Olympics lessons

Science of movement - forces and motion

- Forces - push and pull, what they do, examples in sports (3 weeks) Focus on friction and gravity.
- Newton’s laws of motion
- Energy - motion is energy
- Food and energy - healthy eating, digestive system. (y8 book)

The Olympic Games and the science of movement

LI: To begin exploring what forces are and why they are important in sport.

1. In your groups, choose 3 olympic sports:

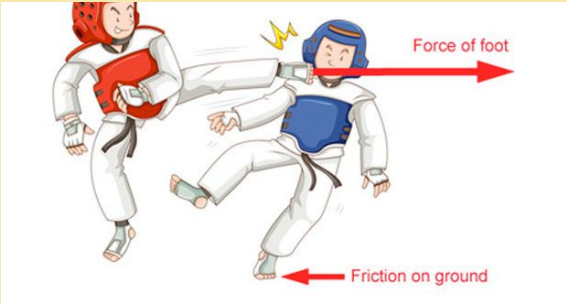
2. Write the **name** of each sport in the **middle** of a piece of A4 paper

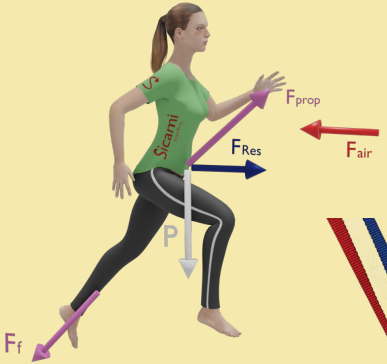
Brainstorm for each sport:

1. What **parts of their body** do they mainly use for the sport?
2. What **movements** do they have to make, and what **direction** do these movements go?
3. What makes a person the **best** at this sport?
4. What **equipment** do they need for this sport?
5. Draw a **diagram**

Why are forces important in sports?

All sports and involve forces - *applying* them, working *with* or *against* them, *reducing* or *increasing* them.





The most skilled force-users

What is a force?

A force is a **push** or a **pull** applied to one object by another object.

Push, Pull or Both?

push pull both

push pull both

push pull both

push pull both

push pull both

push pull both

Activity

Below are some pictures of children using pushing and pulling forces. Write down push or pull in the force box. Does the force cause something to start or stop moving? In the second box, write start or stop.

1

force:

2

force:

3

force:

4

force:

We may not be able to *see* a force, but we can tell that it's there because it affects the object it is applied to.

Forces can:

a) change the speed of an object

b) change the direction of movement of an object

c) change the size or shape of an object

The Olympic Games and the science of movement

LI: To recap forces and begin exploring examples

What is a force?

A force is a **push** or a **pull** applied to one object by another object.

Forces cause objects to **change** their **speed, direction** or **shape.**

PUSH & PULL FORCES

SCIENCE FOR KIDS

We may not be able to *see* a force, but we can tell that it's there because it affects the object it is applied to.

Forces can change:

a) the speed of an object

b) the direction of movement of an object

c) the size or shape of an object

Write a sentence explaining…

1. *How does a spring change when we pull it or push down on it?*
2. *What happens to a still marble when pushed?*
3. *What happens to a rolling marble when pushed?*
4. *What happens to a rolling marble when pushed sideways?*

Can you think of 3 **other** examples of a **force** in action causing something to...

1. Change shape?
2. Change speed?
3. Change direction?

Friction and gravity

The Olympic Games and the science of movement

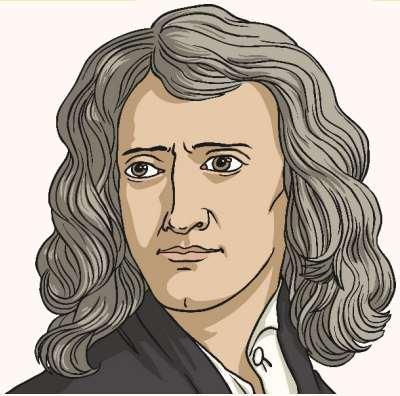
Hei mahi

1. What 3 different things can forces do to an object?
2. What are some types of forces you can remember?

How do we measure forces?

Forces are measured in **newtons**, using a **newton meter.**

The unit of force is named after Isaac Newton, who first theorised about forces.



Forces circus!

1. Work in pairs or 3 (maximum)
2. Go around each of the **stations**. FOLLOW THE INSTRUCTIONS on your worksheet carefully to write the **answers** to your questions.
3. Act sensibly! This is <u>not</u> playtime. Silly behaviour will result in a time-out.

Types of forces - gravity

LI: To explore gravity and the legend who figured out how it worked

Hei mahi:
What are forces measured in? Who is this named after?

Forces

Forces are measured in **newtons**, using a newton meter.

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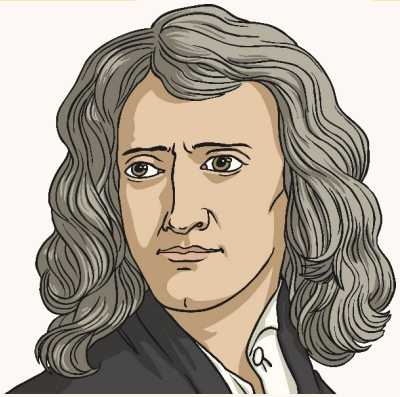
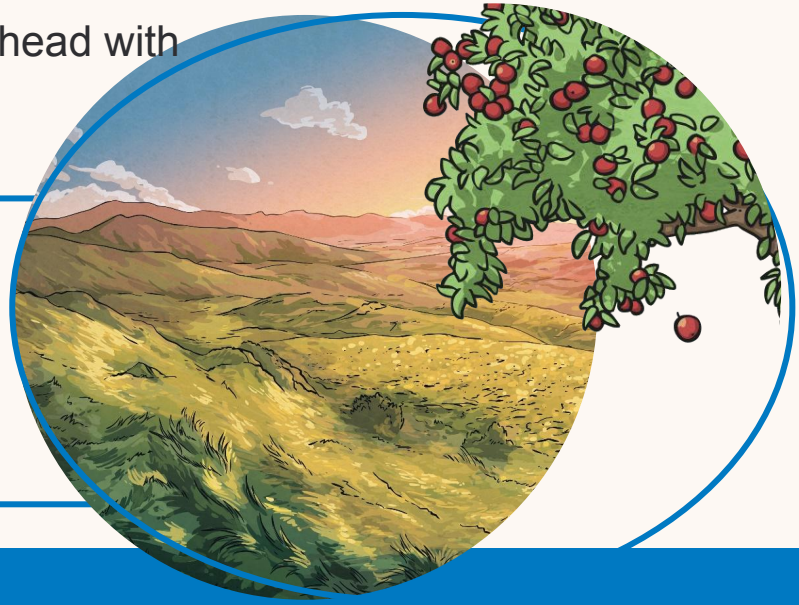


The Apple from the Tree

The eureka moment….

Legend has it, that Newton was hit on the head with an apple and that is how he discovered gravity. This isn't quite true…

He did see an apple fall from a tree, but rather than hitting him on the head, it got him thinking and that's how he worked out that gravity must exist.



Did you know?

This is why the weight of 1 Newton is approximately the same as one apple.

Questions

1. When was Isaac Newton born?

3. What fruit did Newton see falling from a tree?

4. In which direction does gravity pull objects?

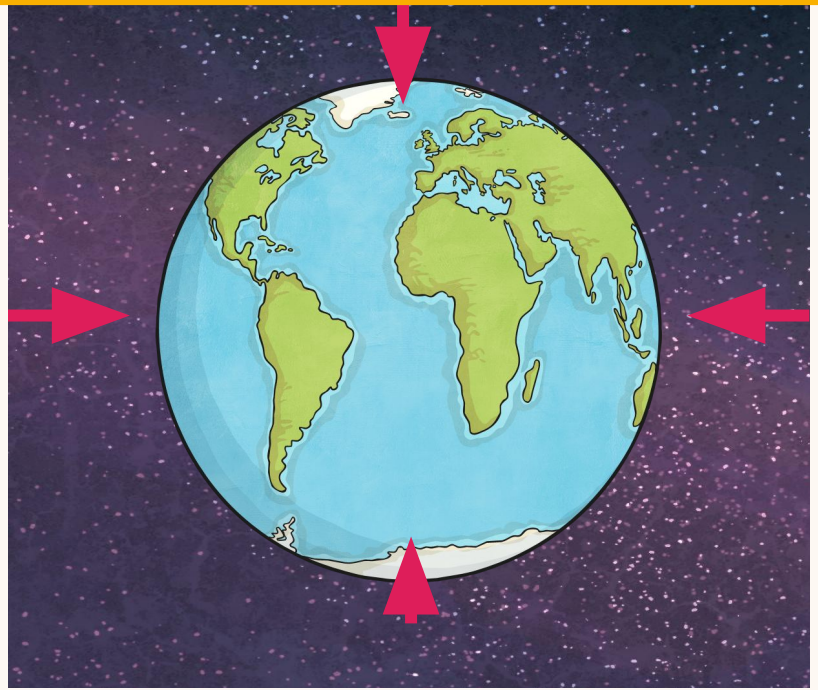
5. Why does the Moon stay in orbit around the Earth?

6. What are forces measured in?

7. What did Albert Einstein think of Isaac Newton?

Gravity is a Force

Gravity is an invisible non-contact force that pulls everything towards the centre of Earth.



Gravity is measured in metres per second squared (m/s^2).

Weight force due to gravity is measured in **Newtons.**

Group discussion

What *role* does gravity play in:

1. **Basketball?**

basketball

2. **Diving?**

diving

3. **Powerlifting?**

powerlifting

Weight and Mass

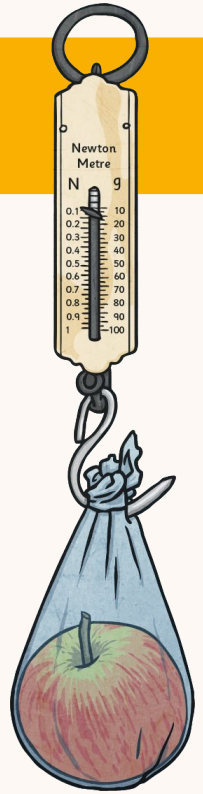
Mass is the amount of ‘stuff’ inside an object, measured in **kilograms** (kg).

Gravity is measured in metres per second squared **(m/s^2).**

Weight force is the strength of gravity pulling an object down. It is measured in **newtons** (N).

Objects with more **mass** have a **greater weight**, as the force of **gravity** pulls them down more strongly.

Weight, Mass and gravity



The equation to measure **weight force** due to gravity is: **Weight (N) = Mass x Gravity**

Mass is measure in **kilograms**

Gravity on Earth is 9.8m/s

Question: Ms Naidoo has a backpack with a mass of 3.75kg. What is its weight force?

Weight, Mass and gravity

Weight (N) = Mass x Gravity

Mass is measure in **kilograms**

Gravity on Earth is 9.8m/s

2. Miss R-B has a dog with a mass of 13kg. What is his weight force?

Weight, Mass and gravity

Weight (N) = Mass x Gravity

Mass is measure in **kilograms**

Gravity on Earth is 9.8m/s

3. Mr Whatman has a car with a mass of 800kg. What is its weight force?

Brainpop task - gravity

Find the link on google classroom

Types of forces - Gravity and Drag (air resistance)

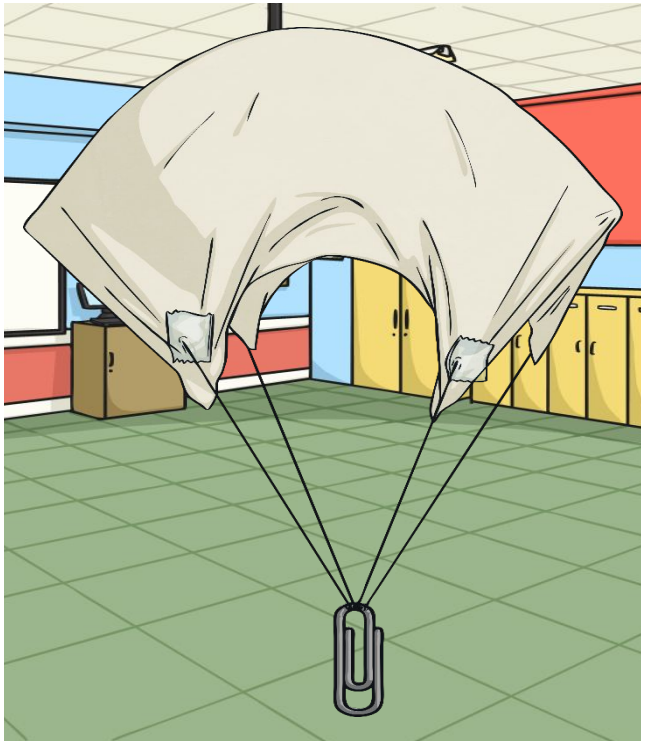
LI: To investigate how gravity and air resistance affect objects.

Question: Which one will fall the fastest? Why?

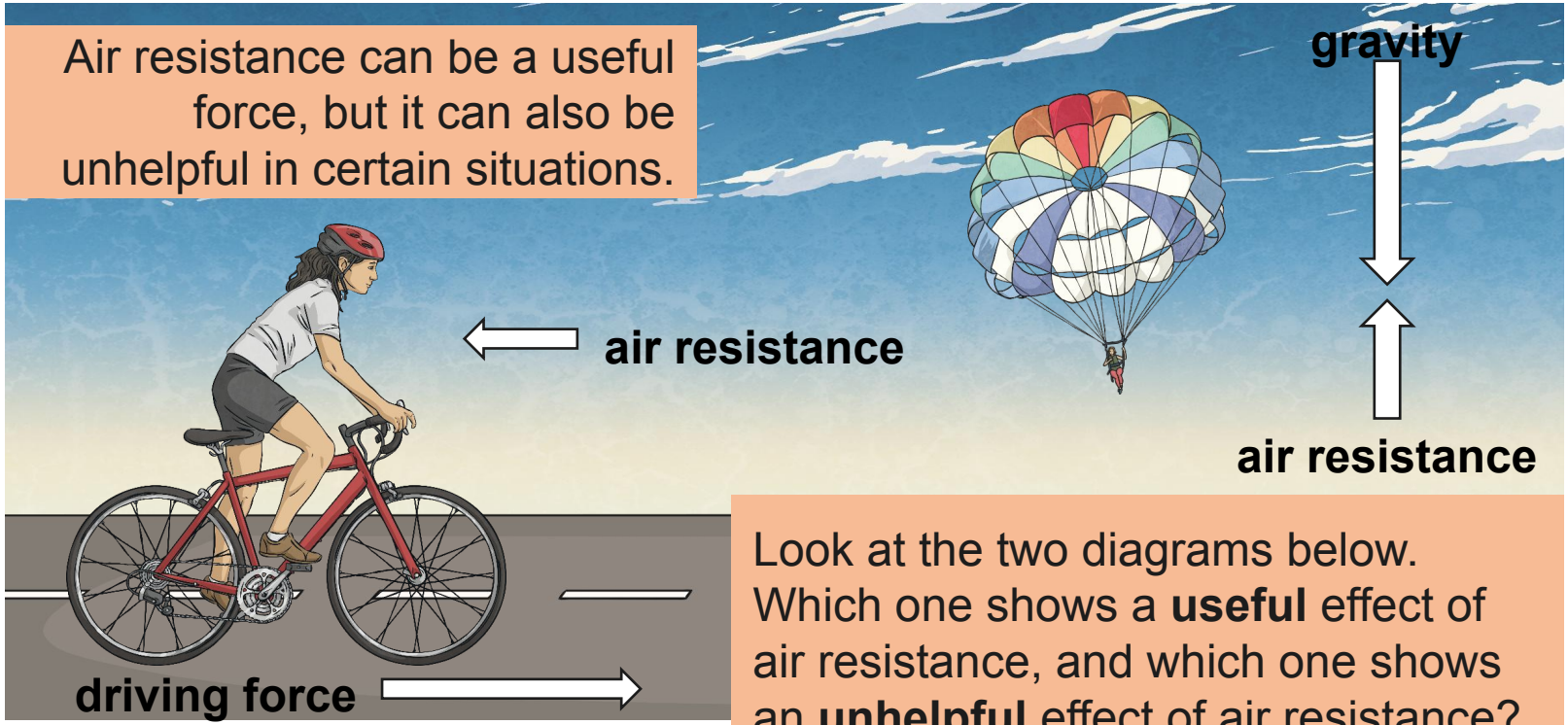
What is air resistance?

When an object moves through the air, air particles hit the object and create air resistance, slowing the object down.

For example, the **air particles** that hit an open parachute make it difficult for it to move through the air, because of its **shape and size.**

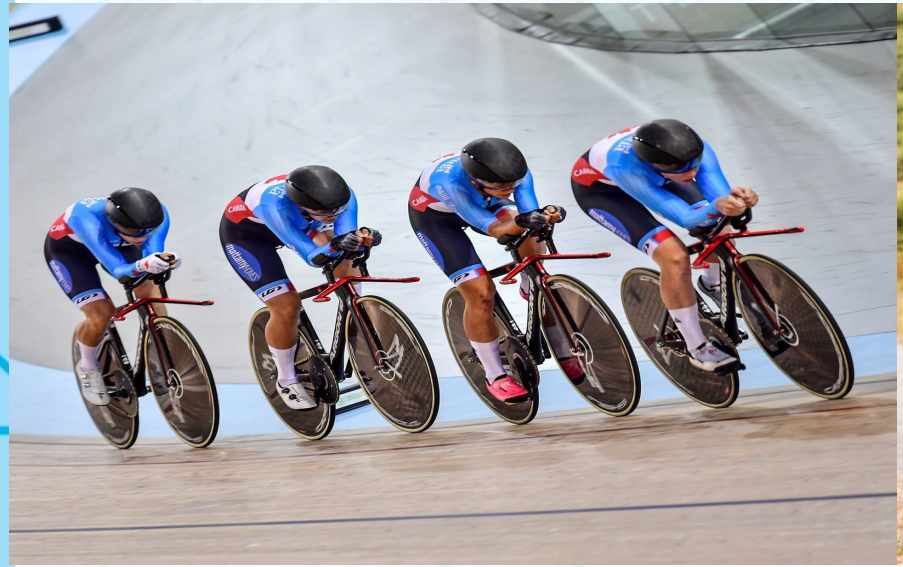


Air Resistance



Look at the two diagrams below. Which one shows a **useful** effect of air resistance, and which one shows an **unhelpful** effect of air resistance?

- Spot the difference



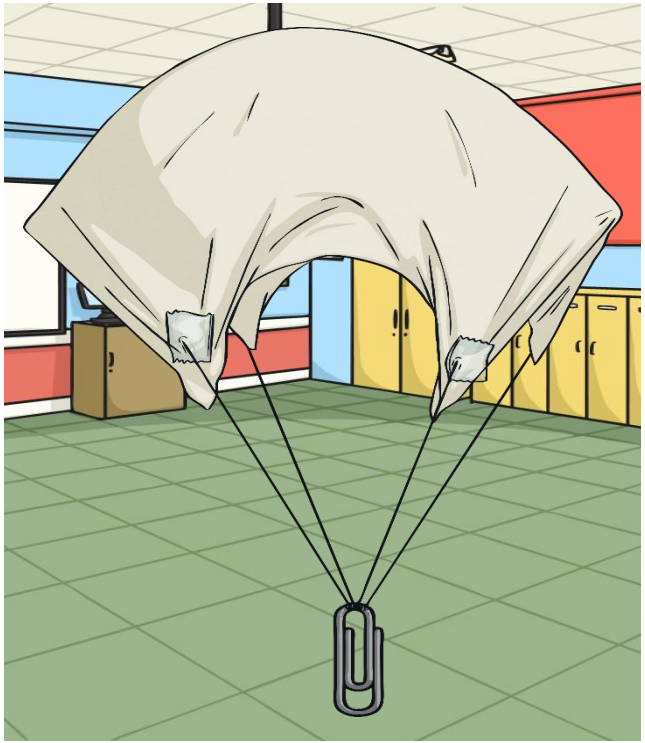
The **shape and area** of an object affects its air resistance.

Some objects are **streamlined** which means that they will have less **air resistance** and move through the air **easily.** Objects that are not streamlined will have **more air resistance.**

The Perfect Parachute

In groups of 2 or 3, You will make two different parachutes and drop them from a height.

You will observe which of your parachutes falls the **most slowly**. This parachute will have the most **air resistance** pushing it up.



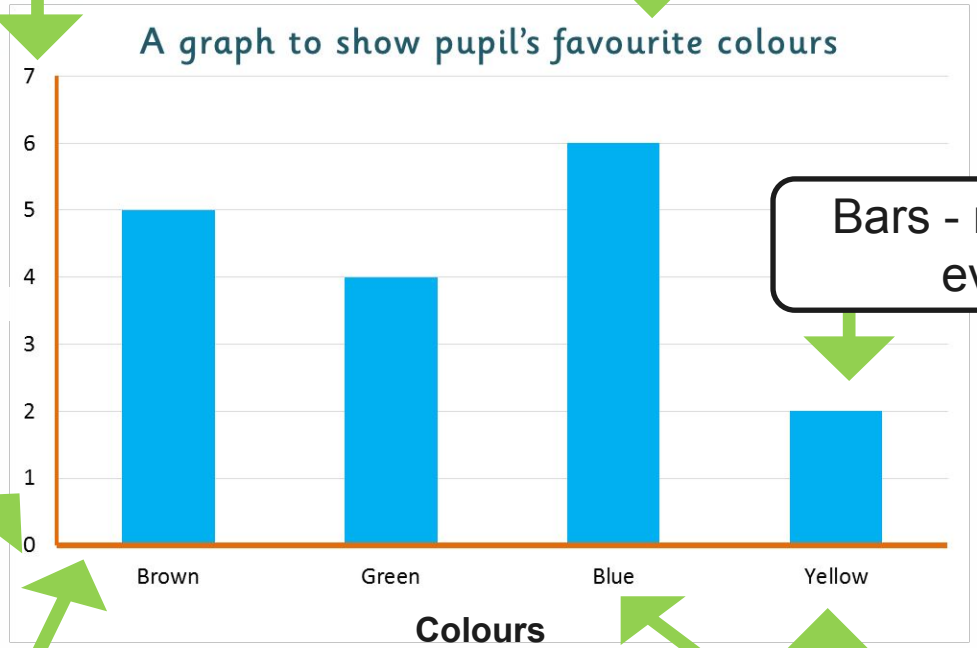
If you did not complete your parachute tests, copy these results into your book:

Time taken for parachutes to fall

	Trial 1	Trial 2	Trial 3	Average
Large				
Small				

Measurements - from 0 to above the maximum

Title - what does the graph show?



Bars - ruled and straight, evenly spaced

Axis

Axis title

Categories - what were the 2 types of parachutes?

Types of forces - friction

LI: to investigate friction force and examples of useful and non-useful friction

Brainstorm: What do you already know about friction?

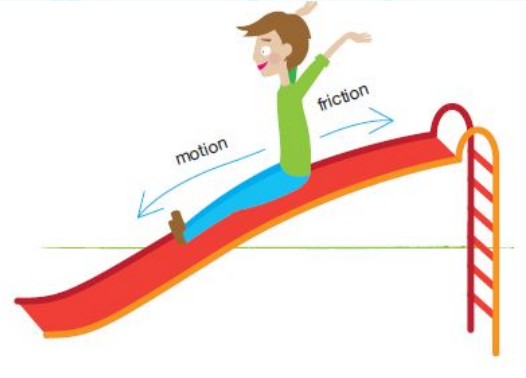
In pairs/3s task:

Put into order from easiest-hardest which surfaces you think it would be to slide across in your socks:

- Polished metal
- Wood
- Concrete
- Carpet
- Grass
- Vinyl flooring (eg. school bathrooms)

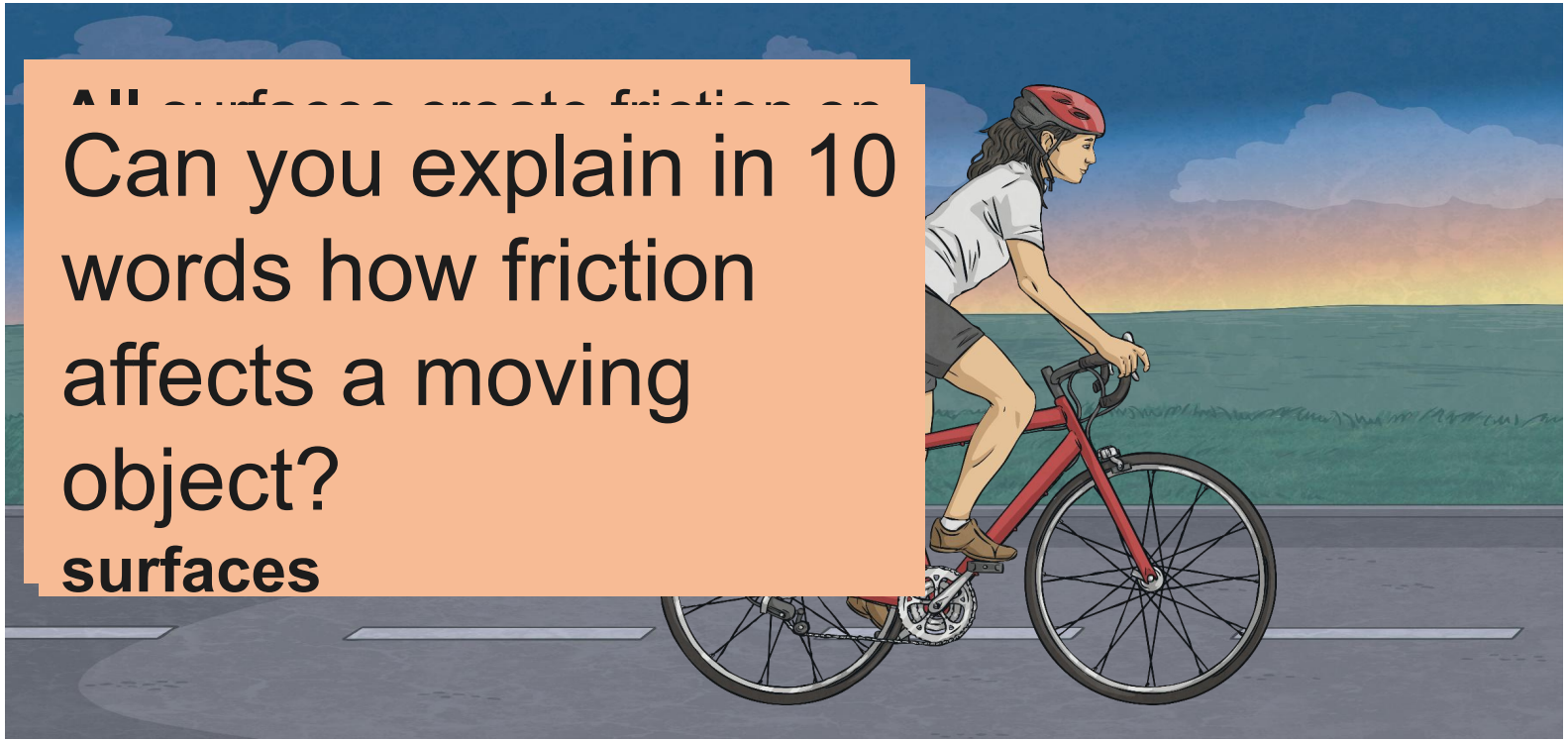
WHAT IS FRICTION?

Friction is a ***resistant*** **force** that occurs whenever one object tries to **move over another.**



What is Friction?

What Is Friction?



All surfaces create friction on

Can you explain in 10 words how friction affects a moving object?

surfaces

Friction - advantages and disadvantages

Complete the worksheet on real life examples of friction, and whether they are an **advantage** or a **disadvantage.**

Can you think of 2 more examples where you can observe friction?

Is it an advantage or disadvantage here?

WHAT AFFECTS FRICTION?

Friction depends on:

- How **rough** the surfaces in contact are
- How hard the surfaces are pushed together.

*The **greater the weight** of a sliding object, the **greater the force** of friction*

Choose an olympic sport

Where can you see friction having an effect in this sport?

Types of forces - friction

Hei mahi:

Brainstorm some *more* examples where friction is an advantage or a disadvantage in real life

Today we will…

- **Explore more examples of friction in real life**
- **Examine at what affects friction and how to reduce or increase it**


Here the floor is smooth

1. What is friction?

a) A force that slows down objects
b) A force that speeds up objects
c) A force that sets objects on fire
d) A force that makes objects float

2. How does friction affect cars?

a) It helps them move smoothly
b) It slows them down and wastes energy
c) It makes them go faster
d) It has no effect on cars

3. Why do musicians like Wilson use rosin on their bows?

a) To reduce friction
b) To increase friction
c) To make the bow look shiny
d) To make the bow lighter

4. How does static friction help us when we walk?

a) It makes us slide
b) It helps us stop
c) It makes us jump higher
d) It has no effect on walking

5. What would happen if there was no kinetic friction?

a) Objects would slide forever
b) Objects would stop immediately
c) Objects would float in the air
d) Objects would explode

6. How does friction affect riding a scooter?

a) It helps the scooter go faster
b) It makes the scooter stop
c) It has no effect on riding a scooter
d) It helps the scooter start and stop

7. Why is friction important in our daily lives?

a) It helps us conserve energy
b) It makes everything more difficult
c) It causes accidents and injuries
d) It helps us perform everyday tasks

WHAT AFFECTS FRICTION?

Friction depends on:

- How **rough or smooth** the surfaces are
- How hard the surfaces are **pushed together**.

*The **greater the weight** of a sliding object, the **greater the force** of frictior*

Reducing friction….

Reducing and increasing Friction

- Friction can be reduced by adding a l**ubricant** - this makes the surfaces smoother eg. adding oil to a car engine.
- Friction can be reduced by moving an object using **wheels** instead of sliding an object on the floor
- Friction can be increased by adding a rough **texture or grippiness** to a surface. Eg. ridges on shoes

REDUCING FRICTION

- Find one example where people use techniques to **reduce or increase** friction in <u>sport</u>

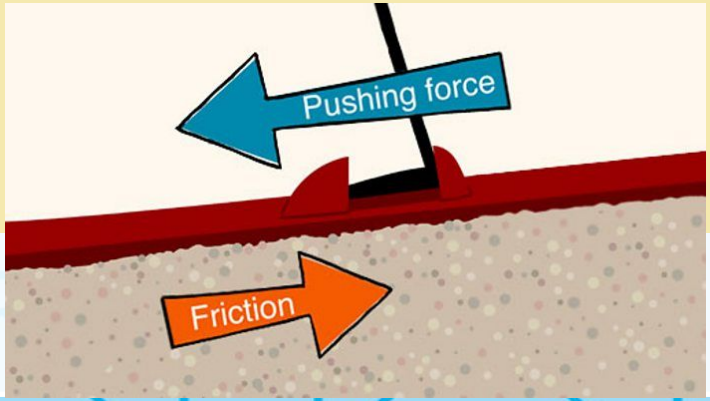
Draw a picture of this example

Assessment 2

Today: we are going to begin our assessment by planning an investigation

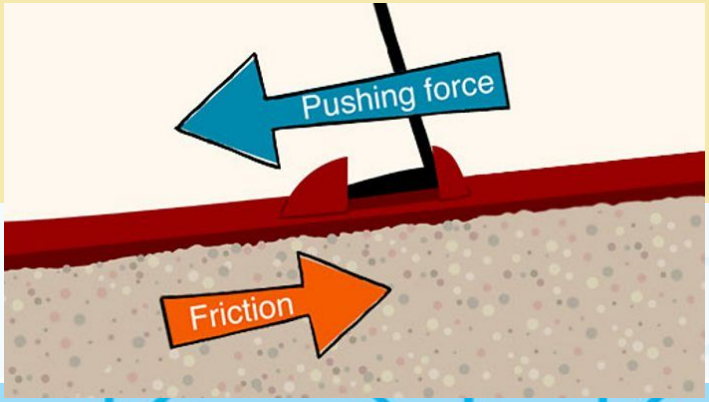
Types of forces - friction

LI: to investigate the friction exerted by different surfaces



Types of forces - friction

Hei mahi: Use your results to draw a bar graph **of the friction generated from each surface you tested**



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The Olympic Games and the science of movement

LI:

What will we learn of this topic?

01

Vocabulary

Let's unlock exciting words and build amazing worlds together!

02

Everyday expressions

Discover cool phrases and expressions for daily adventures!

03

Stories and songs

Jump into exciting tales and catchy songs to learn this language!

04

Playful activities

Engage in games and creative projects that bring this language to life

Introduction

Step into the enchanting world of language discovery! Our journey begins with the exciting exploration of sounds, words, and expressions that make language so fascinating. Together, we'll learn how to greet new friends, introduce ourselves, and create a foundation for clear communication

Through lively activities, every lesson becomes a delightful experience. From cheerful greetings to expressing simple emotions, each step takes us deeper into the wonders of language. Join us on this joy-filled adventure where laughter, friendship, and the thrill of discovering a new way of expressing ourselves await!

01

Vocabulary

Learning vocabulary is very important!

Welcome to the world of vocabulary!

In this section, we'll dive into the magical realm of words, discovering their meanings and how they help us express ideas. We are going to learn:

- Word exploration
- Language connections

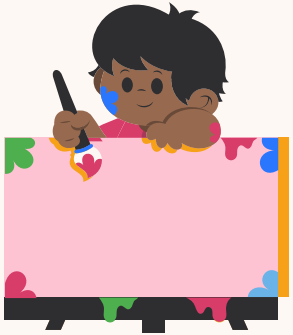
Get ready for a vocabulary adventure where words come to life, **and every discovery opens a new door to the wonders of language!**

Activity 1: Describe the picture

Display a picture of something related to the topic. Have students discuss what they are seeing and **fill in the missing part in the language they are learning**

Can you describe this?

Write your answer



Can you describe this?

Write your answer

Can you describe this?

Write your answer

Everyday expressions

Fun phrases

Get ready for **exciting expressions!** From saying "Hi" to simple requests, we'll turn words into fun tools for talking

Adventure talk

Learn phrases for **daily fun!** Role-playing and cool activities make these expressions your language superpowers!

Chat confidence

Practice phrases for **real chats**. Dive into language fun, turning learning into a journey of self-expression!

Experiment: Classroom survey

Create a list of survey questions. Students have to circulate around the classroom, asking their classmates the questions and recording their responses in the target language

What's your favorite...?

Do you like...?

How often do you...?

What is one thing you always...?