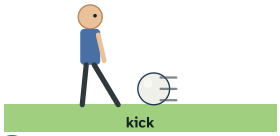
Remember the forces, and test friction and magnets

Name: Class: Date:

Do this page tomorrow, or later in the week, without looking at the screens. Each time you remember an idea, it gets easier to remember the next time. Check the answers at the bottom only when you have finished.

PART 1 Which force did it?

For each picture, name the force and what it does. Say what is pushing or pulling, and what it pushes or pulls: for example, ‘a push from the hand on the door’.



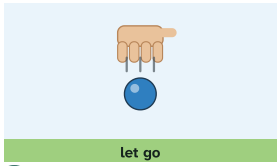
A A kicked ball starts to move.

The force, and what it does:



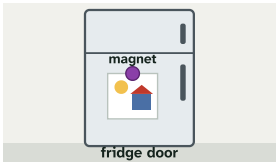
B A bike slows down when the brakes go on.

The force, and what it does:



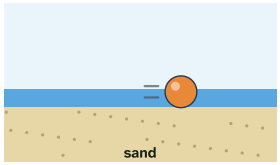
C A dropped ball falls.

The force, and what it does:



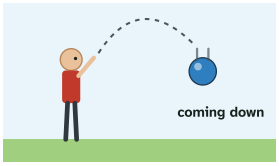
D A drawing stays up on the fridge door.

The force, and what it does:



E A ball rolls along the sand and stops.

The force, and what it does:



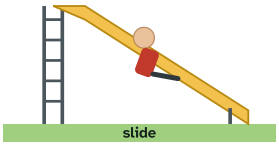
F A ball thrown up comes back down.

The force, and what it does:



G A wagon starts to move when the rope is pulled.

The force, and what it does:



H A child slides down slowly.

The force, and what it does:

PART 2 Remember it all

Without looking back, answer these in a line or two each: What is a force? What does friction do? What is gravity, and when does it pull? What does a magnet pull, and what do two magnets do? Then read the twelve ideas and tick each one you had.

The twelve ideas. Tick the ones you had.

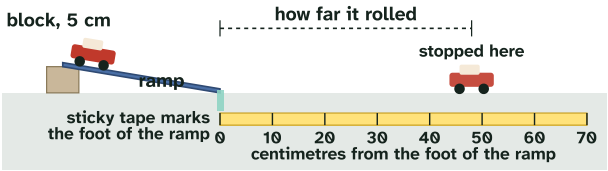
- ☐ A force is a push or a pull.
- ☐ A force comes from one thing acting on another.
- ☐ A force can start, speed up, slow, stop or turn a moving thing.
- ☐ Friction is a force between two surfaces that touch. It works against sliding.
- ☐ Friction pushes against the motion and slows things down.
- ☐ Rough or soft floors slow things more than smooth, hard ones.
- ☐ Gravity is the pull of the Earth on everything, towards its centre.
- ☐ Gravity pulls all the time, even on things sitting still.
- ☐ A heavy ball and a light ball of the same size, dropped together, land together.
- ☐ A magnet pulls on iron and most steel, not on most other metals, plastic or wood.
- ☐ A magnet pulls without touching, and through card and paper.
- ☐ Different poles pull together; the same poles push apart.

Answers to the pictures (turn the page round). **A** A push from the foot on the ball. It starts the ball moving. · **B** Friction from the brake pads on the wheel. It slows the bike. · **C** Gravity: the pull of the Earth on the ball. It starts the ball moving down and speeds it up. · **D** The magnet’s pull on the steel door. It squeezes the drawing against the door, and friction from the squeeze stops it sliding down, so friction is right too. · **E** Friction from the sand on the ball. It slows the ball and stops it. · **F** Gravity: the pull of the Earth on the ball. It slows the ball on the way up, turns it round and speeds it up on the way down. · **G** A pull from the rope on the wagon. It starts the wagon moving. · **H** Friction from the slide on the child. It slows the child down. Gravity, pulling the child down the slide, is right too.

PART 3 Which floor slows a toy car most?

Aim: To find out which floor has the most friction, by letting the same car roll from the same ramp onto different floors.

Each group needs: a toy car that rolls well; a ramp (a thin hardback book or a ruler, with one end on a block about 5 cm high); a tape measure; sticky tape; and three floors, such as tiles or a desk top, carpet or a mat, and a towel laid flat.



> **Safety.** Clear the space before the cars roll, and keep the ramps and cars off walkways so that no one trips.

1. Mark the foot of the ramp with sticky tape. Keep the same ramp, height and car for the whole test: only the floor changes. On a smooth floor the car can roll a few metres, so clear a long run.
2. Hold the car at the top of the ramp and let it go. Do not push it: the ramp gives it the same start every time.
3. Measure how far the car rolled from the foot of the ramp to where it stopped, in centimetres, and write it in the table. Do it three times on each floor, to see whether the results are steady.
4. Move the ramp to the next floor and do the same. Feel each floor with your hand and write whether it is smooth, rough or soft.

Floor	Smooth, rough or soft?	Try 1 (cm)	Try 2 (cm)	Try 3 (cm)
Floor 1:				
Floor 2:				
Floor 3:				

1. Which floor let the car roll furthest, and which stopped it soonest?

2. What did you keep the same each time? Why did that matter?

3. Which force stopped the car, and which floor has the most of it? Where does that force act?

PART 4 Which things does a magnet pull?

Aim: To find out which things a magnet pulls, and whether it has to touch them.

Each group needs: a bar magnet; a steel paperclip; a plain steel nail (not stainless steel or brass); an aluminium can; a piece of copper wire; a plastic ruler; a small wooden block; paper and thick card; and one thing of your own.

> **Safety.** Use school bar magnets, not small strong ones. Never put a magnet in your mouth, and if anyone swallows one, tell an adult straight away. Keep magnets away from phones, computers, bank cards and watches.

1. For each thing, write your guess first: will the magnet pull it, or not? Then bring one end of the magnet slowly towards it, watch for a jump or a tug before they touch, and write what happened.
2. Put the sheet of paper between the magnet and the paperclip and try again. Then put the paperclip on the piece of thick card, with the magnet underneath, and slide the magnet along.

Thing	What it is made of	My guess: pull or not?	What happened
Steel paperclip	steel (mostly iron)		
Steel nail	steel (mostly iron)		
Aluminium can	aluminium		
Copper wire	copper		
Plastic ruler	plastic		
Wooden block	wood		
My own thing:			

1. Which things did the magnet pull? What are they made of?

2. Did the magnet have to touch them? Did the pull get through the paper and the card?