

L.O. Can I investigate the effects of friction?

Key steps:

- I can explain the effects of friction on a moving vehicle
- I can explain the effects of friction created by different materials
- I can recognise and control variables within an investigation

friction

watch something carefully, in order to something about it

observe

a quantity that can be expressed in numbers

is the force that makes it difficult for things to move freely when they are touching each other

prediction

investigation

something that can change

you say what you think will happen based on what you know already

measure

variables

information obtained from carrying out a test

results

a careful search or examination in order to discover facts

brake

a device that allows you to slow something down

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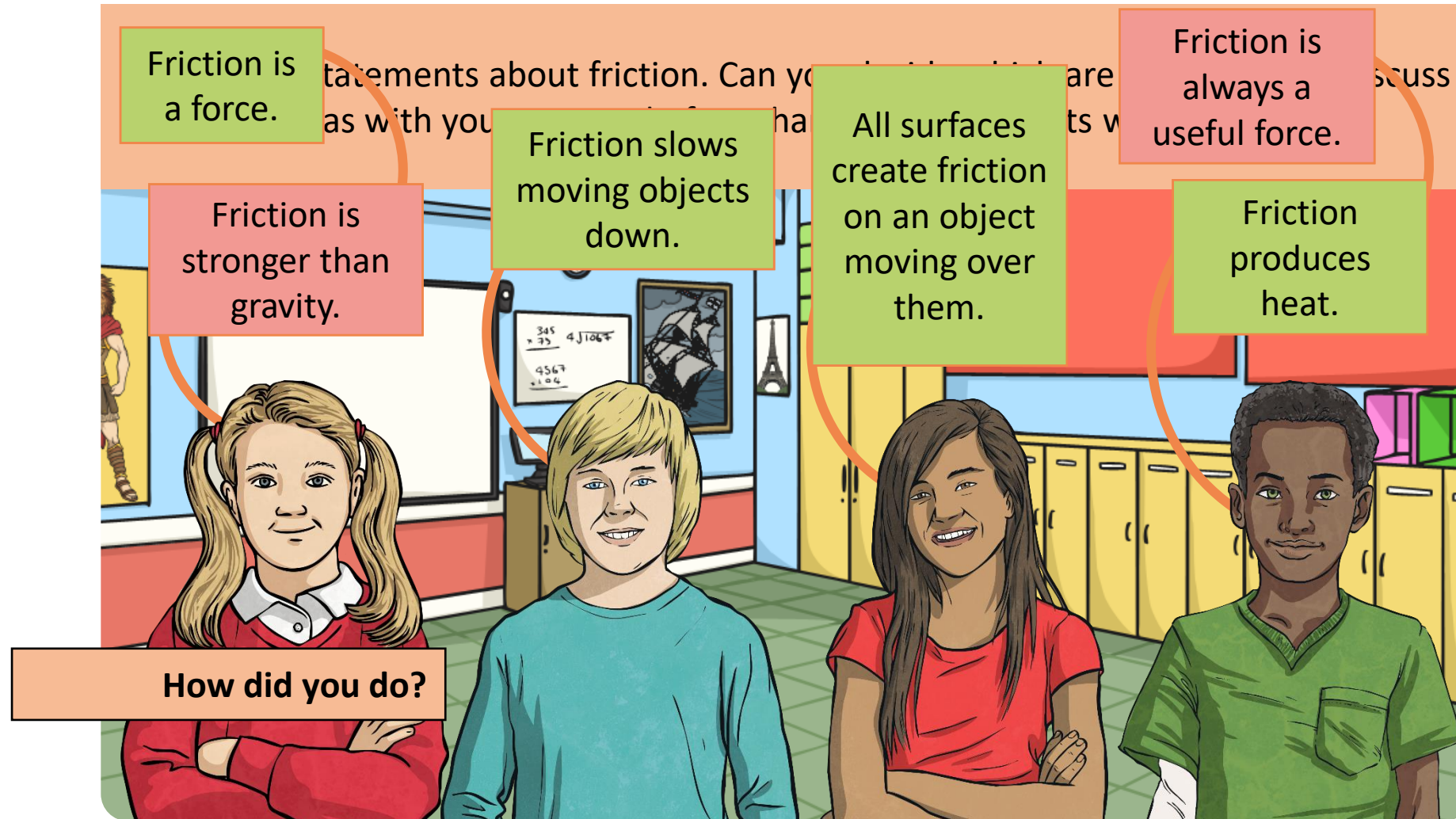
variables

results

brake

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What Is Friction?

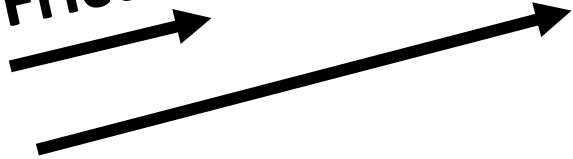


What Is Friction?

Can you explain to your partner how friction affects a moving object?



Friction

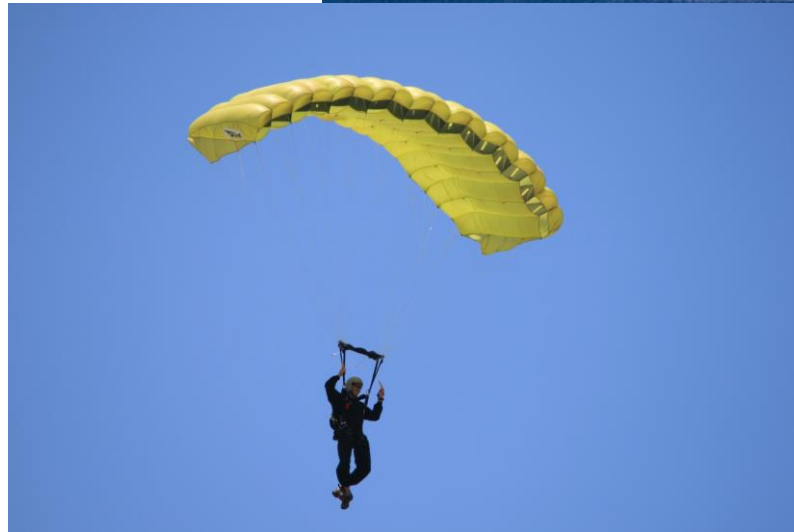


Scooter's driving force



What Is Friction?

Air resistance and **water resistance** are both forms of **friction**. Gases and liquids create friction as well as solids



What Is Friction?

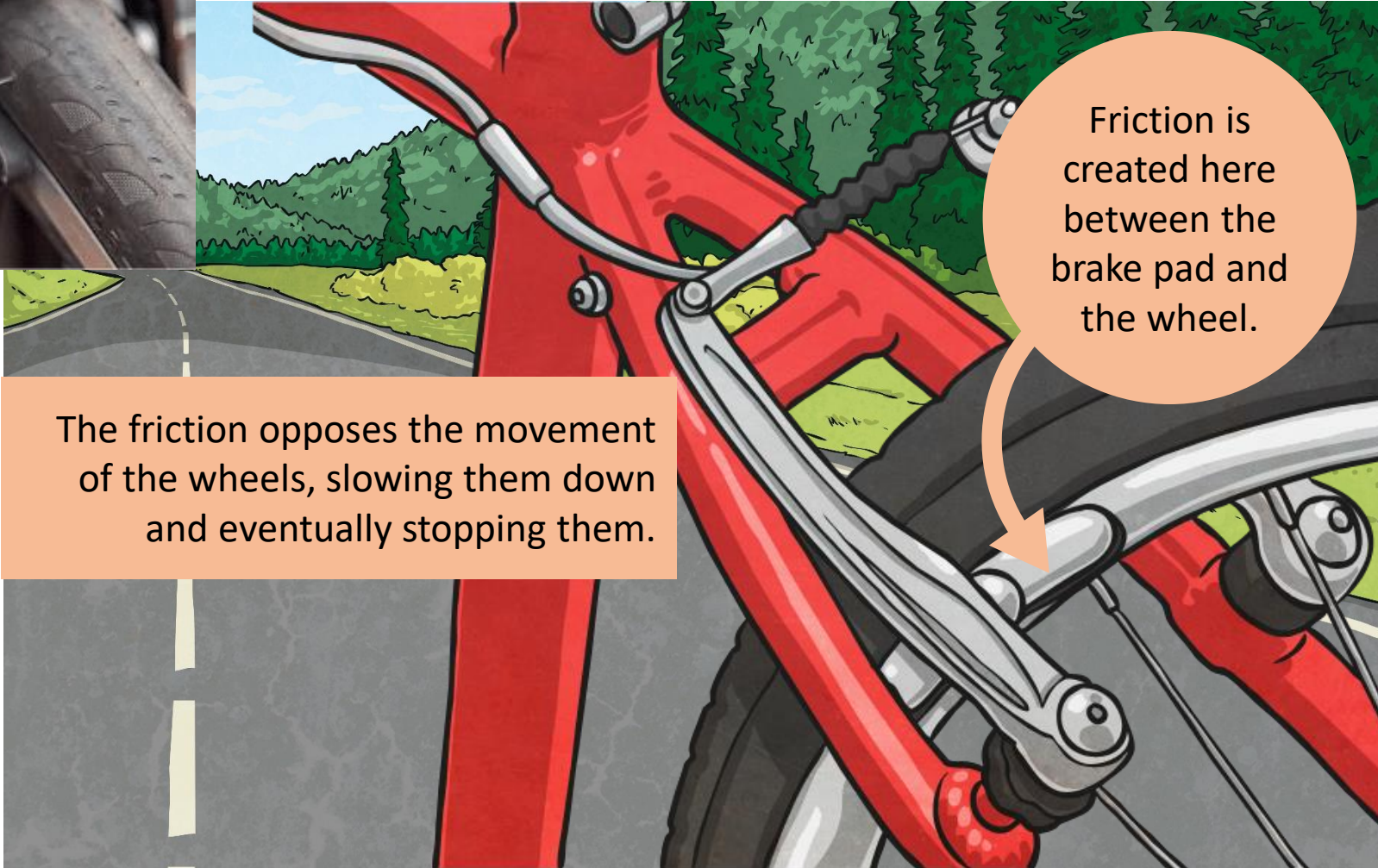
Friction can be useful – for example
The soles of your shoes create friction with the
ground, preventing you from falling over



However, friction can be **unhelpful** too – friction on a bike chain can make the bike harder to pedal.



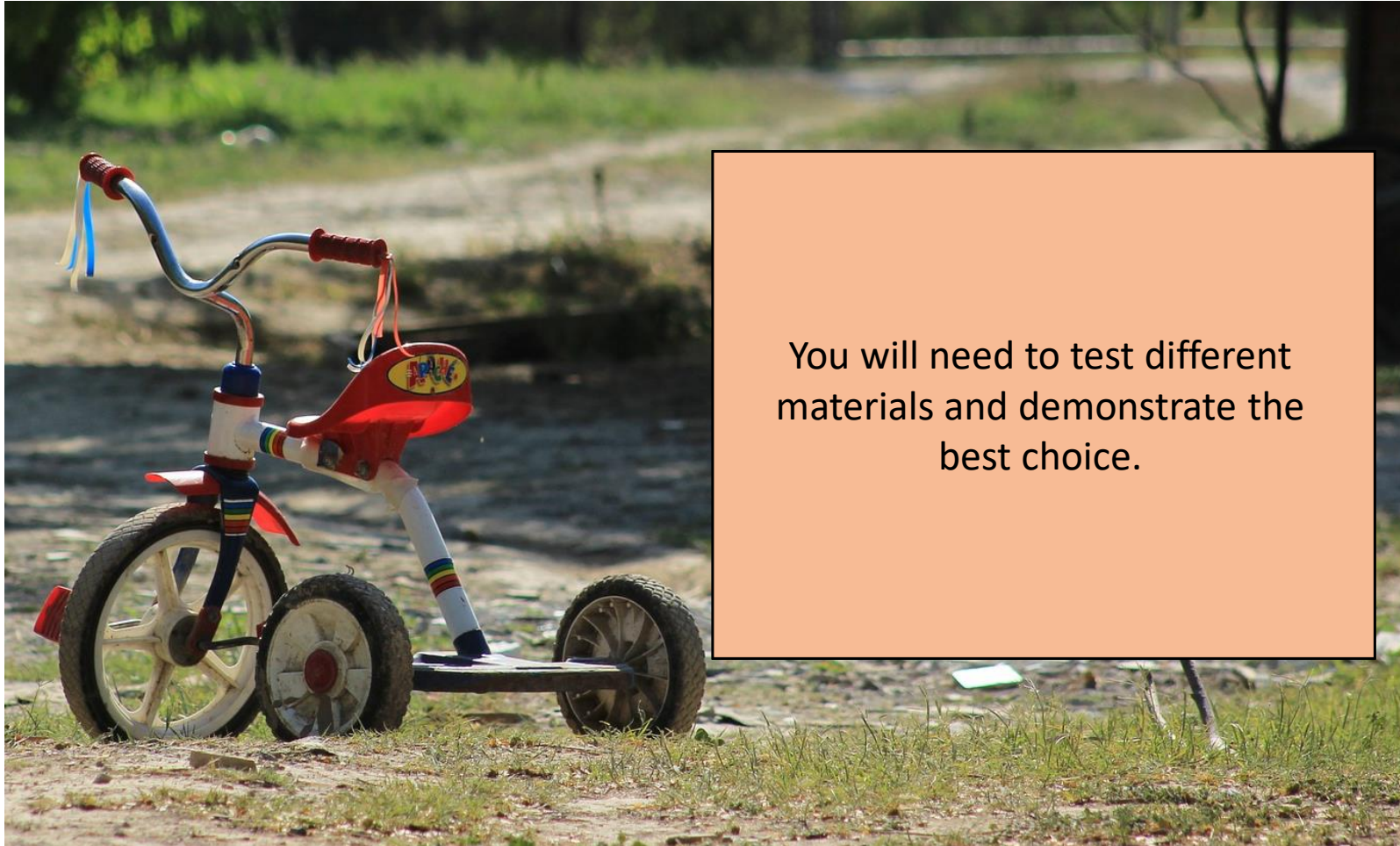
Friction in Action



The friction opposes the movement of the wheels, slowing them down and eventually stopping them.

Friction is created here between the brake pad and the wheel.

Design a Brake Pad



You will need to test different materials and demonstrate the best choice.

Design a Brake Pad



Then wrap the card in a different material, and time how long that material takes to stop the wheel.

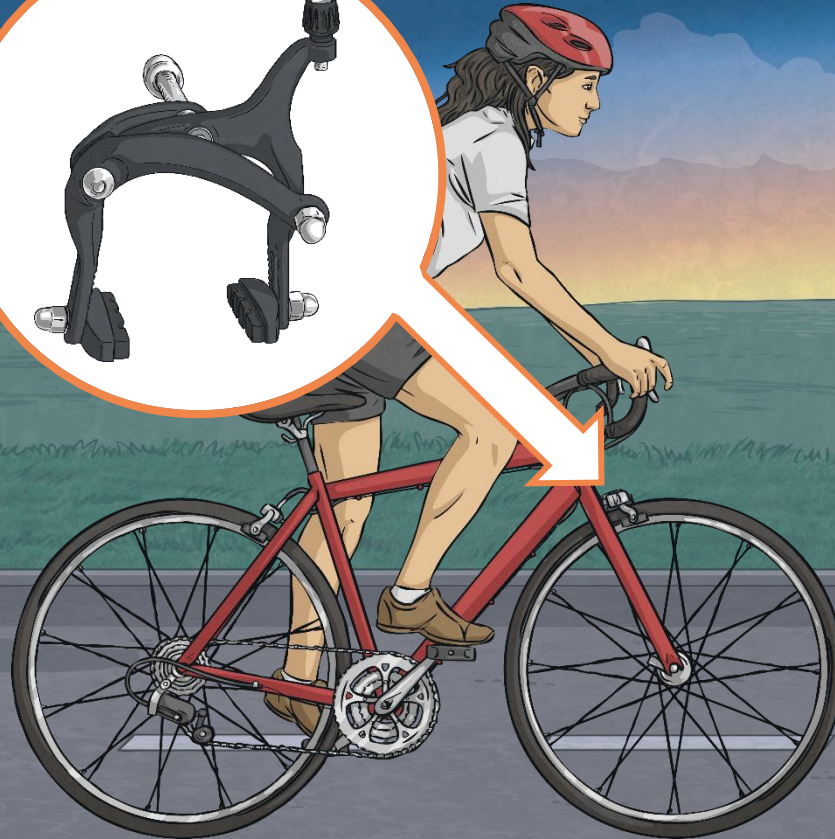
Complete this with each different material.



Reliable Results



Can you think of any variables in this investigation that may be tricky to keep the same every time?



Reliable Results



Why might you take repeat readings when carrying out this investigation?

There is space on your activity sheet to take repeat readings if you have time.



Find the Best Brake Pad



Now that you have tested the different materials, you should know which material is the best choice for the new brake pad. The company want to see a demonstration of the best material in action.

Use your **Investigating Friction Activity Sheet** to write an explanation of your choice, and then take turns to demonstrate to the class how the best brake pad material works.

Investigating Friction

You have been asked to design a new brake pad for a tricycle or scooter. You must choose a material that creates the most friction and stops the wheels the quickest.

Which materials will you test?

Which material do you predict will be the best choice for the new brake pad?

Can you explain why?

Material being tested	Time taken for the wheel to stop (in seconds) First test	Time taken for the wheel to stop (in seconds) Second test

Did your repeat readings match?

Why is it useful to take repeat readings?

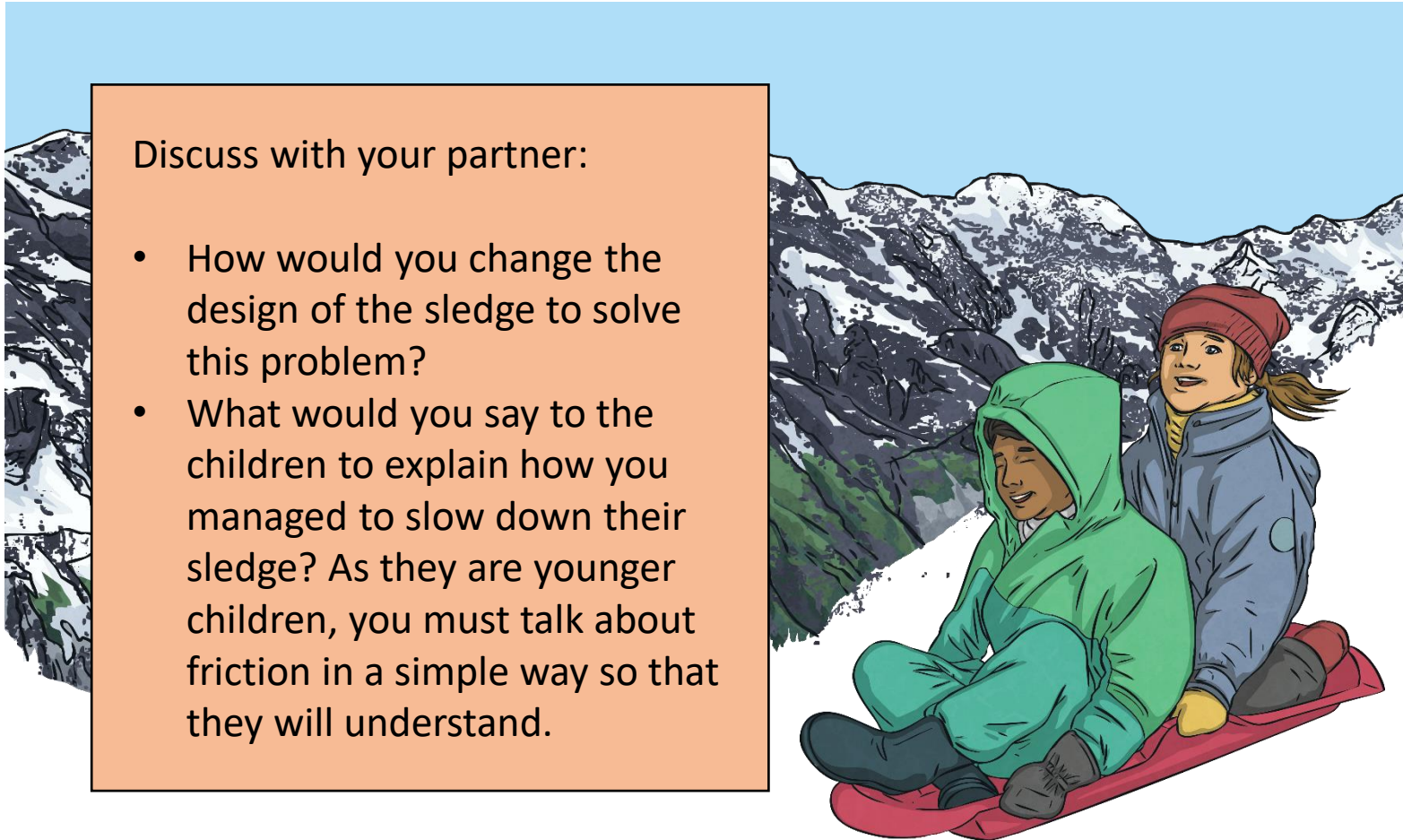
What did you learn by completing this investigation? Looking at your results, what further results would you like to collect to give you more information?

Solve and Explain



Discuss with your partner:

- How would you change the design of the sledge to solve this problem?
- What would you say to the children to explain how you managed to slow down their sledge? As they are younger children, you must talk about friction in a simple way so that they will understand.



Solve and Explain



I would use a strong glue to attach a carpet to the bottom of the sledge.

I would tell the children that friction is a force that acts between the snow and the bottom of the sledge as they move across each other. I would explain that the sledge glides quickly over the snow because the smooth plastic bottom of the sledge does not cause very much friction. However, the rough carpet causes more friction with the snow, so the sledge would move more slowly with carpet glued to the bottom.

What would you do?

