Knowledge Organiser

Topic: Forces | **Year 3** | **Strand: Physics**

What should I already know?

- The shape of some materials can be changed when they are **stretched, twisted, bent** and **squashed**.
- Know how different toys move.
- 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.

Vocabulary

attract	If one object **attracts** another object, it causes the second object to move towards it
bendy	an object that bends easily into a curved shape
friction	the **resistance** of **motion** when there is contact between two **surfaces**
force	the **pulling** or **pushing** effect that something has on something else
gravity	the **force** which causes things to drop to the ground
magnet	a piece of iron or other material which attracts **magnetic** materials towards it
magnetic field	an area around a **magnet**, or something functioning as a magnet, in which the **magnet's** power to **attract** things is felt
metal	a hard substance such as iron, steel, gold, or lead
motion	the activity of changing position or moving from one place to another
non-magnetic	an object that is not **magnetic**
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
position	The **position** of someone or something is the place where they are in relation to other things
pull	When you **pull** something, you hold it firmly and use **force** in order to move it towards you or away from its previous **position**
push	When you **push** something, you use **force** to make it move away from you or away from its previous position
resistance	a **force** which slows down a moving object or vehicle
squash	pressed or crushed with such **force** that something loses its shape
stretchy	slightly elastic
surface	the flat top part of something or the outside of it
twist	turn something to make a spiral shape

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.
- Compare how different things move and group them.
- Observe how a **magnetic field attracts** iron filings by using a bar **magnet.**
- Investigate how **magnets** are used in everyday life.
- Investigate which materials are **magnetic** and sort between objects that are **magnetic** and those that are **non-magnetic.**
- Investigate if the size of a **magnet** affects how strong it is (using chains of paper clips of varying lengths)
- Investigate if all **metals** are **magnetic.**
- Observe what happens when **magnets** with similar poles are placed next to each. Repeat this for when the poles are different.

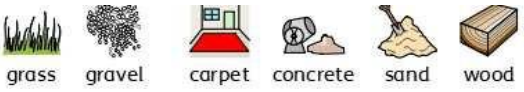
What will I know by the end of the unit?

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.

How do different **surfaces** affect the **motion** of an object?

- **Forces** act in **opposite** directions to each other.
- When an object moves across a surface, **friction** acts as an **opposite** force.
- **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.**
- Objects move differently depending on the **surface** of the object itself and the **surface** of the ramp.

How do **magnets** work?

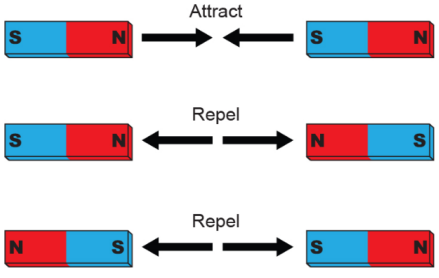
- **Magnets** produce an area of **force** around them called a **magnetic field.**
- When objects enter this **magnetic field**, they will be **attracted** to or **repelled** from the **magnet** if they are **magnetic.**
- When **magnets repel**, the **push** each other away
- When **magnets attract,** they **pull** together.

Which materials are **magnetic?**

- Objects that are **magnetic**, are **attracted** to **magnets.**
- Iron and steel are **magnetic.**
- Aluminium and copper are **non-magnetic.**

How do **magnetic** poles work?

- The ends of a **magnet** are called poles.
- One end is called the north pole and the other end is called the south pole.
- **Opposite** poles **attract**, similar poles **repel**.
- If you place two **magnets** so the south pole of one faces the north pole of the other, the **magnets** will move towards each other. This is called **attraction**.
- If you place the **magnets** so that two of the same poles face each other, the magnets will move away from each other. They are **repelling** each other.



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		

Question 3: Which of these surfaces would create the most friction for a cyclist riding their bike?	Start of unit:	End of unit:
sand		
concrete		
polished wood		

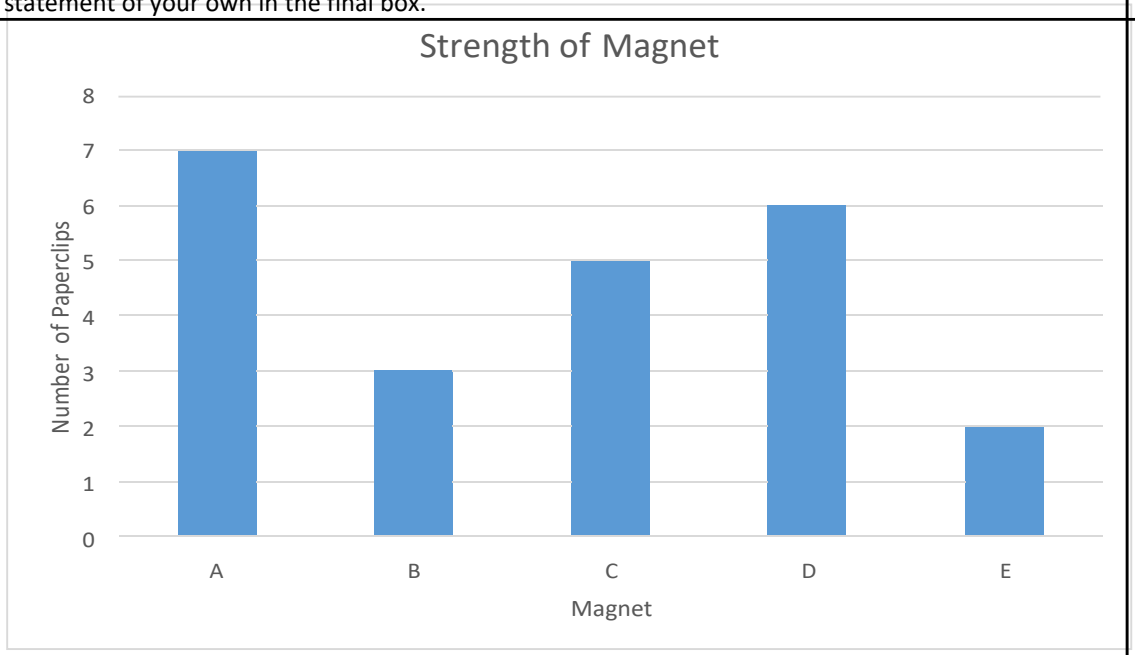
Question 4: What is motion?	Start of unit:	End of unit:
Changing size		
Holding still		
Changing shape		
Moving from one place to another		

Question 5: Which force acts as resistance when one object moves against another?	Start of unit:	End of unit:
resistance		
magnetism		
gravity		

Question 6: You design an experiment to see how far an object moves on ramps of different surfaces. What must you do to keep the test fair?	Start of unit:	End of unit:
keep the object the same for all ramps		
the ramps must all be the same length		
the object must have the same starting point before it starts moving		
all of the above		

Question 7: How can you test which materials are magnetic?	Start of unit:	End of unit:
see which objects are attracted to a magnet		
see which objects are repelled by a magnet		
see which objects are not affected by a magnet at all.		

Question 8: For each of these diagrams, state whether these magnets will attract or repel each other.	Start of unit:	End of unit:
 _____		
 _____		
 _____		

Question 9: You devise an experiment to test the strength of 5 magnets. You label them A-E and then test to see how many identical paperclips (in a chain) they attracted. All of the results have been placed in a bar graph. Write T or F to indicate if the statements are true or false. Write a true statement of your own in the final box.	Start of unit:	End of unit:
		
Magnet A is the strongest magnet		
Magnet C attracted a longer paperclip chain than Magnet D		
Magnet B is the weakest magnet		
The chain that Magnet D could hold had six paperclips		
The paperclips have to be identical to make the test fair.		
	T	

Question 10: You find a new magnet and label it Magnet F. It can hold a chain of 4 identical paperclips. Show that on the graph below. Use a ruler.	Start of unit:	End of unit: