

Teachers notes and answers

Science curriculum links: materials, working scientifically

Maths curriculum links: number and place value, addition and subtraction, fractions, measuring, statistics

Suggested target audience: KS1



Warning – bruises

Neodymium magnets have a very strong attractive force. Unsafe handling could cause jamming of fingers or skin between magnets. This may lead to bruises. Powerful, very large magnets could cause bone fractures.



Warning – metal splinters

Neodymium magnets are brittle. Colliding magnets could crack. Sharp splinters could be sent flying and injure your eyes. Avoid the collision of magnets and wear safety glasses when handling magnets.

1 (a)

Safety

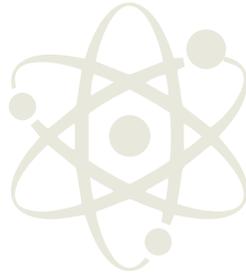
As you will have already read in the problem-solving sheets, neodymium magnets have a number of associated risks. It is essential that you carry out a full risk assessment for any practical work you intend to carry out in the classroom. We strongly recommend that you reference CLEAPSS to ensure that your risk assessments are thorough and well-informed, ensuring that all hazards are identified and precautions to reduce risk are planned for.



Danger – swallowing

Children could swallow small magnets. If several magnets are swallowed, they could get stuck in the intestines and cause perilous complications. These magnets are not toys.

Type of magnet	Number of sheets	
	Tally	Total
2cm ceramic discs		2
Rectangular		3
Flexible squares		7
Neodymium discs		11
Noticeboard magnets		2



(b)

Holds the most sheets of paper



Neodymium

Flexible squares

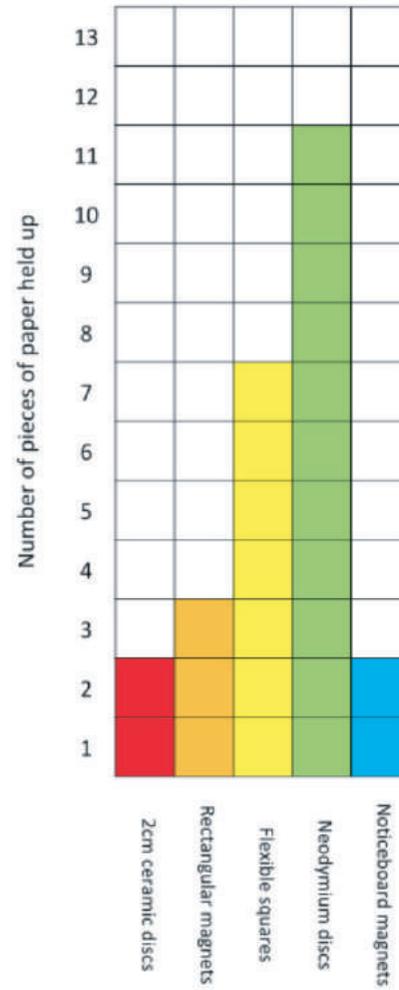
Rectangular

Ceramic discs

Noticeboard magnets

Holds the least sheets of paper

(c)

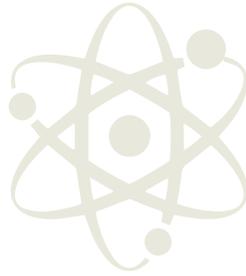


(d) (i) Based on this test which magnet do you think Mr Holt should buy?

I think Mr Holt should buy the neodymium discs for the fridge magnets.

(ii) What is the reason for your decision?

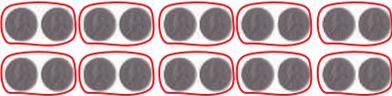
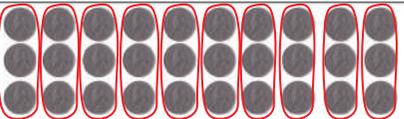
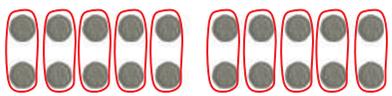
The neodymium disc could hold up 11 sheets of paper so it was the strongest magnet.



2) Mr Holt shared the price of each type of magnet with his class and asked whether information would make them change their minds about which magnet they would choose.

Type of magnet	Number in pack	Cost per pack
2cm ceramic disc magnets	10	£2
Neodymium discs	10	£3
Flexible squares	10	£3
Rectangular magnets	10	£4
Noticeboard magnets	10	£1

(a) Use the information in the table to find the cost of one of each of the magnets.

Type of magnet	Cost of one magnet
2cm ceramic disc magnets	 20p each
Neodymium discs	 30p each
Flexible squares	 30p each
Rectangular magnets	 40p each
Noticeboard magnets	 10p each

(b) Based on your calculations, which magnet do you think they should buy?

They should buy the neodymium discs.

Explain your decision?

They are the strongest and not the most expensive.

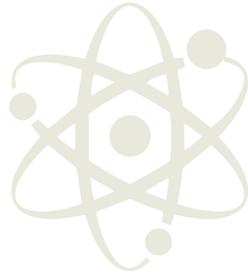
(c) Mr Holt tells the class there is some important safety information on the packet of the neodymium magnets.

(i) Which magnet do you think they should buy now?

They should buy flexible squares.

(ii) What is the reason for your decision?

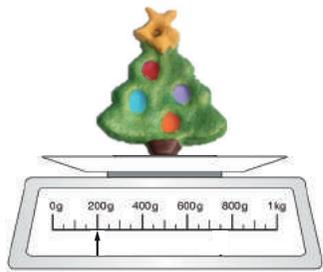
They are almost as strong as neodymium discs because they hold up 7 sheets of paper and they cost the same but they are safer.



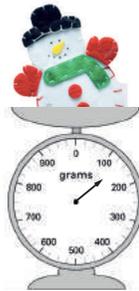
3) The class all agreed that the best magnet to use would be the flexible squares.

Mr Holt made some sample fridge magnets with Christmas decorations to give the children some ideas. Christa noticed that one of the fridge magnets with heavier decoration wouldn't stick to the fridge, it kept falling off. Christa told the class that they needed to find out the maximum mass of decoration they could stick to the magnet so that it would work.

(a) Use the scales below to read the mass of the four magnets Mr Holt made.



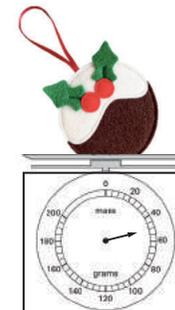
Salt dough
Christmas tree
200g



Felt snowman
beanbag
150g



Felt Santa
stuck to card
100g



Felt Christmas
pudding
50g

(b) (i) Which fridge magnet do you predict will not stick to the fridge?

The salt dough Christmas tree.

(ii) What is the reason for your prediction?

It is the heaviest.

(c) (i) What material do you think the children should use to make their decorations?

Felt and card.

(ii) Why do you think that?

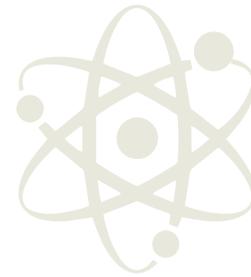
It is light and easier to attach the magnet to the stiff card.

(d) What do you think is the maximum mass of the decorations the children should make?

150g.



making physics matter



Age
5-7
years

Phizzi problem solving

Fridge magnets

Problems to solve

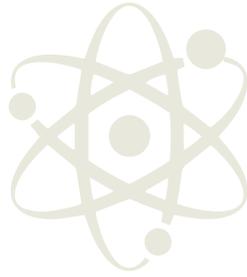
Mr Holt's class is working on a project to make fridge magnets that they can sell at the Christmas fair. Mr Holt has found five different types of magnet that they could use, and he asks the class if they can design scientific tests to help them to decide which type of magnet to buy for the project. To stay safe, Mr Holt says that they will have to carry out their tests on the neodymium magnets with close supervision and wearing safety glasses.

1

Tom's group noticed that some of the magnets would only hold one sheet of paper to the fridge – if they added any more sheets then the magnet would just fall off. They decided that the most important test would be how many sheets of paper the magnet would hold to the fridge and that the best magnet for the job would be the one that could hold up the most sheets of paper.

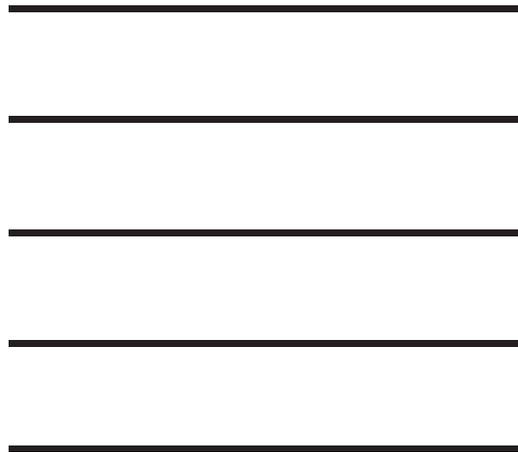
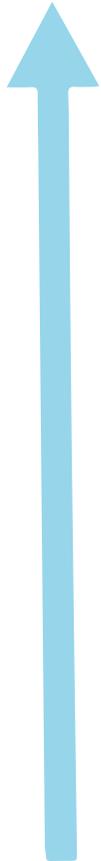
(a) Complete the results table.

Type of magnet	Number of sheets	
	Tally	Total
2cm ceramic discs		2
Rectangular		
Flexible squares		7
Neodymium discs		
Noticeboard magnets		



(b) Write the names of magnets in order from the one that holds up the least sheets of paper to the one that holds up the most sheets of paper.

Holds the most sheets of paper

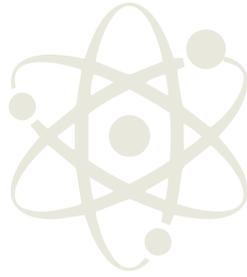


Holds the least sheets of paper

(c) Complete the block diagram below with the data they collected.

(d) Based on this test, which magnet do you think Mr Holt should buy? Explain your decision.

13					
12					
11					
10					
9					
8					
7					
6					
5					
4					
3					
2					
1					
	Zcm ceramic discs	Rectangular magnets	Flexible squares	Neodymium discs	Noticeboard magnets



2

Mr Holt shared the price of each type of magnet with his class and asked whether this information would make them change their minds about which magnet they would choose.

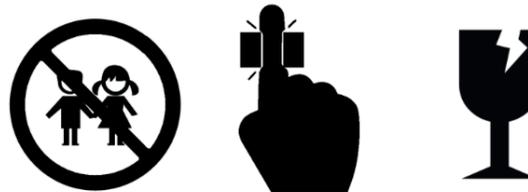
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(a) Use the information in the table to find the cost of one of each of the magnets.

Type of magnet	Cost of one magnet
2cm ceramic disc magnets	
Neodymium discs	
Flexible squares	
Rectangular magnets	
Noticeboard magnets	

(b) Based on your calculations, which magnet do you think they should buy? Explain your decision.

(c) Mr Holt tells the class there are some important safety symbols on the packet of the neodymium magnets.



(i) Which magnets do you think they should buy now?

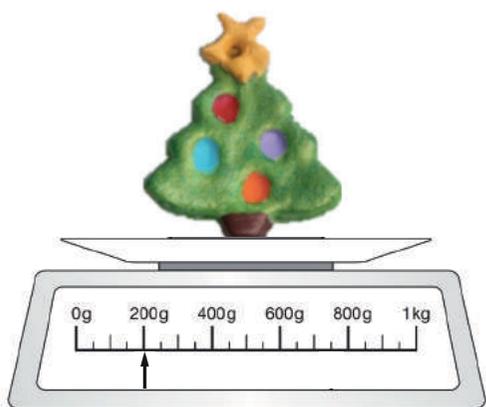
(ii) What is the reason for your decision?

3

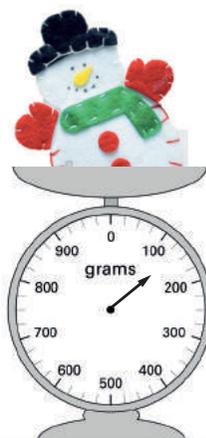
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Mr Holt made some sample fridge magnets with Christmas decorations to give the children some ideas. Christa noticed that one of the fridge magnets with heavier decoration wouldn't stick to the fridge, it kept falling off. Christa told the class that they needed to find out the maximum mass of decoration they could stick to the magnet so that it would still work.

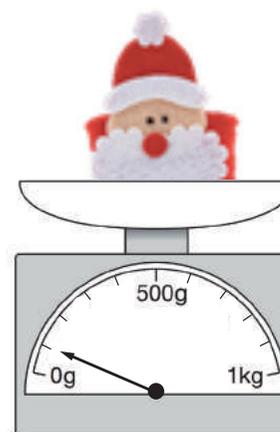
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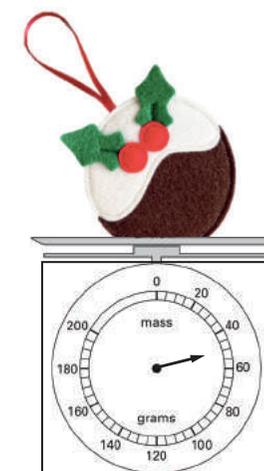
Salt dough
Christmas tree
_____g



Felt snowman
beanbag
_____g



Felt Santa
stuck to card
_____g



Felt Christmas
pudding
_____g

(b) (i) Which fridge magnet do you predict will not stick to the fridge?
(ii) What is the reason for your prediction?

(d) What do you think is the maximum mass of the decorations the children should make?

(c) (i) What material do you think the children should use to make their decorations?
(ii) Why do you think that?