Forces Suite - Magnetic Circus

Magnetic Circus Stations:

The purpose of these activities is to allow the children to explore and discover. Children should not be told anything more than what to do. They should be encouraged to try and identify the key learning objectives in each activity.

Children could record this in many different ways.

- After visiting all stations children could become an “expert” in one and then have to explain it to others, either within class or maybe to younger pupils or parents.
- Children could be recorded either verbally, or maybe even film each other reporting on their findings.
- Labelled drawings
- Flow diagram of instructions with explanations for one or two stations
- Glossary for the circus with reference to each station
- Postcard/label for each station with key point, vocabulary and learning outcome
- Children could use these investigations to plan another of their own, e.g., what could we investigate using the circular nature of the magnetic field?

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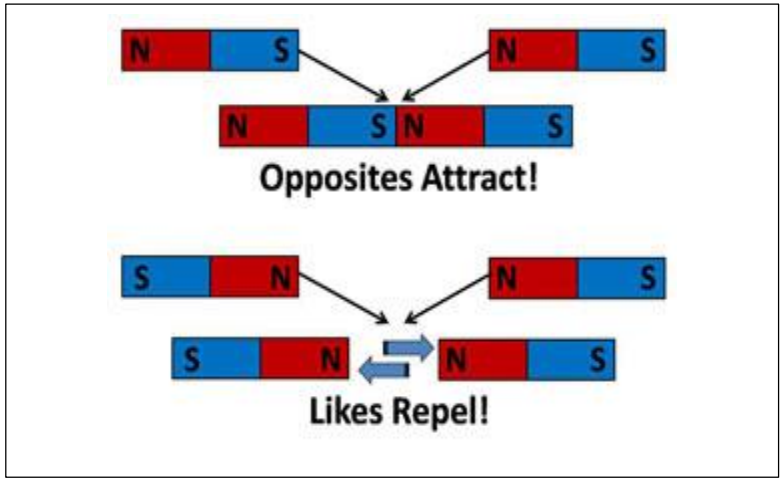
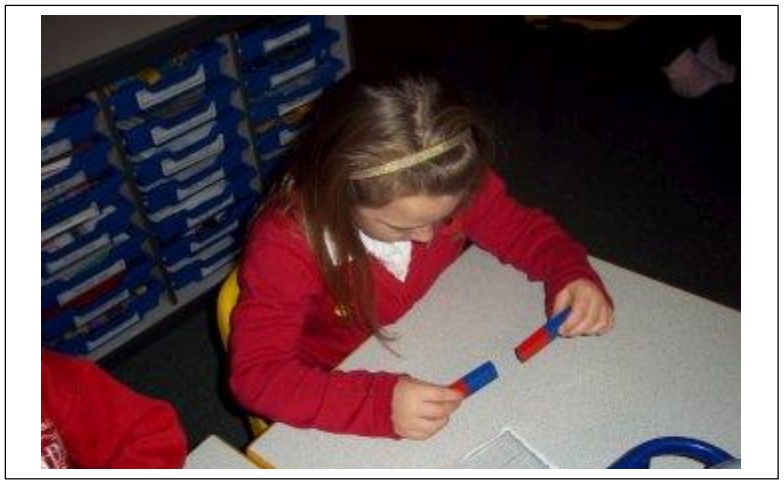
Station 1: Investigating the "like poles attract and unlike poles repel" rule using two coated bar magnets

Equipment: Red and blue bar magnets





- Children can use the magnets to feel the "pull" and the "push".
- They can test the distance at which they begin to feel these forces.
- Discussion could lead to north and south poles.
- Able children may identify the link with the Earth's poles.
- Magnetic fields are invisible.

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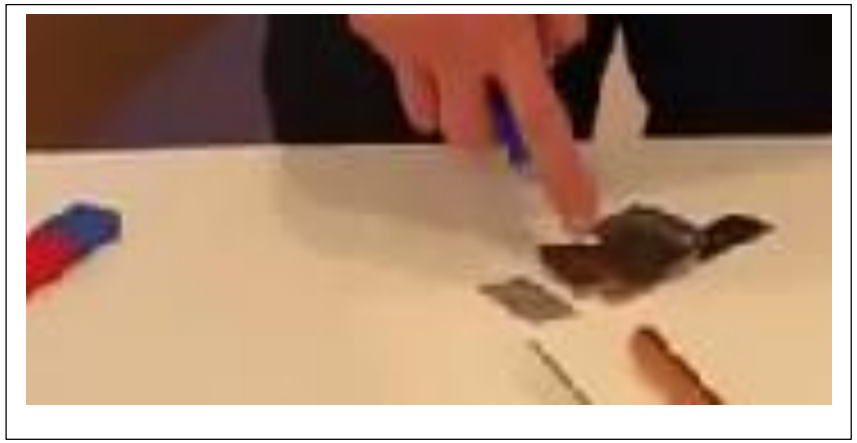
Station 2: Investigating which materials are magnetic with a bar magnet and selection of magnetic metals, non-magnetic metals and non-metals.

Equipment: red and blue bar magnets, metals



- Children can test the array of metal given in order to overcome the common misconception that all metals are magnetic
- They may group them and then identify other properties which separate the groups, eg, colour, weight etc

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Station 3: Investigating whether all magnets are the same strength with a clamp stand, sewing string, blue tack, paper clip, neodymium wand, magnadur magnet and plastic coated magnet.

Equipment: clamp stand, blue tack, thread, paper clip, neodymium wand, magnadur and bar magnets

1. Assemble the clamp stand as usual.
2. Attach a magnet to the top of the stand.
3. Tie a paper clip to a piece of thread and blue tack the thread to the base.
4. Stretch the paper clip towards the magnet, which should then become “suspended” in mid air.

- Observation made will lead to discussions between the magnets and raise the common misconception that the larger the magnet, the stronger the attraction.
- Children love to explore this station. They can test how far the magnetic field stretches by altering the distance between the magnet and the paper clip.
- Children can also reinforce their understanding of magnetic and non-magnetic materials by placing them between the paper clip and the magnet.
- Some children may make some links between what they are observing and other forces, for example gravity.

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Station 4: Investigating the effect of materials on magnetic shielding using a compass, two coated bar magnets, glass, and iron containers of different sizes.

Equipment: 4 compasses, bowls, pans bar magnets

1. Lay the magnet on the table and move a compass around it slowly. What do you see?
2. Cover the magnet with one of the containers and repeat moving the compass.
3. Try it with each of the different containers.
4. What happens? What can you see?

- Children should observe the varying movements of the compass. What can you see? Why could this be happening? Explain your ideas. What happens if put two containers over the compass? These are all valid questions which will lead to further discussion. What other information do the children have about the real world which may offer some explanation for what they are observing?

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Station 5: Neodynium magnet and magnetic effects.

Equipment: neodymium wand, magnetic/non magnetic materials

- An opportunity for children to test whether magnetism is “conducted” or do objects just stick together within the sphere of influence of the magnetic field.
- They may be able to compare any observations they made with using other magnets.
- Another opportunity to group materials according to their properties.

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Station 6: Demonstrating the circular nature and range of magnetic fields visually using magnetic field apparatus.

Equipment: field finder, neodymium wand

- After moving the magnet around the magnetic field apparatus, children should observe it move in every direction.
- This should lead to discussions about the direction of a magnetic field, and that it is 360 degrees.
- Children can work in pairs to move the magnet, ensuring everybody has the opportunity to feel the pull as the magnet is attracted.

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Station ***8: Splat the Rat***

Equipment: baseball bat, copper tube, red and black "rats"

- Two "rats" are supplied, one containing a strong neodymium magnet, the other just a metal weight.
- One person drops one of the rats down the tube,
- The challenge is for another child to Splat it as it emerges from the bottom of the tube.
- Repeat with the other rat.
- How did you do?

- Children will love this investigation. It leads to comparisons of the two "rats". They may notice a difference in weight or colour, but there must be something else.
- This gives an excellent dramatization of Lenz's Law as the magnetised rat takes at least 5 seconds longer.

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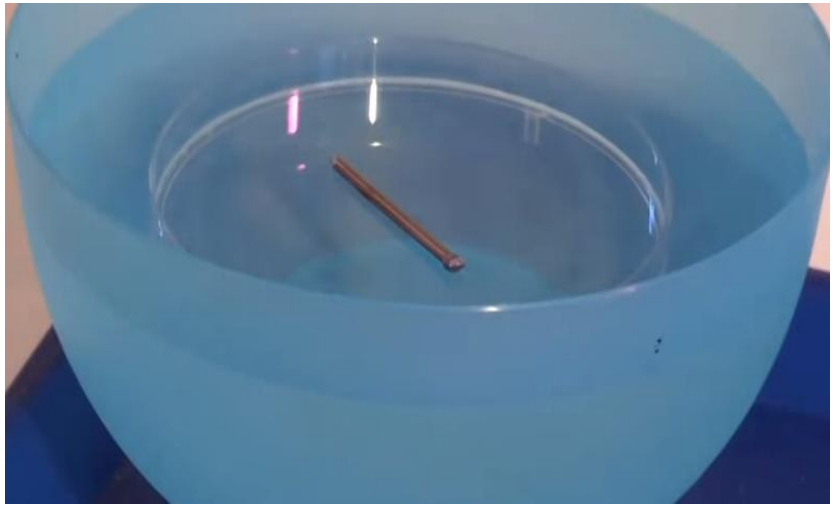
Station 9: Making a compass

Equipment: bowl, water, magnet, pin/needle



1. Hold the needle in one hand, taking the magnet in the other hand, stroke the magnet along the needle.
2. Repeat this many times, ensuring you always use the same end of the magnet and stroke in the same direction.
3. This magnetises the needle.
4. Almost fill the bowl with water.
5. Float the petri dish on top of the water.
6. Carefully place the needle into the petri dish and watch as it settles.
7. The needle will point towards North.
8. Check with a compass.

- This could be a whole class activity if some extension work is needed.
- Children could research the origins of the compass in China.

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Magnetic Circus:

Station Number:

Observation:

Why might this happen?

I have learnt:

Scientific vocabulary used:

Empiribox
Nurturing Future Scientists