

Willerby Carr Lane Primary School - Science

Topic: Forces and Motion

Year: 5

Strand: Physics

What should I already know?

- Forces are pushes and pulls
- These forces change the motion of an object. They will make it start to move or speed up, slow it down or even make it stop.
- Friction is a force that holds back the motion of an object
- Some surfaces create more friction than others which means that objects move across them slower
- On a ramp, the force that causes the object to move downwards is gravity

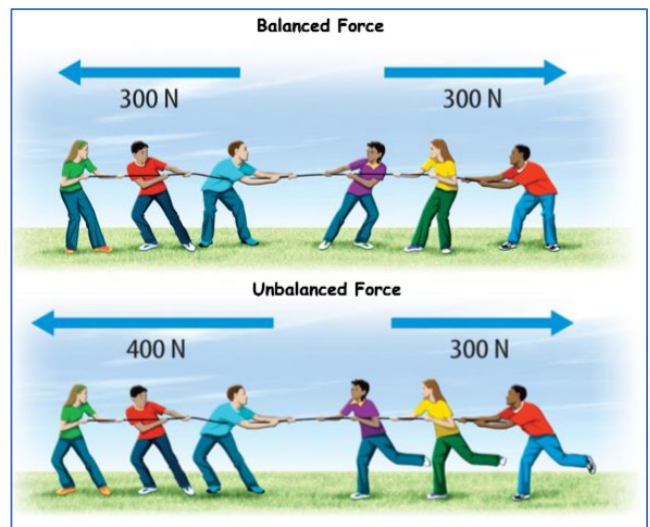
and pulleys allow a smaller force to have a greater effect?

can will turn a smaller gear faster with less force.

- Levers can change the direction of a force or magnify it (make it bigger). Examples: our joints, scissors and bottle openers.
- A pulley is a wheel fixed at one end with a rope passing through it. A single wheel pulley helps reverse the direction of the lifting force. A two wheel pulley reduces the force needed to lift an object

What will I know by the end of the unit?

What is gravity?	<ul style="list-style-type: none"> • That the earth has an invisible pull called gravity. • That unsupported objects fall to Earth because of the force of gravity acting between the Earth and the falling object. • That weight is a measure of the pull of gravity on an object and is a force measured in Newtons. • Know that scientists such as Isaac Newton and Galileo Galilei helped to develop the theory of gravitation
What is air resistance?	<ul style="list-style-type: none"> • Air resistance is a force that slows down objects moving through the air. • Understand that large surface areas encounter more air resistance than small surface areas. • A parachute creates air resistance and this helps to slow its fall
What is upthrust?	<ul style="list-style-type: none"> • Upthrust is the force acting upwards on an object in water. • Larger surface areas create • An object floats when the amount of water it displaces is equal to its own weight
What is water resistance?	<ul style="list-style-type: none"> • Water resistance is a type of friction, which is a force • Water resistance can slow objects down in water • More streamlined shapes are less affected by water resistance • Submarines have teardrop shaped hulls to reduce the water resistance acting on them. This therefore increases the speed of the submarine in the water. • Swimmers wearing swimming suits and caps helps them remained streamlined, reducing water resistance and therefore increasing their speed through the water.
How do mechanisms such as gears, levers	<ul style="list-style-type: none"> • Gears are wheels with teeth that fit together. When one gear moves, the other moves in the opposite way. A larger gear



Vocabulary	
air resistance	a force that is caused by air with the force acting in the opposite direction to an object moving through the air
balanced force	balanced forces are those two forces acting in opposite directions on an object, and they are equal in size.
driver cog	a cog that received power directly and transmits motion to other parts
follower cog	a cog that is moved by the turning force of a driver cog
force	a push or pull upon an object resulting from its interaction with another object
friction	the resistance that one surface or object encounters when moving over another
gears	a toothed wheel that works with others to alter the relation between the speed of a driving mechanism (e.g. engine) and the speed of the driven parts (e.g. the wheels)
gravity	the force that attracts a body towards the centre of the earth
levers	a rigid bar resting on a pivot that is used to move a heavy or firmly fixed load

mass	the weight measured by an objects acceleration under a given force or by the force exerted on it by gravity
Newton	the unit used to measure weight in science.
pulleys	a wheel with a grooved rim around that changes the direction of a force applied to the cord
unbalanced force	unbalanced force occurs when two forces acting on an object are not equal in size, causing a change in motion . unbalanced forces cause a still object to move or moving objects to slow down or speed up, stop or change direction.
upthrust	a force that is applied to all objects whether they float or sink.
water resistance	a force that is caused by water with the force acting in the opposite direction to an object moving through the water
weight	weight is a force. it is the measure of the pull of gravity on an object. in science, weight is measured in newtons.

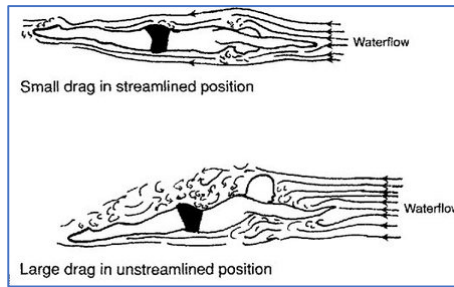
Investigate!

- Plan a fair test into how the size of a parachute changes its effectiveness.
- What is the smallest weight you can lift your rubber with using a lever?
- Investigate how pulleys work and how the number of pulleys used changes the effort required
- Examine how gears work on a bike to make it easier to travel up hills.
- Use an elastic band and then a force meter to measure how the apparent 'weight' of a ball of plasticine changes in water.
- What shape boat hull travels fastest through water?
- Which shape falls most quickly through water?
- How can plasticine be made to float/ sink ?

Common misconceptions

Some children may think:

- the heavier the object the faster it falls, because it has more gravity acting on it
- forces always act in pairs which are equal and opposite
- smooth surfaces have no friction
- objects always travel better on smooth surfaces
- a moving object has a force which is pushing it forwards and it stops when the pushing force wears out
- a non-moving object has no forces acting on it
- heavy objects sink and light objects float.



- A solid block of steel sinks in water. A ship with the same mass floats on the surface.

