an object or substance contains. It can never be zero and is the same wherever it is, even in space. Mass is measured in grams (g) or kilograms (kg) using a scale or the kg scale on a force meter.

Weight is a measure of gravitational force. The weight of an object can vary depending on where it is. For example, gravitational force on the Moon is less than that on Earth, so an object weighs less on the Moon. Weight is measured in newtons (N) using a force meter.

Frictional forces

Friction is in all places where two surfaces meet. It acts in the opposite direction to movement and always slows an object

down. The amount of friction depends on the materials from which the surfaces are made. Friction can be increased by adding tread patterns to tyres and the soles of shoes. Friction can be decreased by smoothing surfaces or using a lubricant, such as oil.







Air resistance

Air resistance is a type of friction that always acts against the direction of movement. It is caused by air particles hitting an object and slowing it down. Objects with a large surface area will hit more particles, and therefore have more air resistance, than objects with a smaller surface area.

Increasing air resistance

Some objects are designed to increase air resistance. Parachute canopies have a large surface area, which increases air resistance and slows down the parachutist's descent. air resistance gravity.

Decreasing air resistance

Some objects are designed to decrease air resistance. This fighter jet has a small surface area and a streamlined shape which decreases air resistance and allows the plane to move quickly through the air.

Levers

Levers are simple machines that can be used to provide a mechanical advantage, so a smaller force can have a greater effect. They consist of a lever arm, a fulcrum, a load to lift and an effort force. Levers make it easier to lift a load.







Water resistance

Water resistance is another type of friction that always acts against the direction of movement. It is caused by water particles hitting an object and slowing it down. Objects with a large surface area will hit more particles, and therefore have more water resistance, than objects with a smaller surface area.

Increasing water resistance

Scuba flippers have a large surface area to increase water resistance as the diver pushes against the water to move forward.

Decreasing water resistance

The front of a submarine has a small surface area and is streamlined to reduce water resistance.

Glossary

Particle - A single piece of matter that is too small to be seen.

Streamline - Having a shape that can move quickly and effectively through a liquid or a gas.

Levers - Levers are simple machines that can be used to provide a mechanical advantage, so a smaller force can have a greater effect.

Force - A force is a push or a pull that makes something move, change speed or change shape

Air resistance - Air resistance is a type of friction that always acts against the direction of movement.

Water resistance - Water resistance is another type of friction that always acts against the direction of movement. It is caused by water particles hitting an object and slowing it down.

Gravity - The force that attracts a body towards the centre of the earth, or towards any other physical body having mass.

Friction - The resistance that one surface or object encounters when moving over another.



