

Forces

Session 1 – To identify forces

Examine the images below – what forces are acting on these?



Define the following:

- What is a force?
- Gravity
- Air resistance
- Friction
- Water resistance
- Buoyancy

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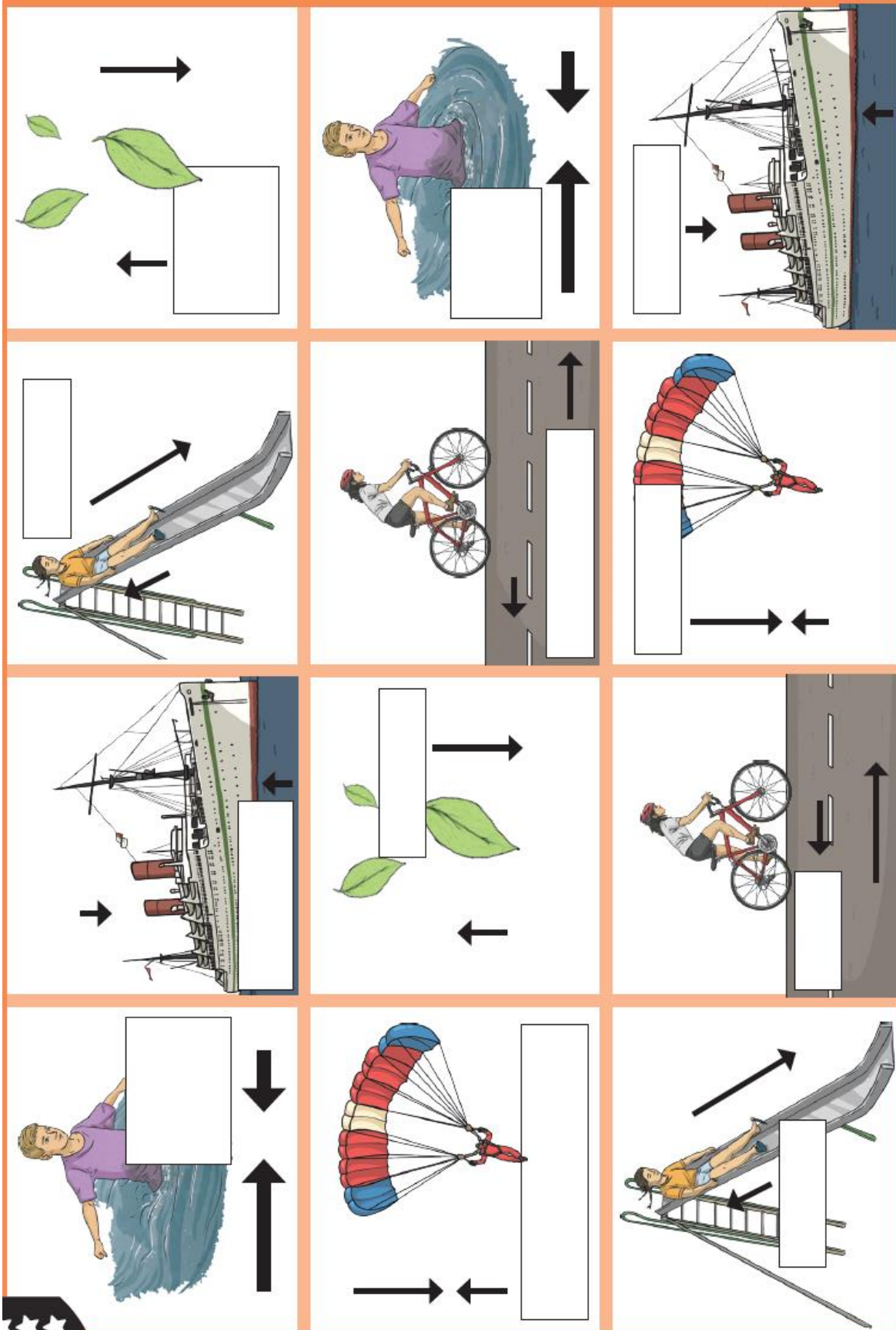
Forces Bingo!

Your parent/carer will choose a Force Card and say the name of a force.

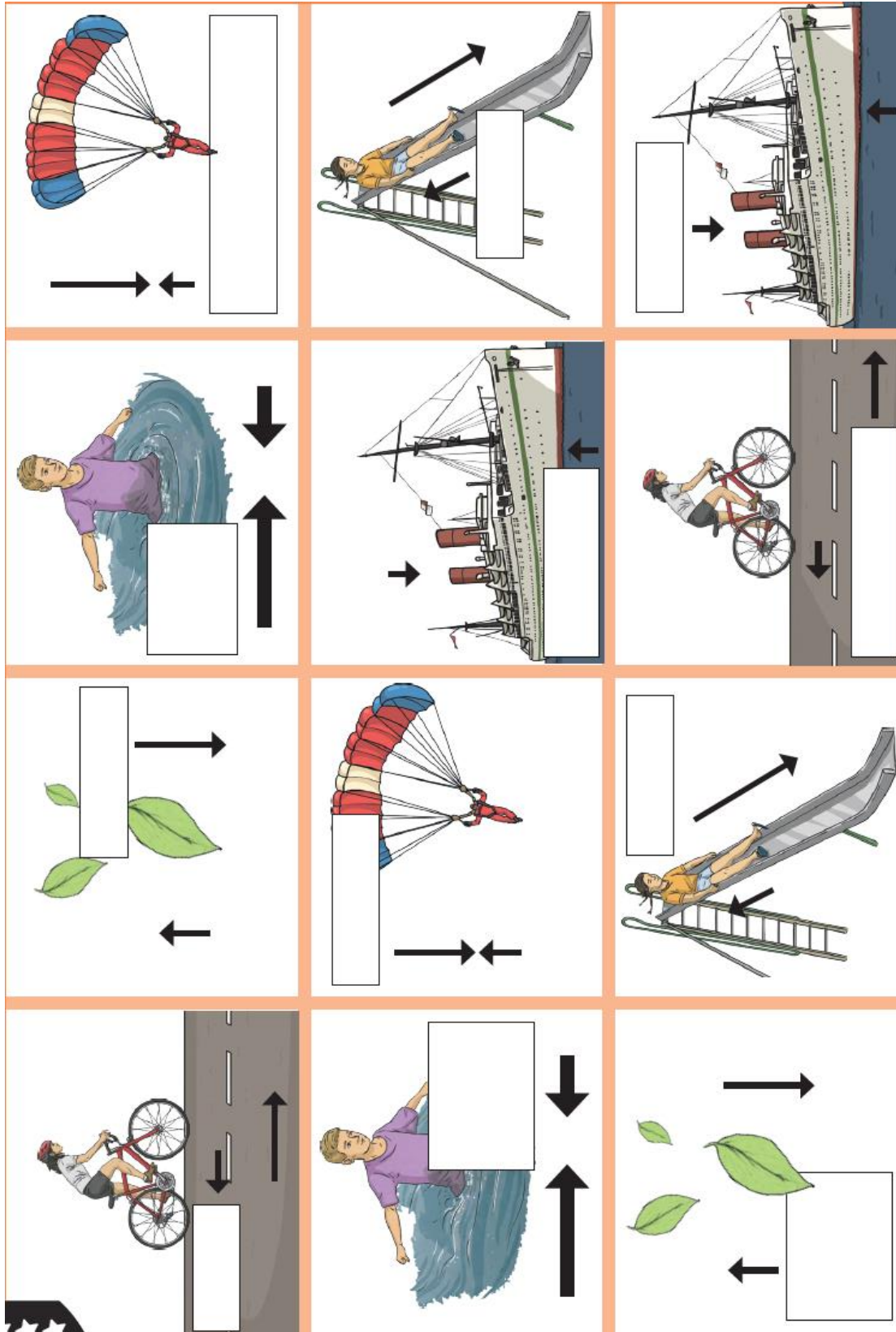
If you have this force missing on one of your pictures, you can write the name of the force next to the correct arrow. You may be able to choose from more than one picture when writing the missing force.

When you have completed three pictures in a row, you should shout 'Bingo!'

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air resistance

twinkl.com

cyclist's force

twinkl.com

gravity

twinkl.com

friction

twinkl.com

friction

twinkl.com

gravity

twinkl.com

gravity

twinkl.com

air resistance

twinkl.com

man's force

twinkl.com

gravity

twinkl.com

water resistance

twinkl.com

buoyancy

twinkl.com

Forces

air resistance

cyclist's force

gravity

friction

friction

gravity

gravity

air resistance

man's force

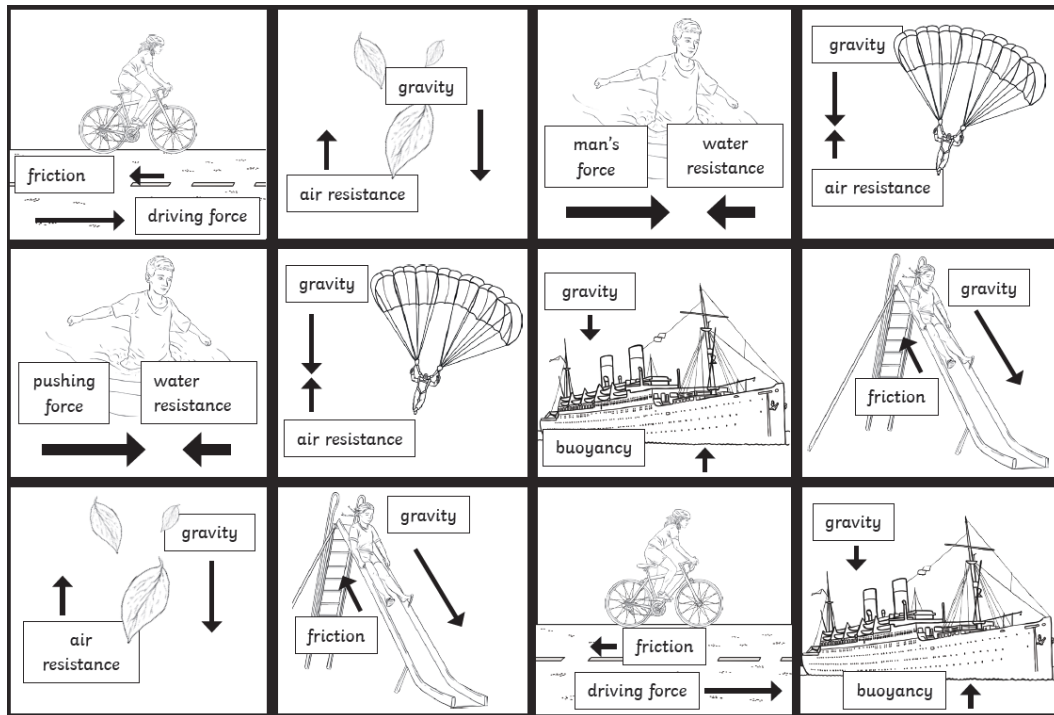
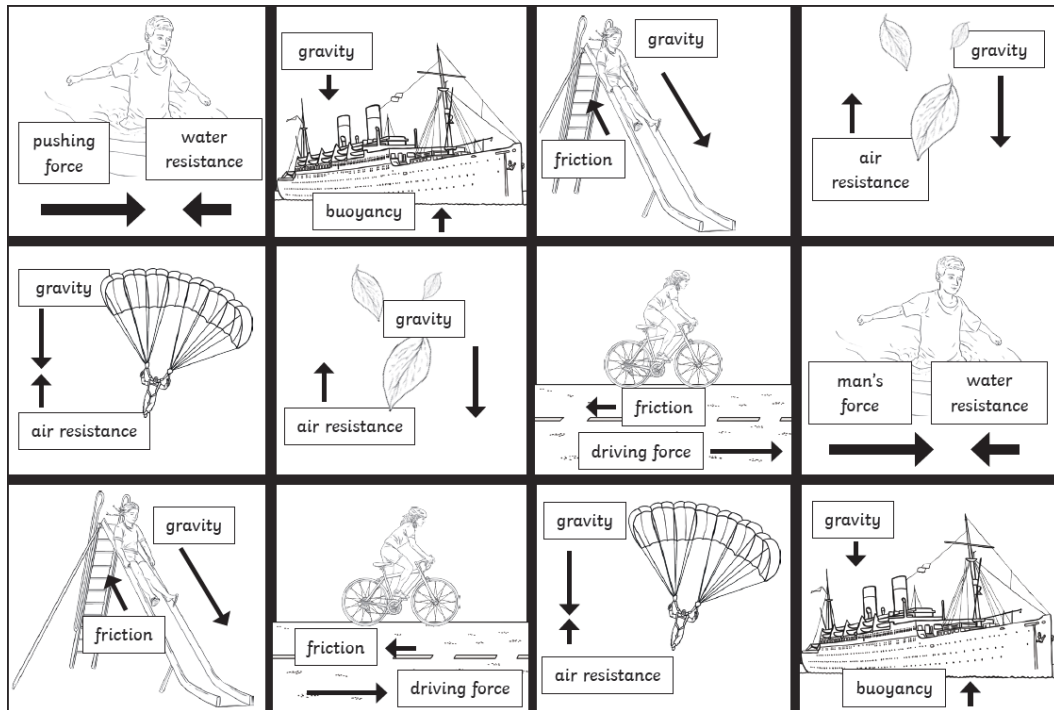
gravity

water resistance

buoyancy

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Answers:



Forces

Now apply your understanding of forces to find examples of each of these forces in action. Explain what is happening in each of these examples, using diagrams to help you. Remember to label your diagrams with arrows.

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Session 2 – To understand Newton's theory of gravity

Let go of a bouncy ball. What does it do? Does this work with other objects?

Examine the comments made by the children.

They are discussing why the bouncy ball falls down rather than falling up, sideways or staying still.

Which child or children do you agree with? Explain your reasons.

Child A: The bouncy ball falls downwards because it is heavy. If it were lighter, it would float away.

Child B: The ball falls downwards because gravity is pulling it down.

Child C: There is no air resistance acting on the ball, so it can go straight down.

Child D: The ground exerts a force on the ball so the ball is magnetically attracted to the ground.

Who discovered Gravity?

Isaac Newton famously developed his theory of gravity when he saw an apple fall to the ground from an apple tree.

Research Isaac Newton and his theory of gravity. Create a fact file on Isaac Newton and his theory.

Read and use the 'Newton and Gravity Fact Sheet' to help you.

What is the difference between mass and weight? How is this significant to gravity and how it is measured?

Does an objects mass and weight differ when on the moon? What about if we could land on Jupiter?

Newton and Gravity Fact Sheet

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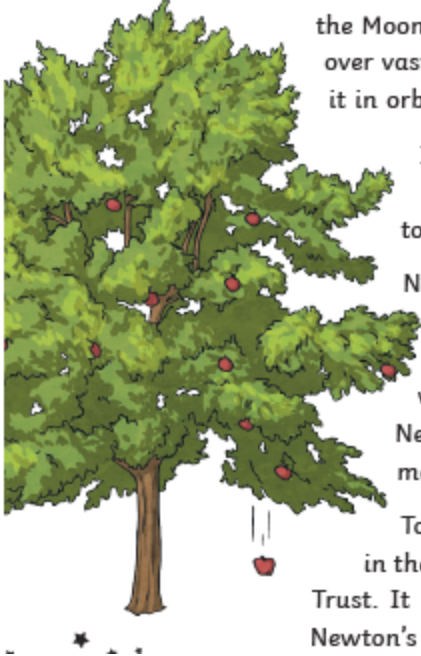
Isaac Newton was an English scientist and mathematician. He made many discoveries in his lifetime. One of the most important and influential discoveries that he made was the law of gravity.

Newton was born in 1643 at Woolsthorpe Manor in Lincolnshire. He worked hard at school, and was accepted to study at Cambridge University. He worked there for many years, but in 1665, the plague broke out and he was forced to move back to Woolsthorpe Manor.

While Newton was in the garden at Woolsthorpe Manor one day, he saw an apple fall from a tree. Some say it fell on his head but there is no evidence that this definitely happened. The sight of the apple falling down from the branch to the ground inspired Newton to think about the way it fell. Years later, he told his friend William Stukeley that he wondered why the apple fell down rather than sideways or upwards. He concluded there must be a 'drawing power' in the Earth and that 'the sum of the drawing power must be in the Earth's centre, not in any side of the Earth.'



Newton spent a lot of time thinking hard about the force of gravity, and how it pulls objects down towards the centre of the Earth. He was particularly interested in the way the Moon orbits the Earth, and he reasoned that gravity must extend over vast distances, pulling the Moon towards the Earth and keeping it in orbit.



In 1687, Newton published his discoveries about gravity in his famous book, *The Principia*. His findings are known today as Newton's Law of Universal Attraction.

Newton died in 1727, but his legacy lives on. All forces are measured in newtons (N), using a newton meter – both of which are named after Isaac Newton. Even Albert Einstein, writing in 1927, 200 years after Newton's death, described Newton as a 'shining spirit', and claimed he had one of the most brilliant minds of anybody who had ever lived.

Today, the apple tree that inspired Newton's ideas still grows in the gardens at Woolsthorpe Manor, now owned by the National Trust. It can be seen from the window of the room that was Isaac Newton's bedroom.