Oughterside Foundation School - Science

Topic: Forces | **Year: A** | **Strand: Physics**

What should I already know?

- Know what a **force** is and be able to explain that a push and pull are types of **forces.**
- That when **forces** are applied to an object they allow them to move or stop moving.
- The strength of the **force** determines how far and fast an object moves.
- **Friction** is the **resistance** of **motion** when there is contact between two **surfaces**
- The **force** that causes objects to move downwards towards the ground is **gravity**.
- That **magnets** have poles, and that opposite poles **attract**, while similar poles **repel.**

Vocabulary

attract	If one object **attracts** another object, it causes the second object to move towards it
friction	the **resistance** of **motion** when one object rubs against another
force	the **pulling** or **pushing** effect that something has on something else
gear	a part of a machine that causes another part to move because of teeth which connect the two moving parts
gravity	the **force** which causes things to drop to the ground
lever	a basic tool used to lift or pry things open
motion	the activity of changing position or moving from one place to another
opposite	**Opposite** is used to describe things of the same kind which are completely different in a particular way. For example, north and south are **opposite** directions
pulley	a simple machine that makes lifting something easier. A pulley has a wheel or set of wheels with grooves that a rope or chain can be pulled over
repel	When a magnetic pole **repels** another magnetic pole, it gives out a **force** that pushes the other pole away
resistance	a **force** which slows down a moving object or vehicle
spring	a spiral of wire which returns to its original shape after it is pressed or pulled
streamlined	A **streamlined** vehicle, animal, or object has a shape that allows it to move quickly or efficiently through air or water
surface	the flat top part of something or the outside of it

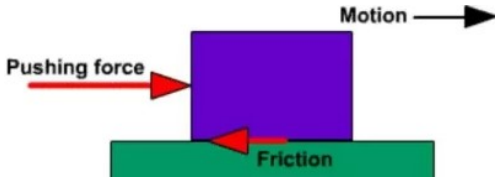
Investigate!

- Investigate the amount of **friction** created by different **surfaces**. Use measures (such as length and time) to show how far or fast and object travels.
- Draw diagrams to show how objects move down ramps, through the air and through water, using arrows to show the direction of the **forces.**
- Explore the effects of **friction** on **motion** and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel
- Provide examples of when **friction** is useful.
- Investigate how **surface area** affects **air resistance** and explain the relationship between them.
- Make parachutes to investigate how **air resistance** works. Ensure that only one variable is changed while other variables stay the same. Variables may include the objects attached to the parachute, shape of parachute, size of parachute, length of string attached to the object, height of drop, material of parachute. Explain why this is necessary in an experiment.
- Explore **resistance** in water by making and testing boats of different shapes
- Design and make products that use **levers**, **pulleys**, **gears** and/or **springs** and explore their effects

What will I know by the end of the unit?

What are **forces?**

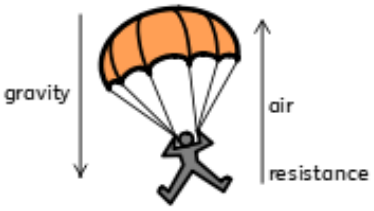
- **Forces** are pushes and pulls.
- These **forces** change the **motion** of an object.
- They will make it start to move or speed up, slow it down or even make it stop.
- For example, when a cyclist pushes down on the pedals of a bike, it begins to move. The harder the cyclist pedals, the faster the bike moves.
- When the cyclist pulls the brakes, the bike slows down and eventually stops.
- **Friction** is a **force** - it is the **resistance** of **motion** when one object rubs against another.



- Other **forces** that create **resistance** of **motion** include **water resistance** and **air resistance.**

What is **gravity** and air **resistance?**

- **Gravity is** the **force** that pulls objects to the centre of the Earth.
- Air **resistance** pushes up on the parachute, **opposing** the force of **gravity .** This makes the parachute land more slowly.



What is water **resistance?**

- Water **resistance** is the **friction** that is created between water and an object that is moving through it.
- Some objects can move through water with less **resistance** if they are **streamlined.**

What are examples of **mechanisms?**


lever


pulley


gear


spring

- **Levers** allow us to do heavy work with less effort . For example, trying to pick up a large heavy box is difficult, however if a **lever** is used it becomes much easier to move it.
- **Pulleys** also allow us to do heavy work - objects are attached to ropes and **pulley** wheels, and so instead of lifting heavy object upwards, we can pull on the **pulley** rope downwards.
- **Gears** are toothed wheels. Their 'teeth' can fit into each other so that when the first wheel turns, so does the next one. This allows **force**s to move across a **surface.**
- **Springs** can be stretched by pulling them or squashed by pushing them. The greater the **force** pulling or pushing the **spring,** the greater the force the **spring** uses to move back to its normal shape.

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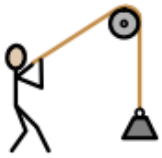
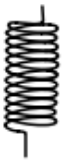
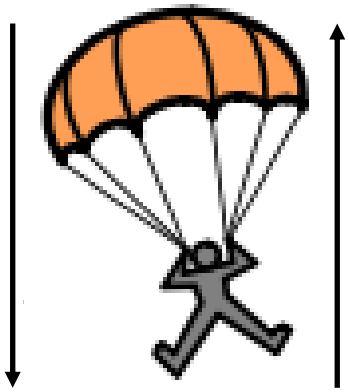
Topic: Forces	**Year: 5**	**Strand: Physics**

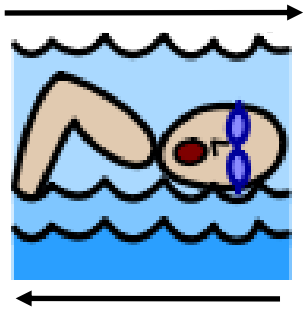
Question 1: The pulling or pushing effect that something has on something else can be best described as a….	Start of unit:	End of unit:

Question 2: Which force pulls objects towards the ground?	Start of unit:	End of unit:
resistance		
magnetism		
gravity		
friction		

Question 3: A force which slows down a moving object is...	Start of unit:	End of unit:
resistance		
magnetism		
gravity		

Question 4: Match the mechanism to the name of it.	Start of unit:	End of unit:
 pulley  gears  lever  spring		

Question 5: Label this diagram to show which forces are in action.	Start of unit:	End of unit:
		

Question 6: Label this diagram to show which forces are in action.	Start of unit:	End of unit:
		

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You are planning an investigation to understand more about air resistance using parachutes that you have made. You decide to ask the question, *"Does the surface area of the parachute affect the time it takes for a parachute to fall?"*	Start of unit:	End of unit:
Question 7: Name three things that must stay the same during the experiment.		
Question 8: Name one variable that will change during the experiment.		
Question 9: Give a prediction and explain your reasons for this prediction (if pupils have done the experiment, the question could be changed to give a *conclusion* for the end of unit question).		
Question 10: Explain the importance of repeating the test a few times.		