



INTRODUCE

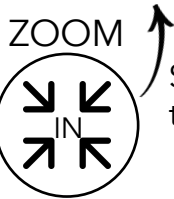
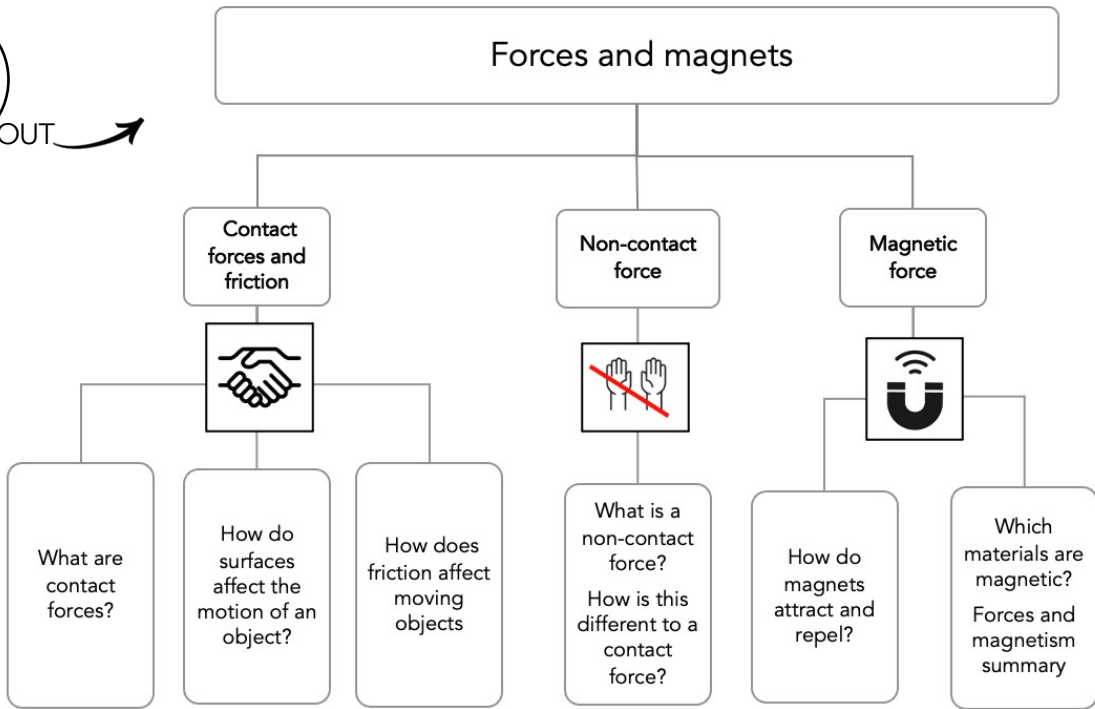
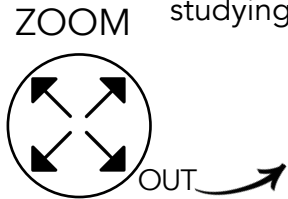
Y3 Forces and magnets

Curriculum navigation



Share the big ideas that you will be studying.

Find a large version in the resource section at the end of this document.



Show how the specific content relates to the big ideas.

Show the stages of the study, one sequence at a time.

Big Picture, Small Picture Adapted from Walkthrus by Tom Sherrington and Oliver Caviglioli

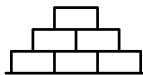
The big idea



Forces and magnets

- compare how things move on different surfaces
- notice that some forces need contact between 2 objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having 2 poles
- predict whether 2 magnets will attract or repel each other, depending on which poles are facing

Previous learning



Year 1
Everyday materials

Year 2
Uses of everyday materials

Ask relevant questions	Set up simple, practical enquiries and comparative and fair tests	Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers	Gather, record, classify and present data in a variety of ways to help in answering questions	Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables	Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests	Identify differences, similarities or changes related to simple, scientific ideas and processes

Academic and elaborative vocabulary (Tier 2)

consequence	result or effect	factor	a thing that affects a decision or situation
assume	believe without proof	similar	things that are very alike
		define	tell or show something very clearly



Knowledge Organiser



A contact force occurs when two objects physically touch



Non-contact force



A force that acts on an object without touching it

push

pull

twist or turn = push + pull

forces act in **opposite directions**

friction is the force that stops things from moving

resistance is a force that slows down an object that is moving

surfaces change how objects move (**motion**) over them

grass

carpet

wood

table

rough

smooth

magnets

horseshoe **ring** **bar**

magnets always have a north and south pole

North **South**

magnetic field

North **South**

opposite poles attract

similar poles repel

magnetic materials

non-magnetic



iron and steel



copper and aluminium





Suggested foundational knowledge that is essential to teach **Forces and magnets study summary**

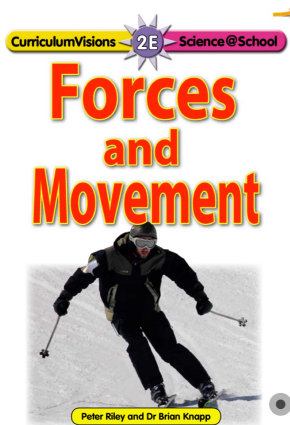
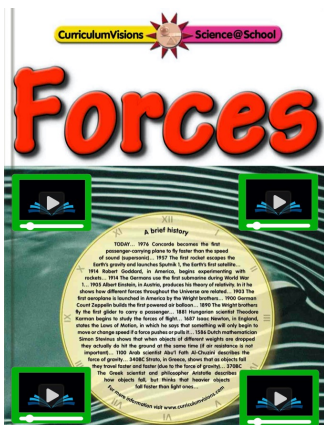
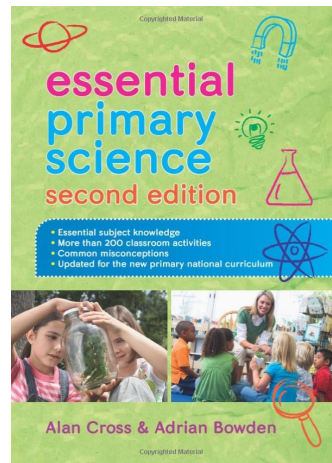
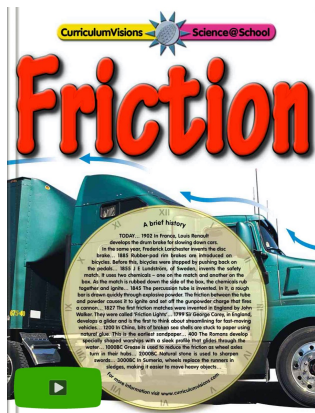
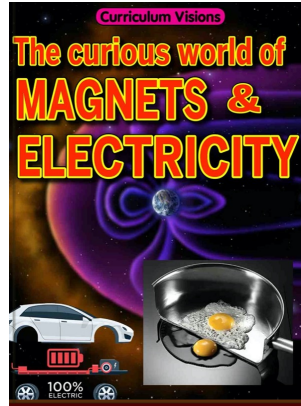
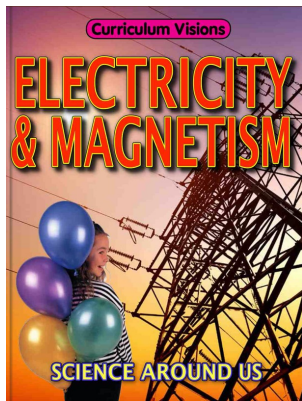
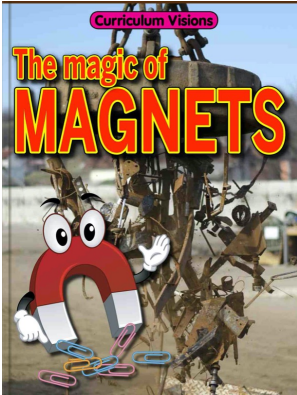


Suggested Lesson	Learning question	Cumulative Quiz					
ESSENTIAL 1	What are contact forces?	1 -2					
ESSENTIAL 2	How do surfaces affect the motion of an object?		3-4				
ESSENTIAL 3	How does friction affect moving objects?			5-7			
ESSENTIAL 4	What is a non-contact force? How is this different to a contact force?				8-9		
ESSENTIAL 5	How do magnets attract and repel?					10-13	
DESIRABLE 6	Which materials are magnetic? Forces and magnetism summary						1 -16



Curriculum Visions Resources and video books

Other books





Click on the link below to import this quiz to your Socrative account

<https://b.socrative.com/teacher/#import-quiz/43656268>

Cumulative quiz

It's most effective if you use these questions through cumulative quizzing

Lesson by lesson

Teach | Test | Teach | Test | Teach | Test | Test

Year 3 Forces and Magnets

1. Select the **contact** forces

- (A) push
- (B) gravity
- (C) pull
- (D) twist or turn
- (E) magnetism

2. Is resistance a force?

- (A) Yes - resistance is a force.
- (B) No - resistance is not a force.

3. Resistance is a force that...

- (A) **speeds up** an object.
- (B) **slows down** an object.
- (C) **doesn't affect** an object.
- (D) I'm not sure.

4. A rough surface will...

- (A) help an object move quickly.
- (B) slow an object down or stop it.
- (C) I'm not sure.

5. Friction is...

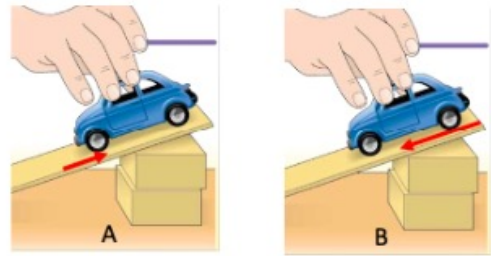
- (A) the force that stops things moving.
- (B) the force that helps things move better.
- (C) I'm not sure.

6. Friction **opposes** the movement of an object.

- (T) True
- (F) False

7. Direction of friction - is it diagram A or B?

- A A - friction **opposes** the movement of the object.
- B B - friction **supports** the movement of the object.
- C I'm not sure.



8. Select the **non-contact** forces

- A push
- B magnetism
- C twist
- D pull
- E gravity

9. A contact force is the same as a non-contact force.

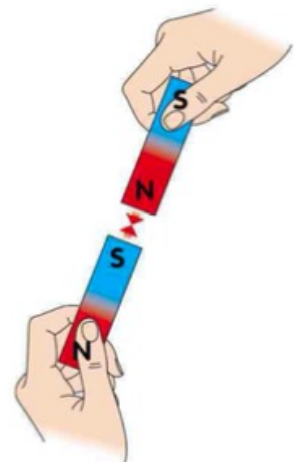
- T True
- F False

10. A magnet must have...

- A south pole + south pole.
- B north pole + south pole.
- C north pole + north pole.
- D I'm not sure.

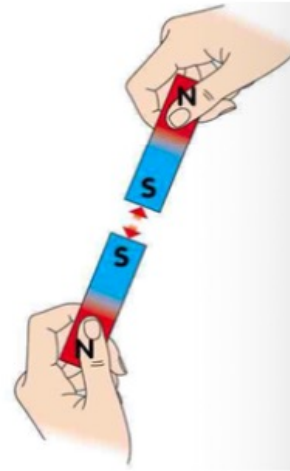
11. These magnets are...

- A attracting.
- B repelling.
- C I'm not sure.



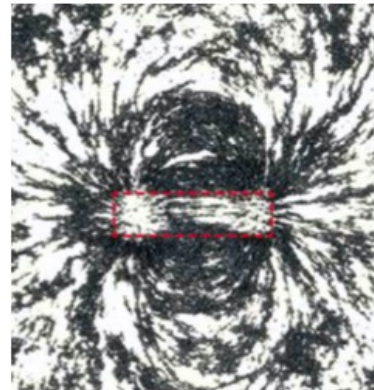
12. These magnets are...

- A attracting.
- B repelling.
- C I'm not sure.



13. This image shows us the...

- A magnetic field.
- B north and south poles.
- C I'm not sure.



14. Iron and steel are materials that are attracted to magnets.

- T True
- F False

15. Select the materials that are **not** magnetic.

- A plastic
- B iron
- C wood
- D paper
- E steel

16. Which everyday things would you find magnets in?

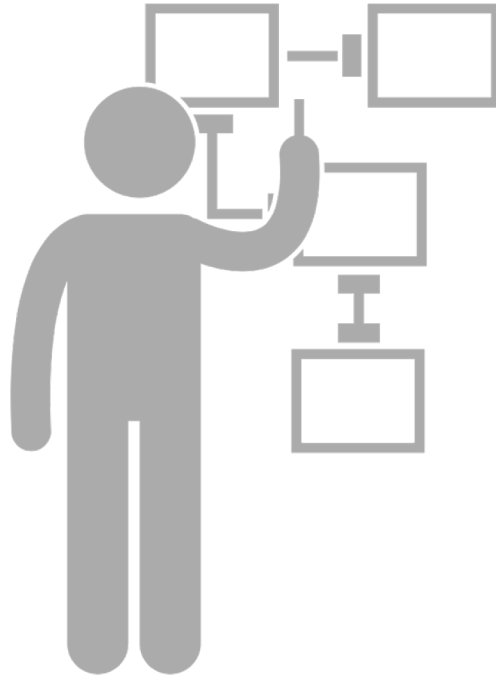
- A Computer.
- B Fridge.
- C Speaker.
- D Electric motor.



Vital Vocabulary

|

Not needed if you are using the
vocabulary modules



Knowledge notes for planning

1

What is a contact force?

A contact force occurs when two objects physically touch



boot + football = contact force



push away



Does wind push or pull?



pull towards



Do round things roll all by themselves?



twist or turn - pushing or pulling

WORKING SCIENTIFICALLY

How are contact forces used in the classroom, PE or with toys?



Possible vocabulary to teach, use and make pupils aware of

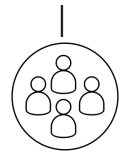
contact



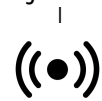
-tact



con-



force



2

How do surfaces affect the resistance of an object's movement?



resistance is a force that slows down an object that is moving.



forces act in **opposite** directions

WORKING SCIENTIFICALLY

Which surfaces would be high resistance and which would be low resistance? Why is that?



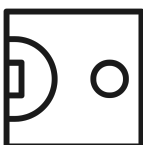
grass



wooden floor



carpet or rug



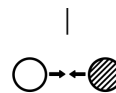
playground surface

What are the similarities and differences between these surfaces?

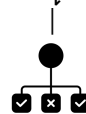


Possible vocabulary to teach, use and make pupils aware of

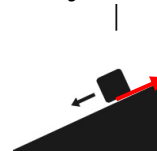
resistance



consequence



friction



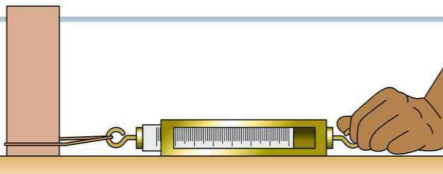
3

How does friction affect moving objects?

WORKING SCIENTIFICALLY

A forcemeter measures friction in Newtons (N)

Newton (N) = units



It's like a ruler that measures length in cm or mm



Always measure twice to **check** your readings

How much force (N) is needed to lift a book?



How much force (N) is needed to drag a book across the table?



What do you notice?
Is there a difference?



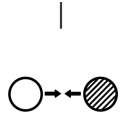
Try lifting and dragging an apple using a force meter.

What do you notice?

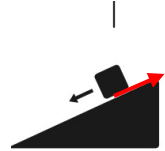


Possible vocabulary to teach, use and make pupils aware of

resistance



friction



What is a non-contact force?

WORKING SCIENTIFICALLY



A force that acts on an object without touching it

gravity

non-contact force

The unseen force that pulls things to the ground



attract



repel



magnetism

non-contact force



magnetism -

The invisible push or pull that works between some materials

pole



What's the difference between a contact and non-contact force?

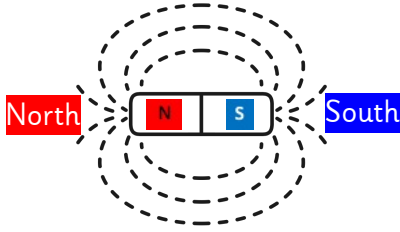


Possible vocabulary to teach, use and make pupils aware of

5

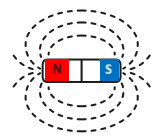
How do magnets attract and repel objects?

Magnets have an invisible force field that **repels** or **attracts** certain materials



Possible vocabulary to teach, use and make pupils aware of

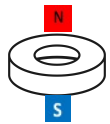
magnetic field



attract



repel





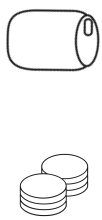
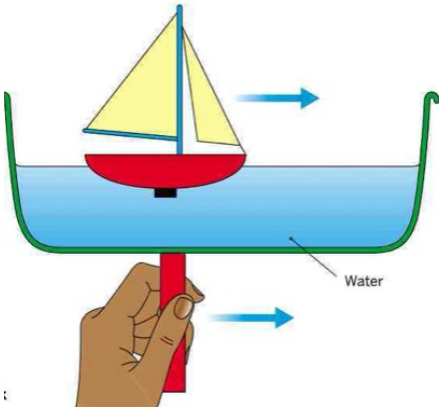

Ring, bar or horseshoe magnets **all** have **north** and **south** poles

WORKING SCIENTIFICALLY

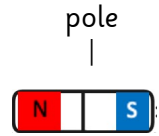
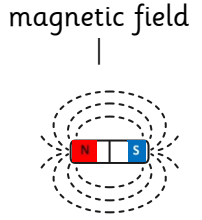
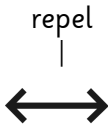


How can these magnetic ring magnets stay suspended without touching each other on the centre pole?

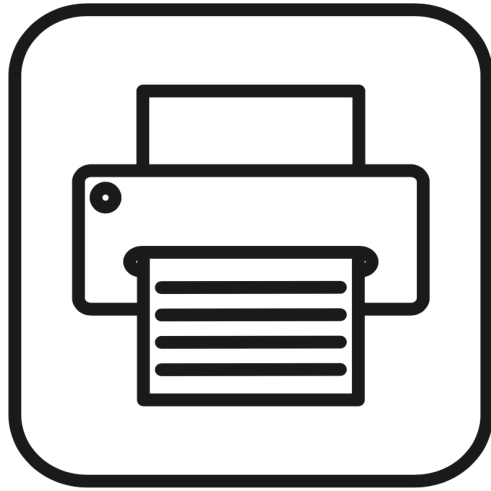


6	
Which materials are magnetic?	
	Any material made of iron or steel
The magnetic field will only act on materials made of iron or steel	
	
Not all metals are magnetic	
	aluminium and copper do not contain iron or steel
magnetic force can work through water	
	
WORKING SCIENTIFICALLY	
How can we sort and classify materials based on their magnetic properties? 	

Possible vocabulary to teach, use and make pupils aware of



Cobalt is also magnetic but is a material pupils are not likely to be familiar with. It is often used in modern batteries.



Pages for printing
knowledge notes

1

What is a contact force?

A contact force occurs when two objects physically touch



boot + football = contact force



push away



Does wind push or pull?



pull towards



Do round things roll all by themselves?



twist or turn - pushing or pulling

WORKING SCIENTIFICALLY

How are contact forces used in the classroom, PE or with toys?



2

How do surfaces affect the resistance of an object's movement?



resistance is a force that slows down an object that is moving.

forces act in **opposite** directions



WORKING SCIENTIFICALLY

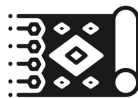
Which surfaces increase or decrease resistance?



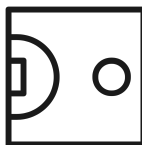
grass



wooden floor



carpet or rug



playground surface

What are the similarities and differences between these surfaces?



3

How does friction affect moving objects?

WORKING SCIENTIFICALLY

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How much force (N) is needed to lift a book?



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What do you notice? Is there a difference?



Try lifting and dragging an apple using a force meter. What do you notice?



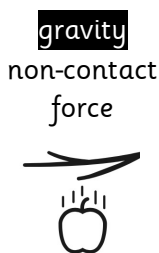
4

What is a non-contact force?

WORKING SCIENTIFICALLY



A force that acts on an object without touching it



The unseen force that pulls things to the ground



magnetism non-contact force



magnetism - The invisible push or pull that works between some materials

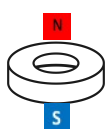
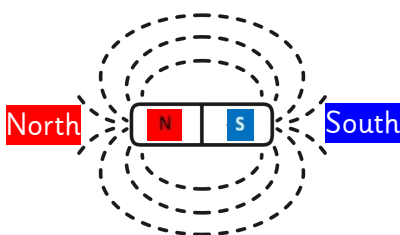
What's the difference between a contact and non-contact force?



5

How do magnets attract and repel objects?

Magnets have an invisible force field that repels or attracts certain materials



Ring, bar or horseshoe magnets all have north and south poles

WORKING SCIENTIFICALLY



How can these magnetic ring magnets stay suspended without touching each other on the centre pole?



6

Which materials are magnetic?



Any material made of iron or steel

The magnetic field will only act on materials made of iron or steel



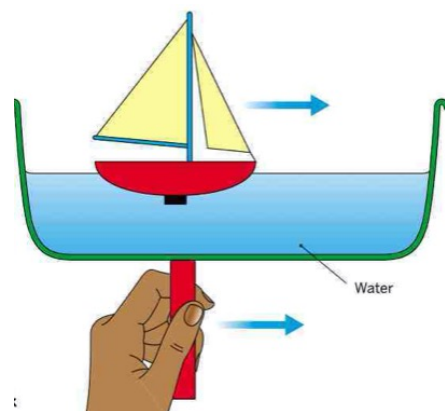
Not all metals are magnetic



aluminium and copper do not contain iron or steel



magnetic force can work through water



WORKING SCIENTIFICALLY

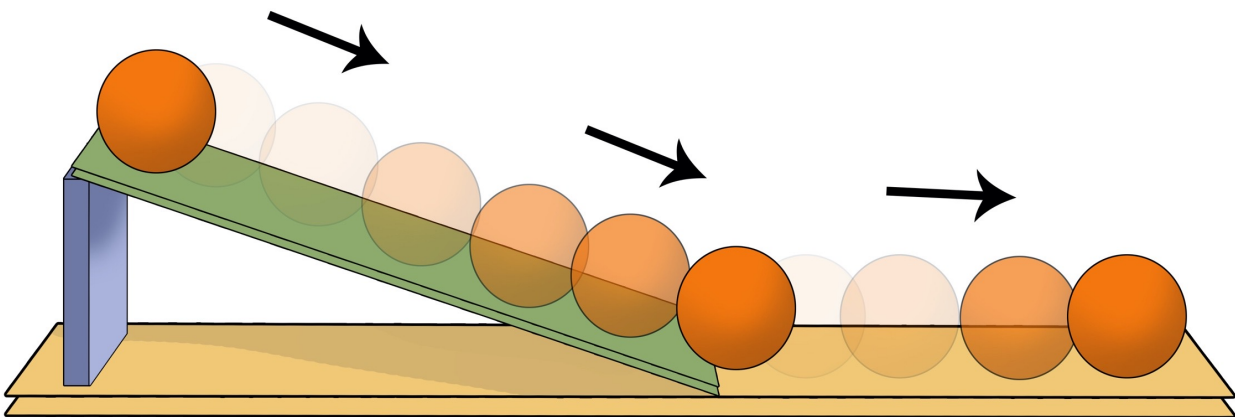
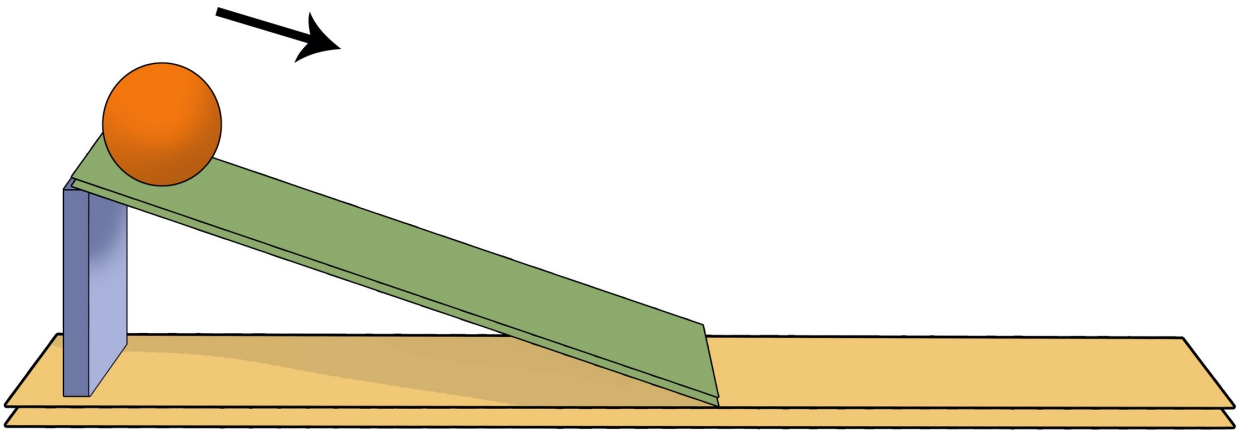
How can we sort and classify materials based on their magnetic properties?





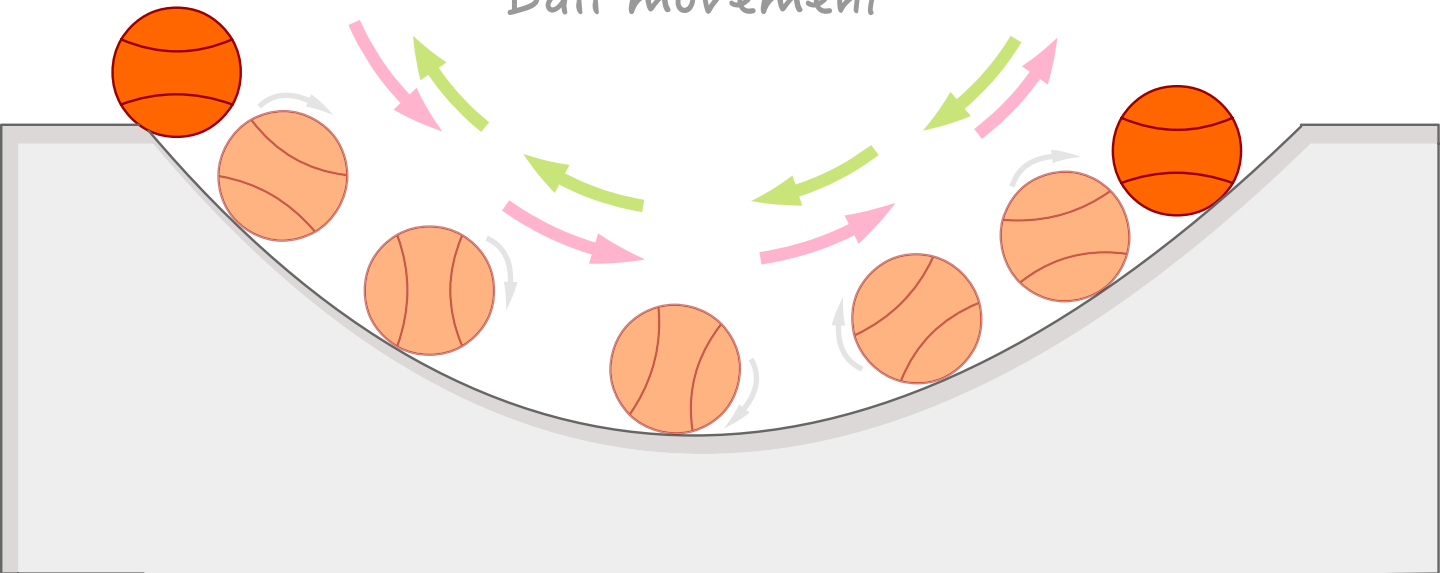
Teaching and learning resources

Friction affects the movement of an object



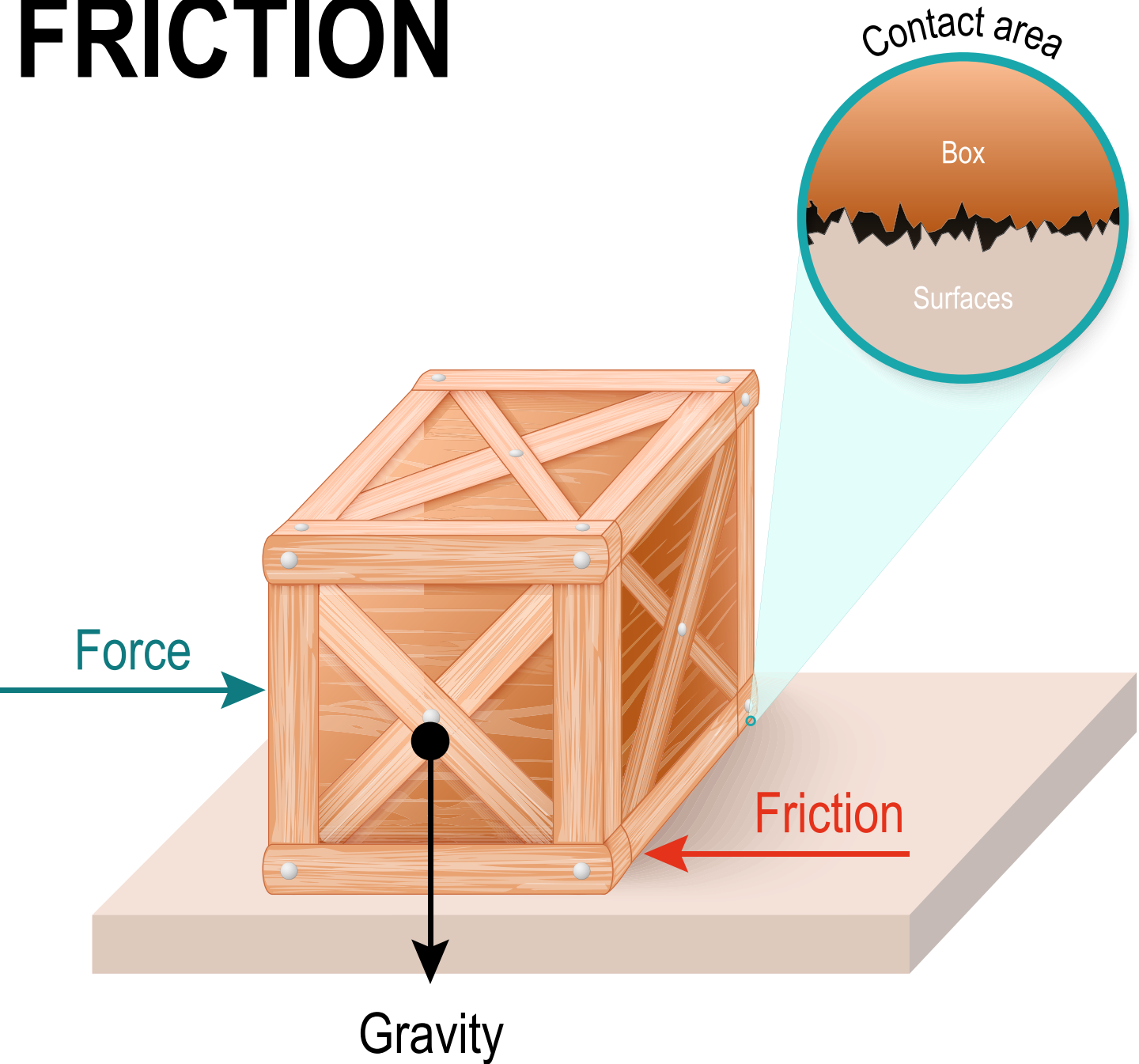
Friction affects the movement of an object

Friction surface
Ball movement

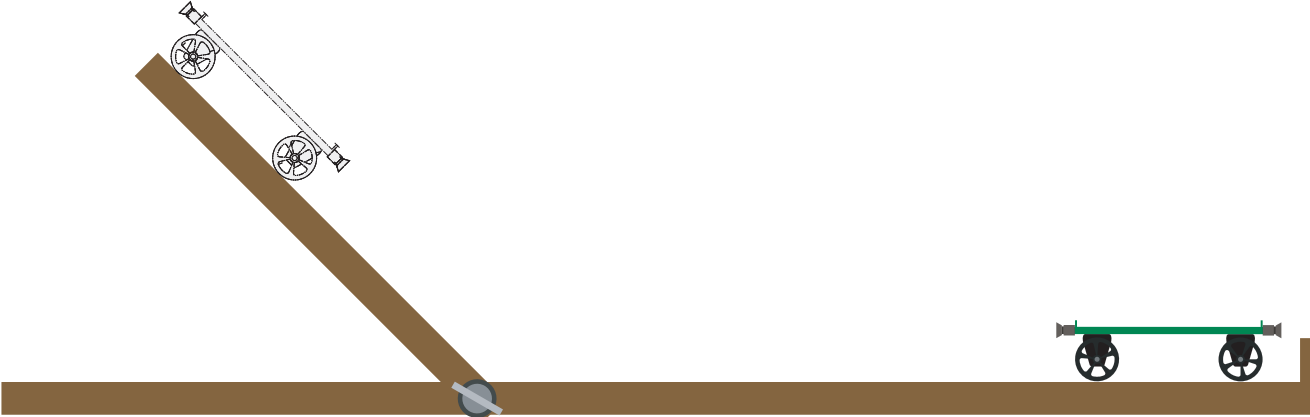
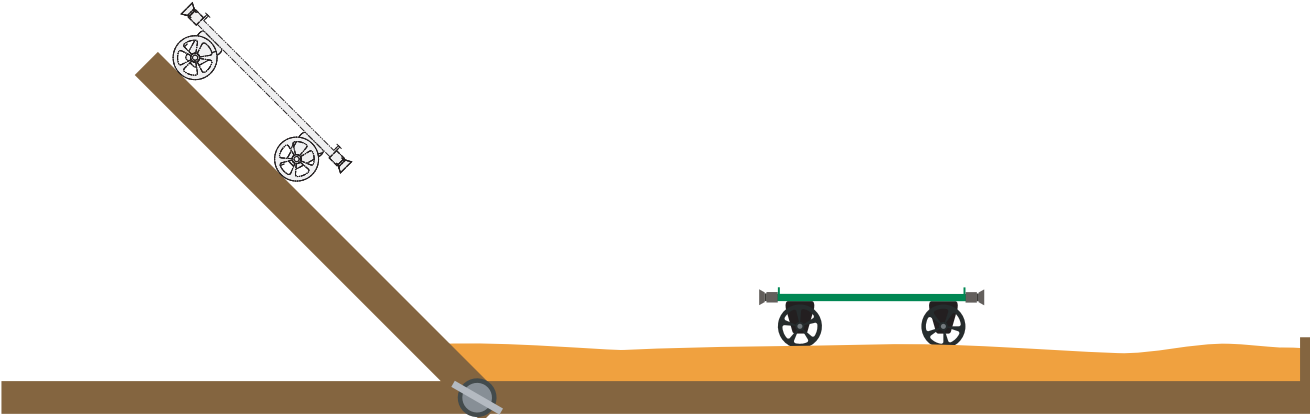
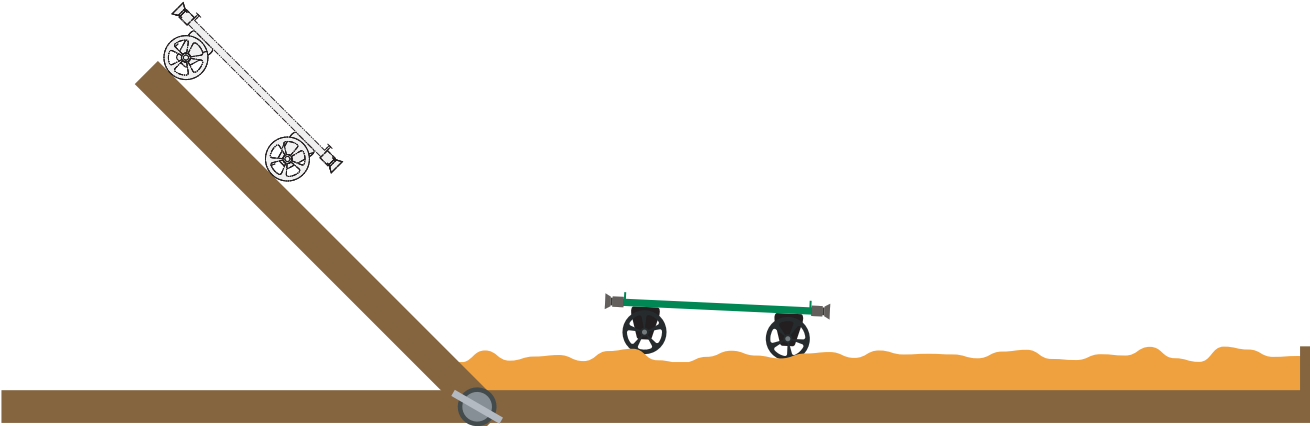


Friction affects the movement of an object

FRICITION



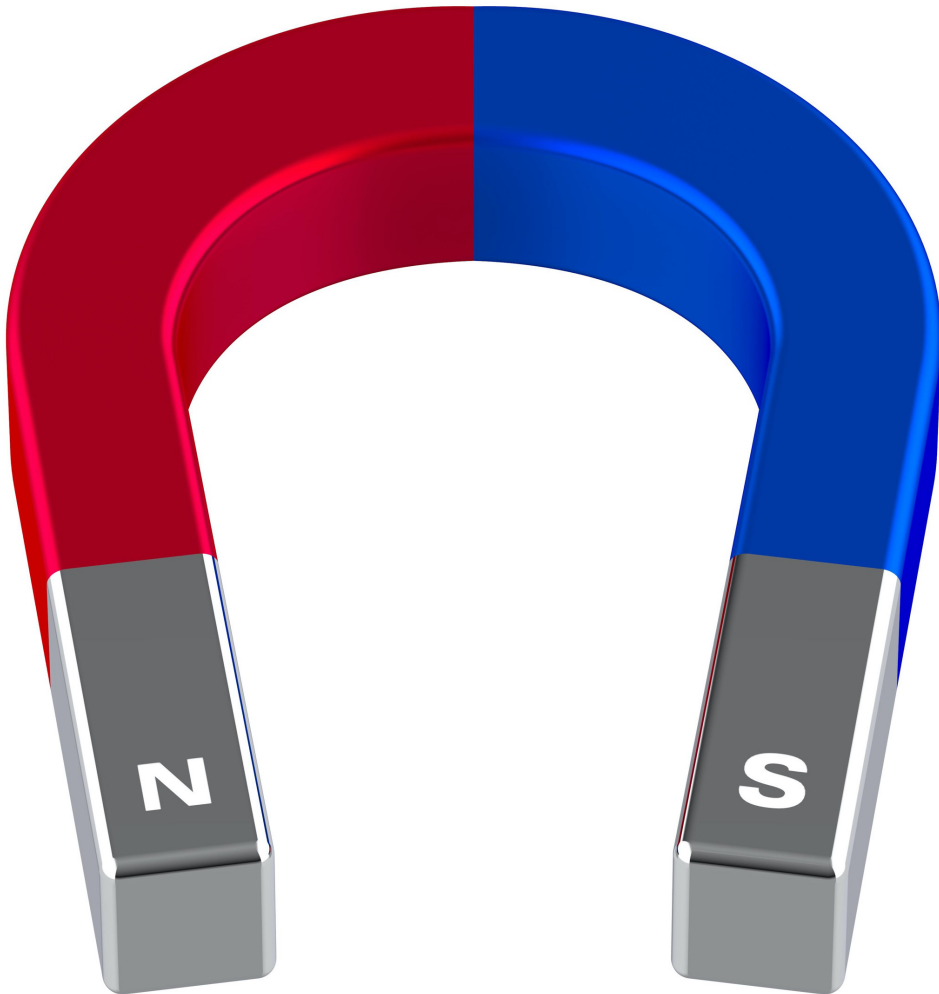
Different surfaces affect the friction



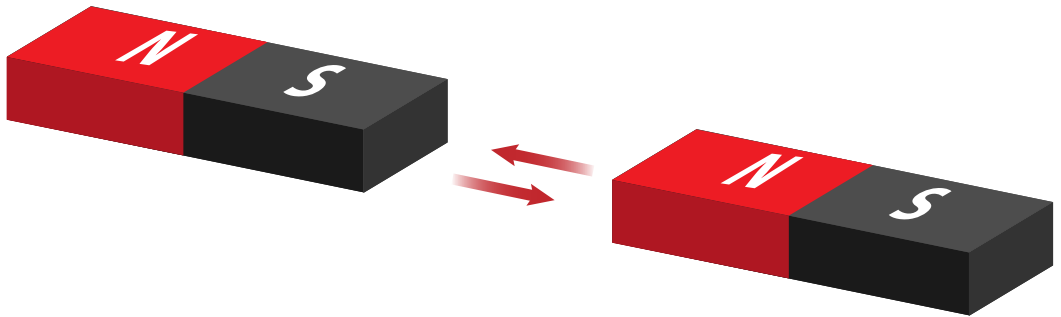
Friction can help
|
A match box makes the most of friction.



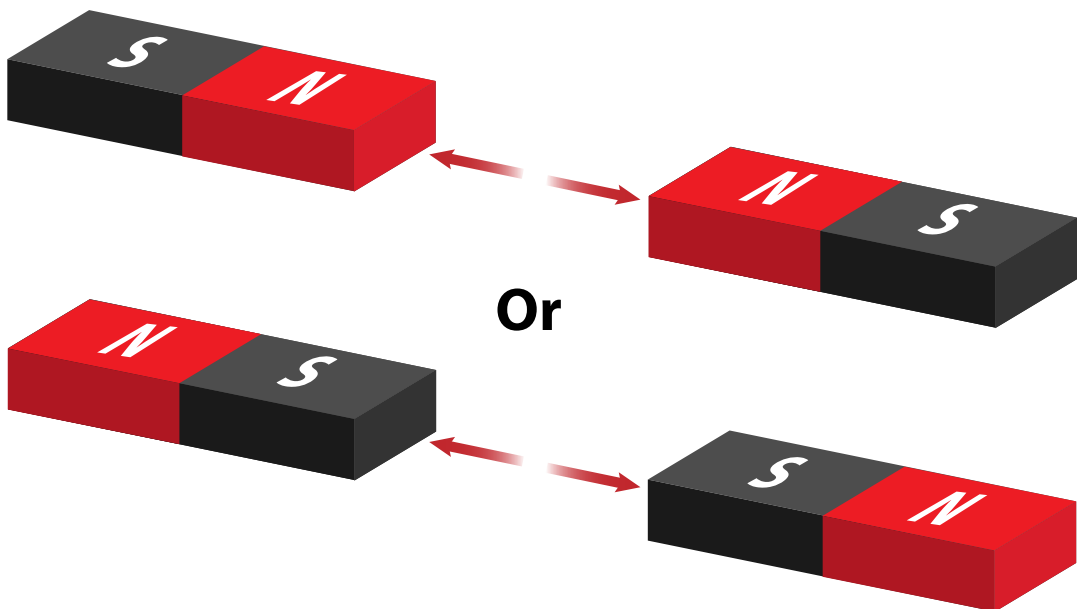
Magnets have poles
|
North and South



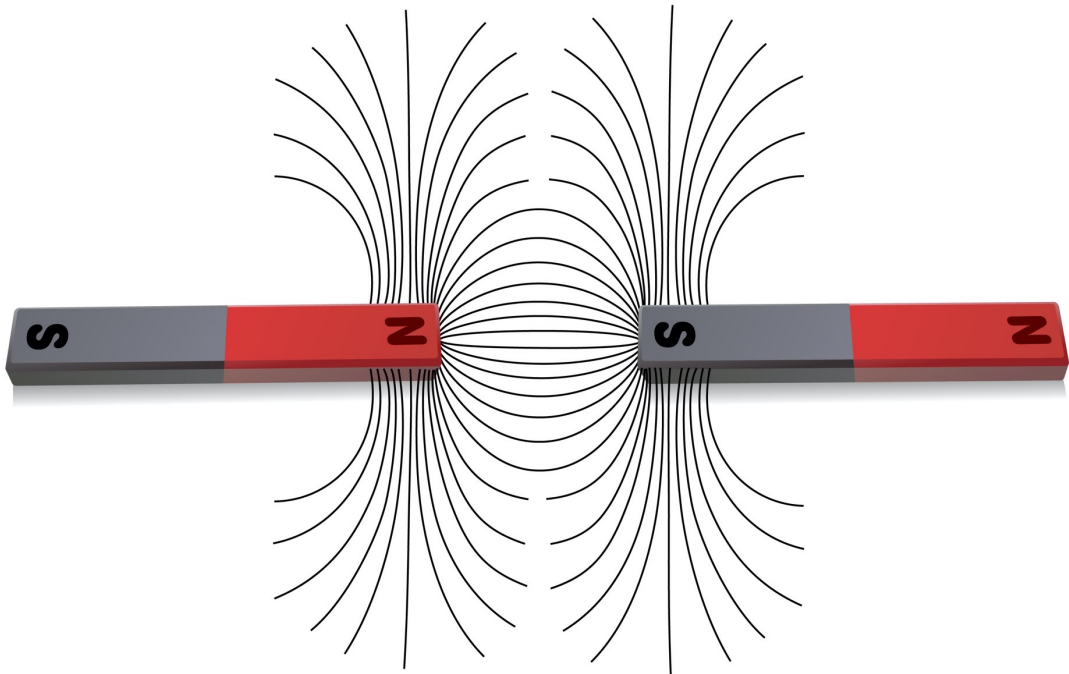
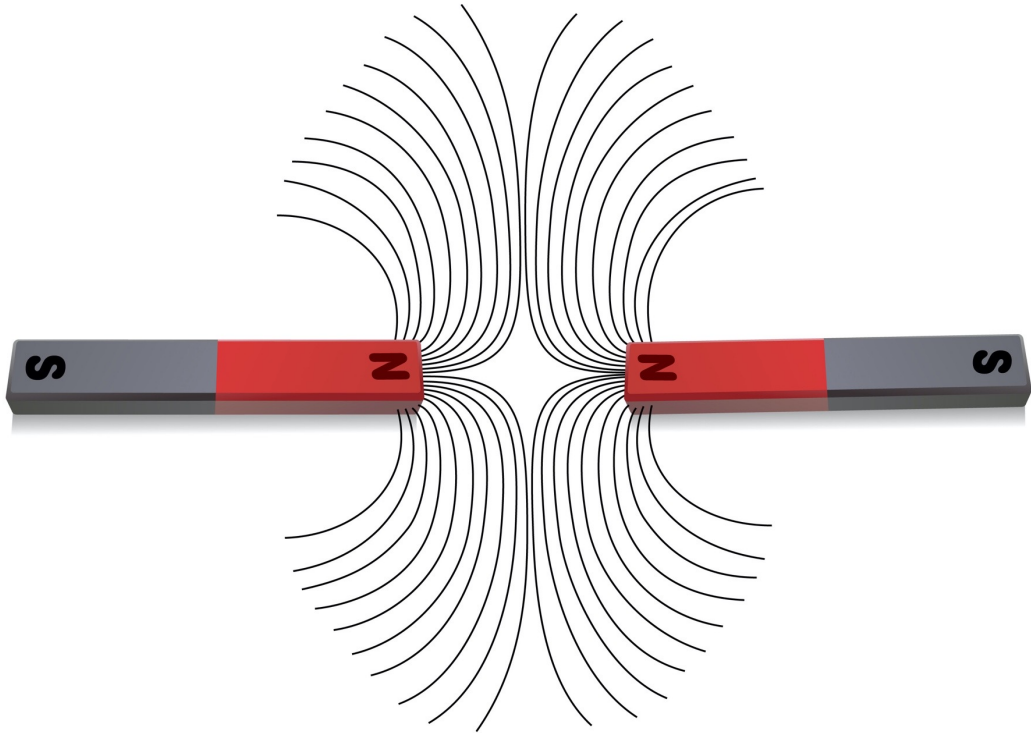
Opposite poles attract



Like poles repel

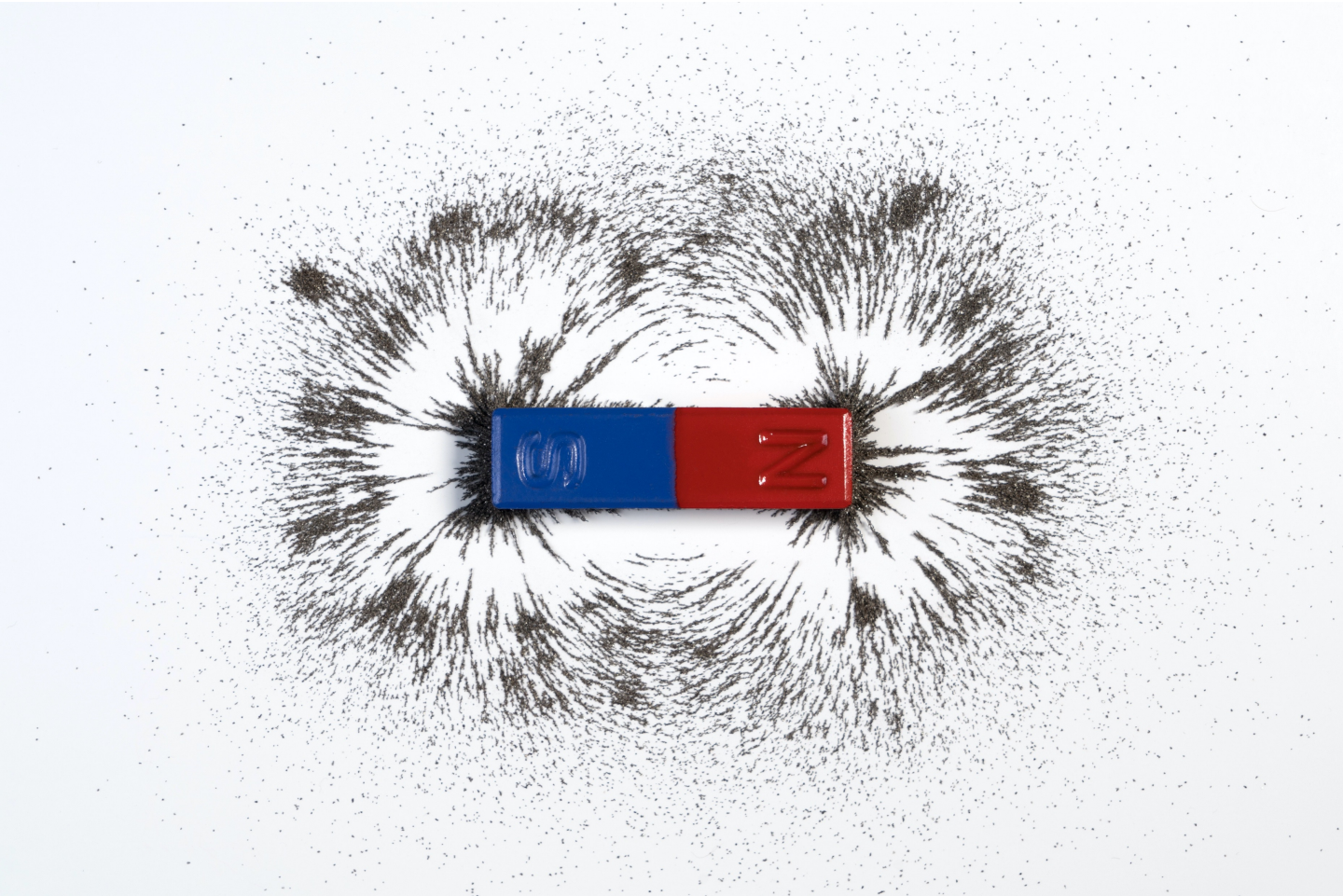


Like poles repel



Opposite poles attract

Iron filings show the magnetic field



Iron filings show the magnetic field



Magnets attract objects with certain properties



Industrial magnets are very powerful



Industrial magnets are very powerful



Magnetism is used in the home



Magnetism is used in the home



Use at the start of the study and as a curriculum guide throughout the study to show children the connections