

Teachers notes and answers

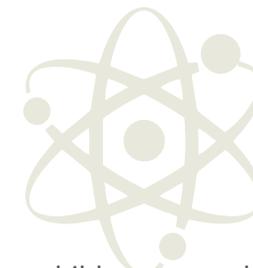
Science curriculum links:	materials, working scientifically
Maths curriculum links:	number and place value, addition and subtraction, fractions, shape, statistics
Suggested target audience:	KS1

- 1) This simple enquiry is a great way for children to explore the magnetic properties of materials and objects as well as introducing Venn diagrams for sorting.
- (a) In this challenge children learn that they can use a tally chart to record the data from their scientific enquiries as well as practicing tally chart notation.

Sticks to the magnet	<input checked="" type="checkbox"/>	1
Does not stick to the magnet	<input checked="" type="checkbox"/>	1

- (b) Once the tally chart is complete the children get to use it to answer some simple number problems. Either counting objects in the photo or counting marks on the tally chart. **12 objects**
- (c) The children will count all of the objects in the (left) blue circle. **6 objects**
- (d) The children will count all of the objects in the (right) red circle. **6 objects**

There are different methods that children can use to answer this question. It would be valuable to discuss the different ways that children chose to solve this problem. Did they count the objects in the red circle? Did they count the markings in the table or did they subtract 6 from 12?



The next two parts to the question encourage children to use data to support or refute scientific ideas.

- (e) Children use the data in the table to help them decide whether they agree or not with Ruby's idea. The data doesn't agree with Ruby's conclusion, encourage discussion to think why that is – did she not count the objects correctly or did she test more objects than she recorded. Here are some examples of what they might think.

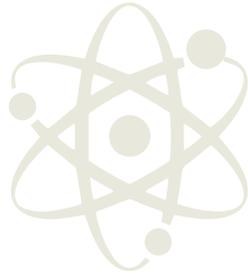
The same number of materials stick to the magnet and do not stick to it.

Half the things stuck and half did not.

The tally chart does not agree with what Ruby thinks.

Once the tally chart is complete, the children get to use it to answer some simple number questions. The disagreement between Ruby's idea and the data could be a prompt for the children to plan and carry out their own enquiries to see if their data agrees with Ruby. It will; there will be far more objects in your classroom that will be non-magnetic rather than magnetic.

- (f) Children use the photograph to help them decide whether they agree or not with Shannon's idea. Shannon hasn't noticed that there is a metal object in her non-magnetic group but it is true that all the magnetic materials that she tested were made of metal.



3) This question provides children with the opportunity to solve problems by identifying half of a quantity.

(a) They will need five paper clips.

half of 10 is 5

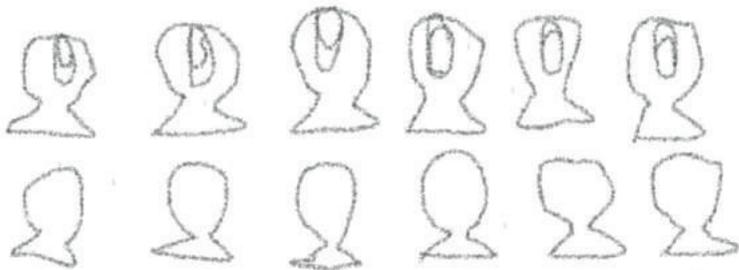
They need 5 paper clips

(b) They will need 10 paper clips.

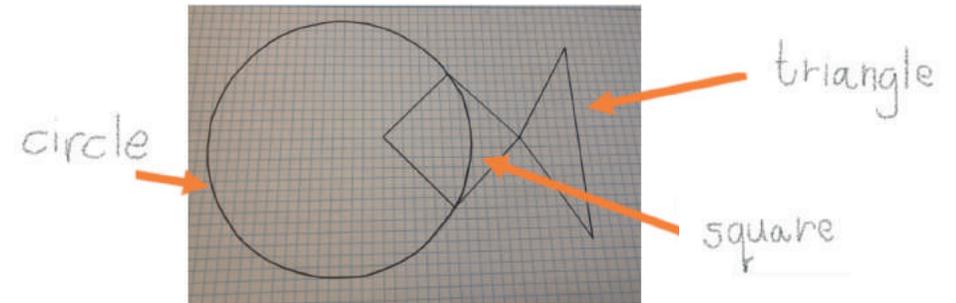
half of 20 is 10

They need 10 paper clips

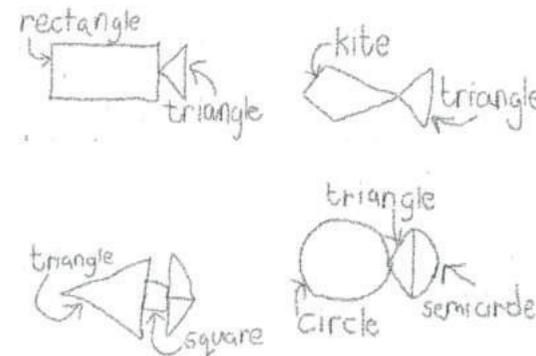
(c) They can make 12 fish.



4) This problem links to mathematics of shape, as the children design the fish in the magnetic game.



This exercise can be developed further with children investigating all of the different combinations of shapes they can use to create a fish.



The extra challenge links this project to environmental science and marine life. Children could learn about the difficulties marine life experiences and learn a little about the United Nations Global Goals. In exploring how they could use their magnetic fishing games to raise money for a marine conservation charity, this cross-curricular project can be linked to PSHE and citizenship curricula.



making physics matter



Age
5-7
years

Phizzi problem solving

Magnetic fishing game

Problems to solve

1

Miss Greet's class decided that they would like to make a magnetic fishing game to raise money at the summer fair.

(a) Complete the tally chart below to record their results:

Sticks to the magnet	<input checked="" type="checkbox"/>	
Does not stick to the magnet	<input checked="" type="checkbox"/>	

(b) How many objects did the class test?

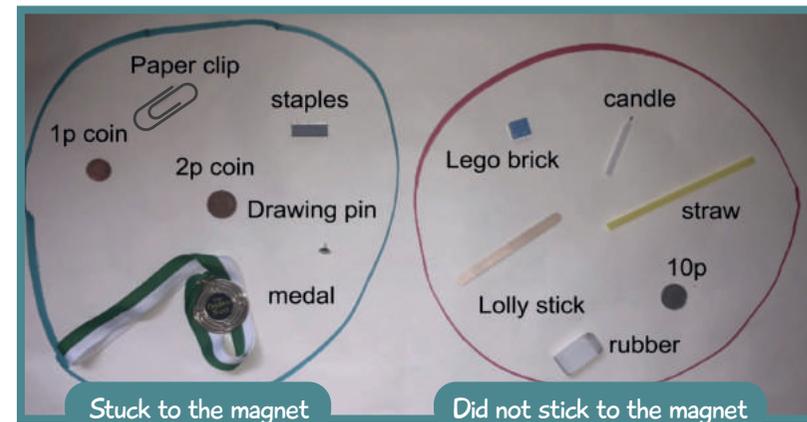
(c) How many of the objects stuck to the magnet?

(d) How many objects didn't stick to the magnet?

(e) Ruby says "fewer materials stuck to the magnet than didn't".

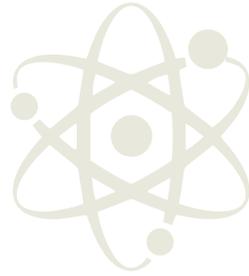
Use the results to decide whether you agree or disagree with her.

(f) Shannon says "all metals stick to magnets". Use the results to decide whether you agree or disagree with her.



Plan your own investigation to find out what objects in your classroom will stick to a magnet?

Do your results agree with the ideas that Ruby and Shannon have about their results?



2

Jonah and Alisha make a magnetic fishing game. They put paper fish in their pool with paper clips stuck to them so they are pulled towards a magnetic fishing line. The aim of the game is to catch as many fish as you can in one minute; there are always seven fish in the pool at the start of the game.

- (a) Jonah manages to catch three fish. How many fish are left in the pool?
- (b) Alisha catches two fish in a minute. How many fish are left in the pool?
- (c) Miss Greet tries out the game. She catches seven fish. How many more fish than Jonah did she catch?
- (d) Who won the game?



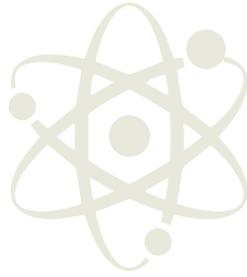
3

Rahul and Leon decide that they want to make their fishing game a little trickier, they will only stick paper clips to half of the paper fish.

- (a) If they want 10 fish in their pool, how many paper clips will they need?
- (b) If they want 20 fish in their pool, how many paper clips will they need?
- (c) Miss Greet gives them six paper clips, how many fish will they make for their pool?



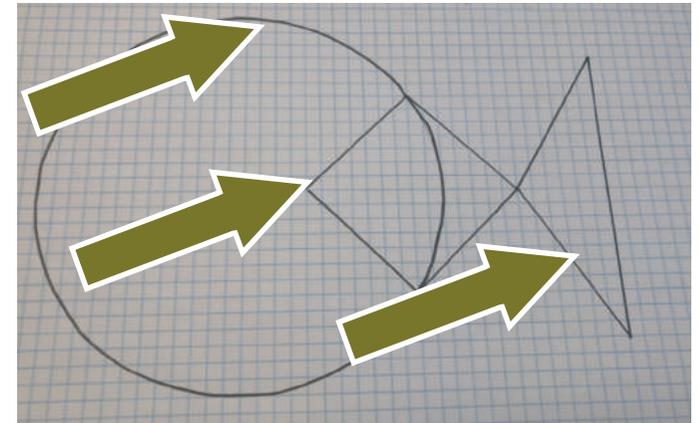
In pairs, make your own magnetic fishing game. Why not investigate how wearing a blindfold affects how many fish you can catch in a minute?



4

Miss Greet made a template for the children to draw around to make their paper fish.

- (a) Label all of the shapes you can see in the template.
- (b) How many other ways can you find to create a fish shape with 2D shapes?



Investigate how many different ways you can make a fish shape by drawing around different shapes.

You could use triangles, squares, rectangles, circles, semicircles, diamonds and kite shapes.



Did you know?

The Marine Conservation Society is the UK's leading marine charity. They work to ensure our seas are healthy, pollution free and protected. Perhaps you could make a magnetic fishing game to raise money for this charity or another one that protects ocean life.

How much do you think people would pay to play your game? How many children are there in your school? If they all have a go on your game, how much money could you make for the charity?

