Science Knowledge Organiser

Year 5

Autumn (ii)

Why is gravity and upthrust important for life on Earth?

Portable Knowledge -

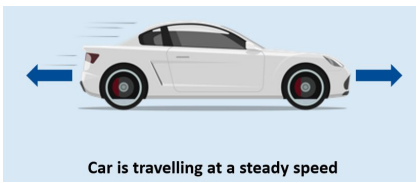
Gravity is the force that keeps all objects on Earth. Upthrust is the opposing force stopping objects from being pushed into Earth. Air resistance, water resistance and friction slows down or stops movement (force).

To know that unsupported objects fall towards The Earth because of the force of gravity acting between The Earth and the falling object.

Gravity is the force of the Earth's gravity that holds use firmly on the Earth's surface and causes objects to fall to the ground when dropped.

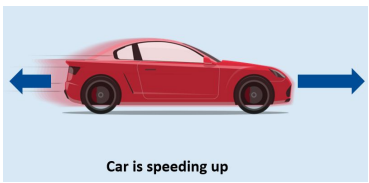
Everything on the planet feels the pull of gravity.

When forces are balanced, an object will not change its speed or direction. This is because the forces are equal.



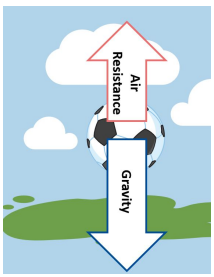
Car is travelling at a steady speed

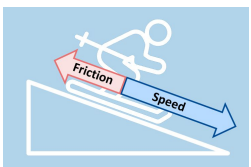
When forces are unbalanced an object will change direction or speed. This is because the forces are unequal.



Car is speeding up

To know the effects of air resistance, water resistance and friction that act between moving surfaces.

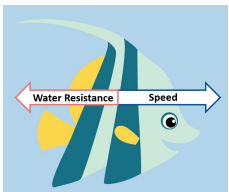




Friction is the force between two touching surfaces.

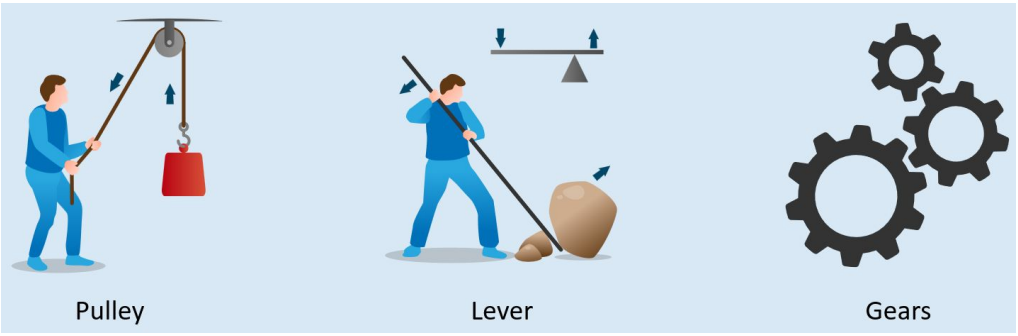
Smoother surfaces create less friction.
Less friction = More speed
Rougher surfaces create more friction.
More friction = Less speed

Air resistance is a type of friction. It is the force which acts against objects as they move through the air. When an object is dropped, air resistance acts in the opposite direction of the fall.



Water resistance is another type of friction. It is the force which acts against objects as they move through the water. When an object moves through water, water resistance acts in the opposite direction.

To know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a great effect.



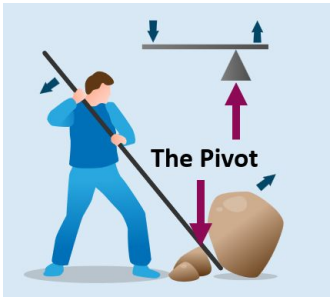
Pulley Lever Gears

These are all simple machines which can change a small force into a bigger force.

Pulleys are used to lift heavy things. You loop a rope over a wheel and when you pull down on the rope it lifts the heavy things up.

It's easier to pull down on the rope than to lift up the heavy objects.

Pulleys are used in lifts, cranes, blinds and fishing rods.

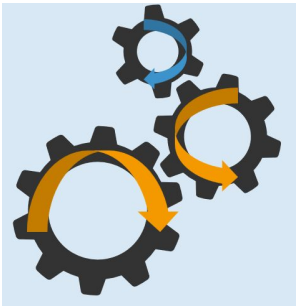


Levers are used to lift heavy objects. Levers move around a point called a pivot, and this can change a smaller force into a larger force.
If you push with a small force on the long side of the lever, you produce a bigger force on the short side.

We see levers used in wheelbarrows, scissors, see-saws and door handles.

Gears are used to change the speed or direction of something.

If the middle gear was turned a full circle, the smaller gear would complete more than once circle in the same time.
This is because its circumference is smaller than the middle gear.
The small gear moves faster.
The larger gear would move slower because it has a larger circumference, so it wouldn't complete a full circle in the same time as the middle-sized gear.



Core vocabulary

Resistance - a force that opposes or slows down another force.

Friction - the resistance when two objects are rubbed together.

Gravity - the force that brings things to the ground.