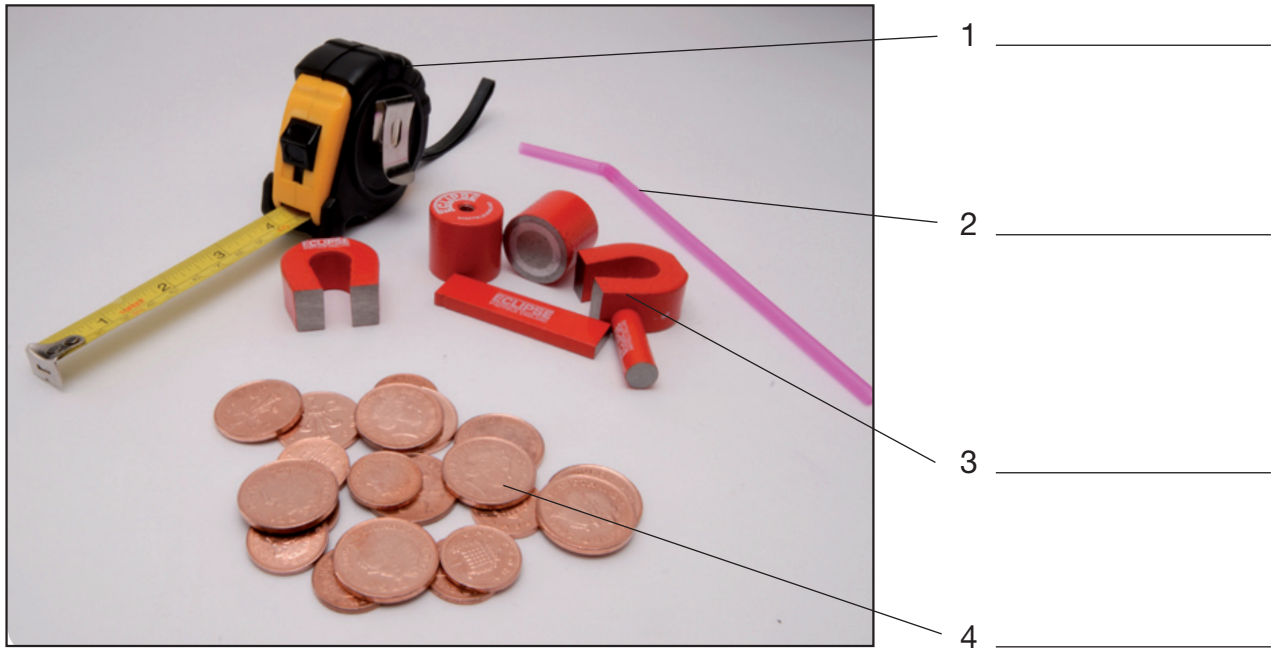


Exercise 1

Vocabulary: Materials

Label the diagram with the materials you used for this experiment.

metal tape measure drinking straw assorted magnets
assorted coins



Exercise 2

Vocabulary: Verbs

Complete the instructions for the experiment with the correct verbs from the box.

- 1 Use the magnet to _____ for coins.
- 2 Make coins _____ on top of each other.
- 3 _____ coins from the magnet.
- 4 Try to get a coin to _____ really fast.
- 5 Get a coin to _____ uphill.
- 6 _____ as many different coin sculptures as possible.

hang roll build fish stand spin

Look at your experiment sheet and check your answers.

Exercise 3

Conclusions: Speaking, Writing

Read the text and place the adjective phrases from the box in the correct places.

magnetic strong	magnetic little	magnetic low	not magnetic covered in
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Some coins are made of steel, which is ⁽¹⁾ _____. Some coins are made of copper or aluminium, which is ⁽²⁾ _____. Very ⁽³⁾ _____ magnets can attract a 'string' of coins. The friction on the bottom coin in a string is very ⁽⁴⁾ _____. It spins easily with very ⁽⁵⁾ _____ resistance. Euro 1, 2 and 5 cent coins are made of steel ⁽⁶⁾ _____. copper. Steel is an alloy of iron and carbon. It's the iron that makes the coins ⁽⁷⁾ _____. Iron, nickel and cobalt are the only ⁽⁸⁾ _____ metals.

Exercise 4

A Scientific Report: Writing

Now write a report on your experiment. Use the language provided to help you.

Useful Language

useful language for writing a scientific report

1. *Say what you did*

We tested ...

2. *Say how you did it*

We used ...

We found that ...

We think this is because ...

magnetic copper steel not magnetic coins
--

made of made from

Magnetic Coins
Keith Kelly**Learning Objectives**

To explore the magnetic attraction of a range of different magnets on an assortment of coins.

Content summary

Some coins are made of steel, which is magnetic while other coins are made of aluminium, which is not. Very strong magnets can attract a 'string' of coins. The friction on the bottom coin in a string is very low, so it spins easily with very little resistance.

Skills

Reading, speaking, writing

Grammar

Past simple; present simple

Vocabulary

Nouns: *tape measure, drinking straw, magnet*

Verbs: *hang, roll, build, stand, spin, fish*

Adjectives: *magnetic, low, strong*

Time needed

60–90 minutes

Age group

7–11

Materials needed

- Assorted coins (try small coins of your own)
- 1 rare-earth (e.g. neodymium) magnet
- Assorted other magnets
- 1 drinking straw

Practicalities

1, 2 and 10 cent Euro coins as they have a high content of steel. 1 and 2 Euro coins will also work.

Rare-earth magnets are very strong. You can buy them from educational suppliers, e.g. www.mutr.co.uk. Be careful when bringing two rare-earth magnets together in case your skin is trapped between them.

Bar magnets work best for balancing activities as it is easier to balance your magnetic sculptures on a flat magnet.

Procedure

1. Tell pupils they are going to conduct a scientific experiment and learn how magnets work and how some metals are magnetic and others aren't.
2. Introduce/pre-teach the vocabulary that pupils will need: *tape measure, drinking straw, magnet, hang, roll, build, stand, spin, fish, magnetic, low, strong*
3. Hand out the experiment sheet or put the sheet up on the interactive whiteboard or projector and have pupils read out the instructions in class.
4. Ask them to work in groups and predict the results of the experiment following the questions which are on the worksheet. The question given on the report writing frame is only about how many coins will hang from a magnet, but there are other questions you might get pupils to investigate. You may need to give them a little time to think and talk about this. They can do this first in their own language but should then try to express it in English. (They should use *will* e.g. *We think the magnet will hold*)
5. Pupils work in groups and follow the instructions on the experiment sheet. Monitor and help where required. Help pupils to say what they are doing in English.
6. Pupils try out their experiment. Get them to record their results. They can make notes in English or in their own language.
7. Ask pupils to discuss in their groups these questions: Why do some coins stick to the magnet and others don't? Which coins are best for this experiment? Why is that? How does the bottom coin of a chain spin so fast?
8. Hand out the worksheet and ask pupils to work their way through exercises 1, 2 and 3. They can check their answers with a partner. These exercises consolidate the vocabulary used in the experiment and get them to come to a conclusion about how magnets work and why some coins are attracted to the magnet and others aren't.

9. Pupils then write up their findings in the form of a scientific report – encourage them to use the language in the Useful Language box. This exercise could be done for homework.

Open-ended investigation

For a more inquiry-based activity, encourage the class to respond to a series of challenges. For example, how many coins can you attract to the magnet? What is the longest string of coins you can suspend? What is the most unusual shape you can make with the coins and magnet? Can you make a coin spin without touching it? Can you make a coin roll uphill without touching it? What magnetic coin tricks can you do?

Extra ideas to explore with your students

Make a string of coins then use the straw to blow on the bottom coin. See how quickly and easily it spins. Why is that?

Use an extending metal tape measure with a magnet on one side and a coin on the other to roll the magnet uphill or upside down.

Magnetic Coins
Keith Kelly

Exercise 1 – Vocabulary: Materials

- 1 – assorted coins
- 2 – assorted magnets
- 3 – drinking straw
- 4 – metal tape measure

Exercise 2 – Vocabulary: Verbs

Answers are on the experiment sheet

Exercise 3 – Conclusions: Speaking, Writing

- 1. magnetic 2. not magnetic 3. strong 4. low 5. little 6. covered in
- 7. magnetic 8. magnetic