Term 4 context: Great Kiwi Summer!

Hei mahi:

Write a big title at the top of a brand new page:
Great Kiwi Summer

Great Kiwi Summer!

For our new context...

We are exploring the ‘Great Kiwi summer’ by examining the science around ***keeping safe and healthy during a summer holiday*** so that we can protect our Hauora.

1. Safe travel
2. Water safety
3. Sun safety
4. Food safety

Task: Create a title page for our new context

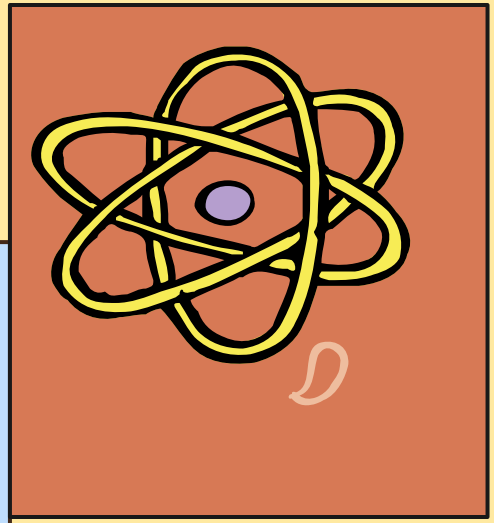
1. Car, driver, and passenger safety

2. Water safety - rips and staying afloat

3. Sun safety - protecting against the sun's harmful rays

4. Food safety - avoiding food poisoning

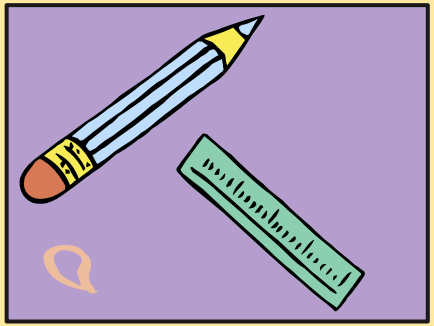
Y7 Science - Car safety



Hei mahi:

LI: To discover how cars are designed to keep passengers safe

What safety features do cars have that you can think of?



What's road safety all about?

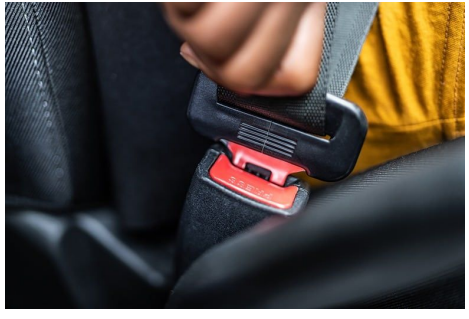
- ✔ walking safely, cycling safely, and being safe in cars
- ✔ keeping yourself safe - and your friends and family too
- ✔ making smart choices
- ✔ making sure you don't get hurt – or even killed

Fast traffic is a big hazard for people on foot and bikes. But why is fast traffic dangerous?

FACT: It takes time for vehicles to come to a complete stop.

In your groups discuss:

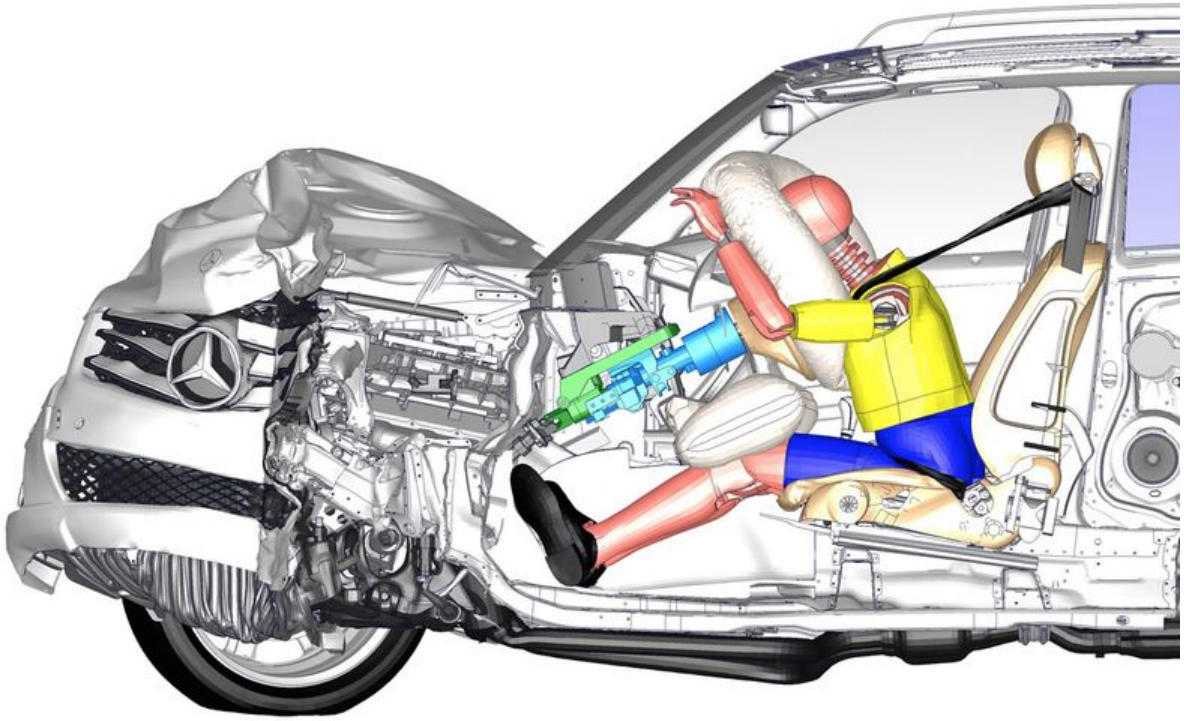
1. Cars are designed to <u>crumple</u> in the front before stopping. Why?



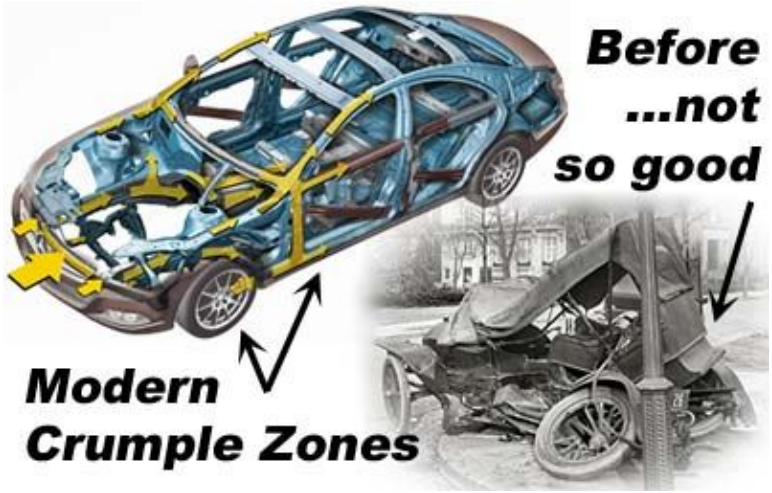
2. Cars have <u>seatbelt</u> for every passenger. Why?

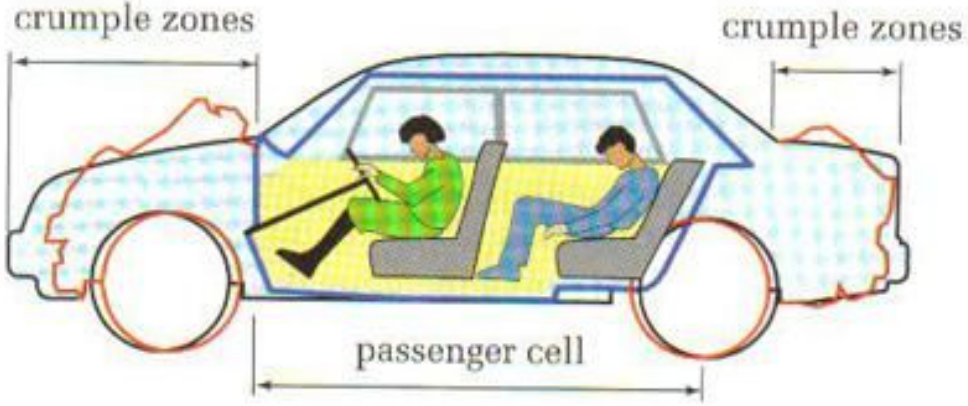
3. Cars have “<u>air bags</u>” for driver and often for passengers. Why?

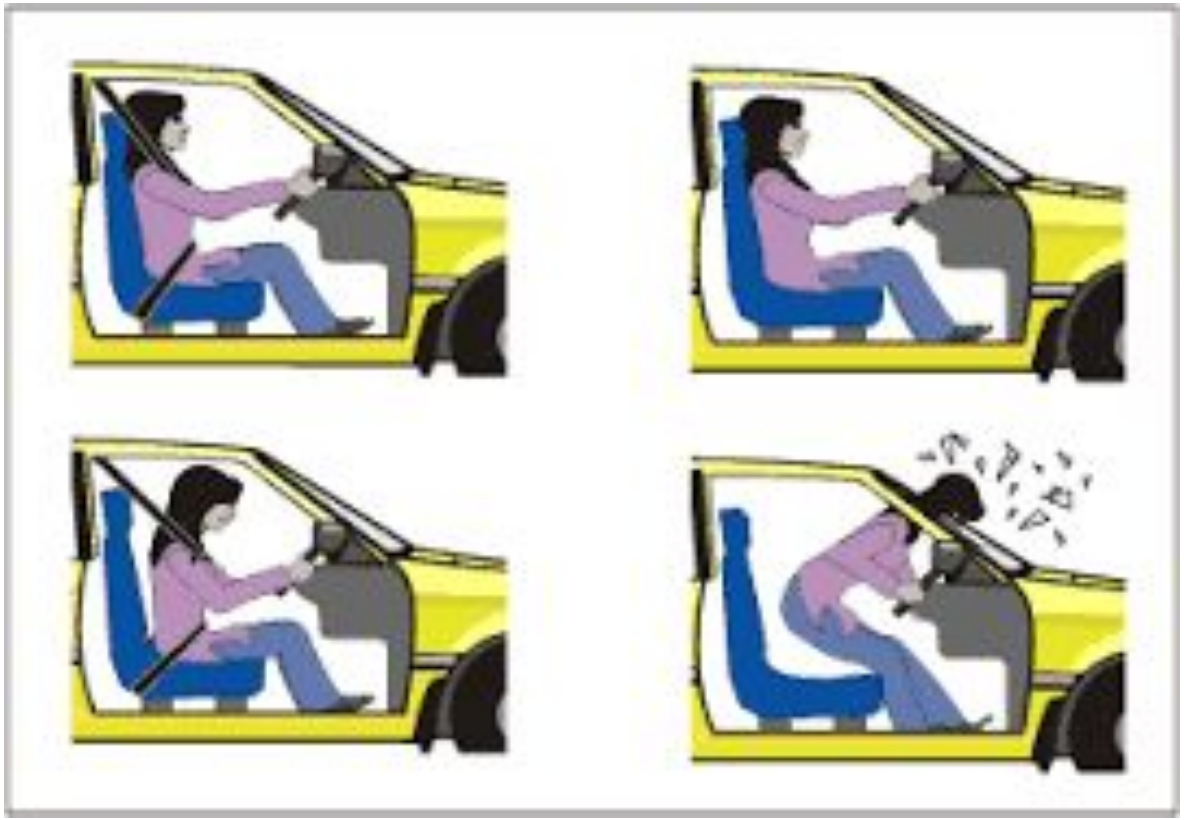
Safety features of a car



1. Crumple zones are designed to absorb the energy of collision before the cabin carrying passengers is deformed.


Before
...not
so good
Modern
Crumple Zones


crumple zones
crumple zones
passenger cell



2. Seat belts

They restrain both the top and bottom of the body from moving into danger.

2. Seat belts

They restrain both the top and bottom of the body from moving into danger.

3. Airbags

Air bags are designed to keep your head, neck, and chest from slamming into the dash, steering wheel, or windshield in a front end crash.

Usually both the driver and passenger airbags are fully inflated within approximately 60–80 milliseconds after the first moment of vehicle contact.

Video Of Airbag

Air bags explode at speeds of 320 kph. This is a violent reaction, necessary to have the bag deployed and beginning to slowly deflate when the occupant contacts the bag.

Questions

1. What is the main reason for crumple zones?

a. Makes stopping time longer b. Car stops faster

c. Reduces energy from the impact affecting the person inside.

d. less car damage.

2. Why shouldn't small children be belted in the front passenger's seat?

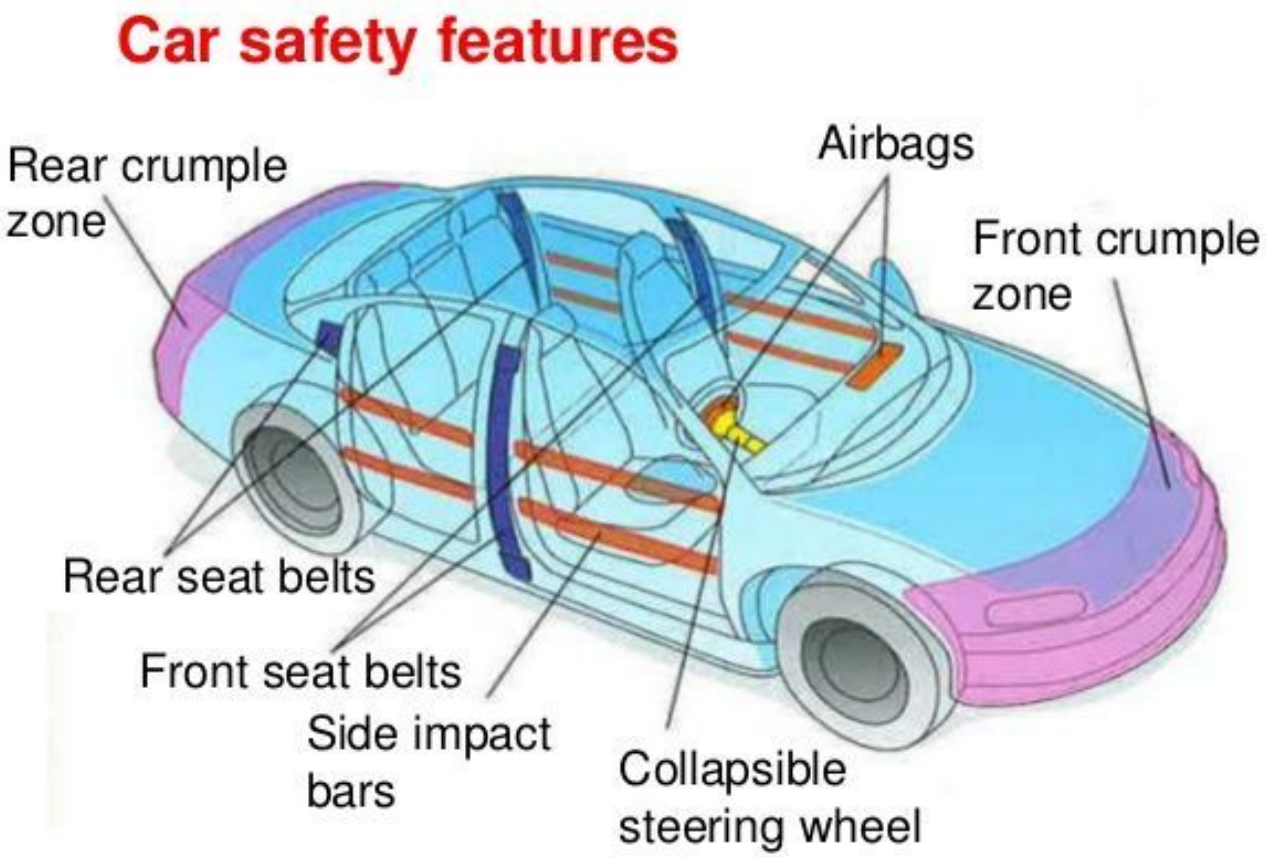
a. The could slip out. b. The air bag may hurt them

c. They can't see through the windshield. d. They distract the driver.

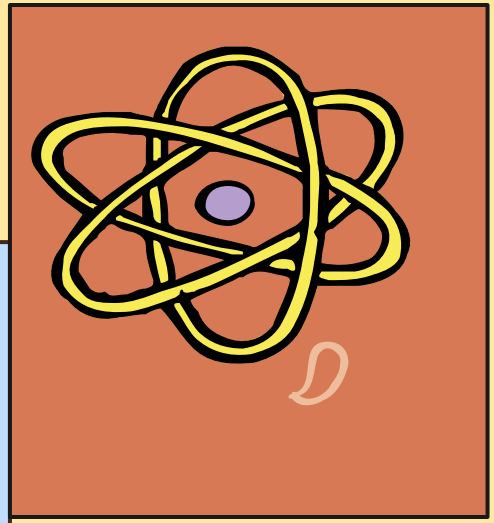
e. all of the above

3. In the 1960's seat belts on the waist were first put into American cars. Later a shoulder harness was also added. What are some possible reasons for this?

Draw a <u>detailed</u> diagram in your books with the safety features we have talked about



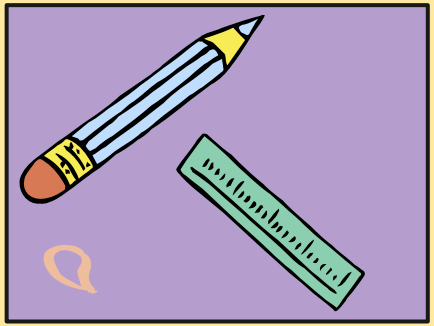
Y7 Science - Car safety



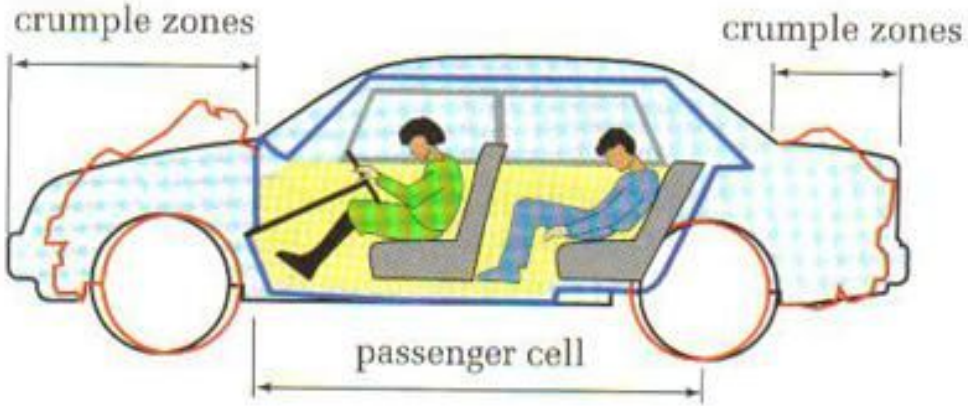
Hei mahi:

Write down today's LI: To carry out an experiment investigating crumple zones.

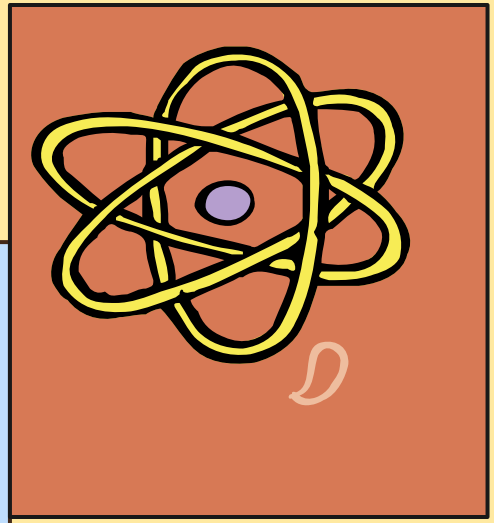
Why do cars have crumple zones?



Crumple zones are designed to **absorb** the impact energy during a crash so that **less** impact energy affects the **passenger compartment.**

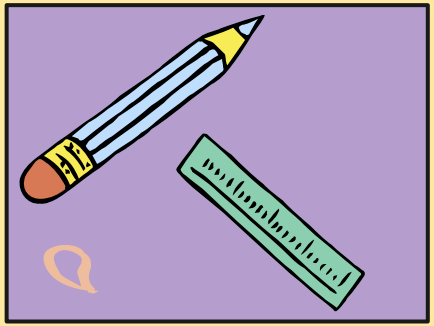


Y7 Science - Car safety



Hei mahi:

Write down today's LI:
To investigate why seatbelts are important for car safety



Newton's First Law of Motion - Inertia

An object that is still, **will remain still**, and an object that is moving **will continue to move** in the same direction and speed **unless a force is applied to it.**

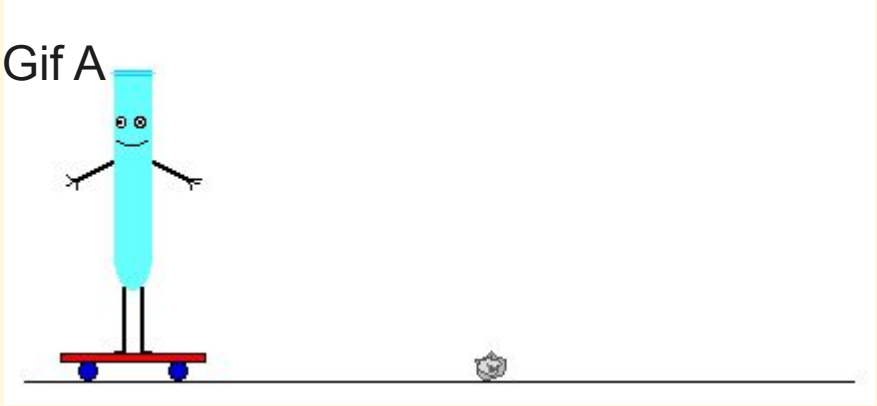
For example, a football that is on the ground won't move unless you kick it. When you kick the football, it won't change direction or speed unless it is kicked again, hits something or friction slows it down.

Newton’s First Law of Motion - inertia

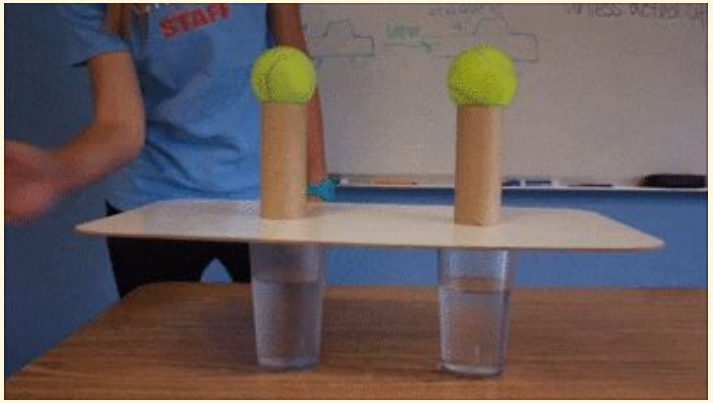
Newton’s First Law of Motion - Inertia

Write a sentence explaining how each gif demonstrates Newton's law of Inertia

Gif A



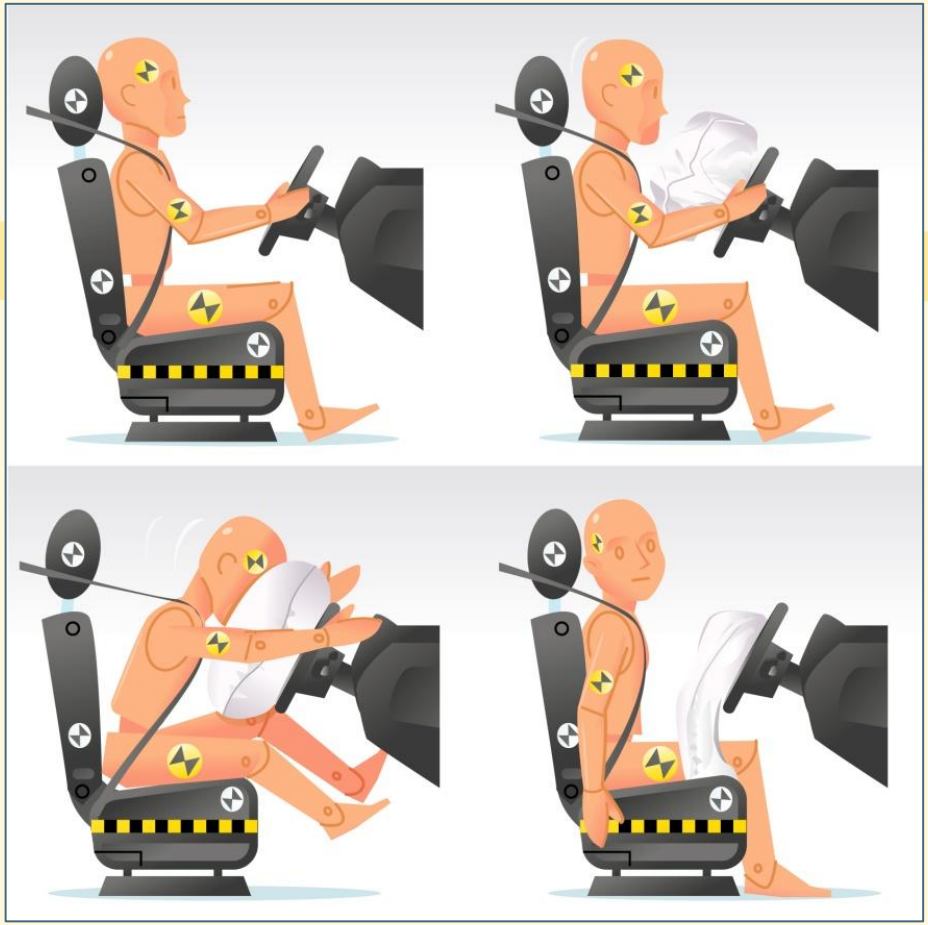
Gif B



Gif C

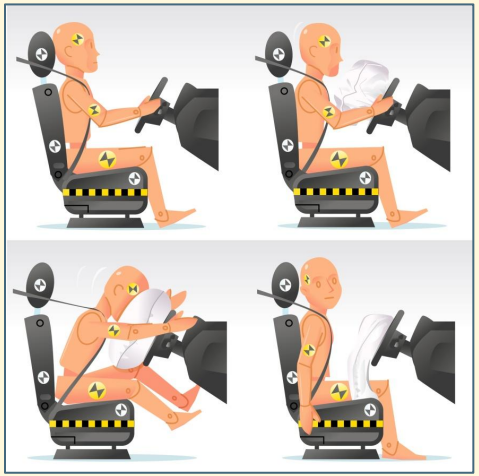
Gif D

Law of **inertia + seatbelts and headrests**



- Seat Belts reduce risk of serious injuries by 50%-83%.
- They reduce the movement of occupants inside the vehicle during a crash.
- Prevent passengers from hitting the other occupants.
- Prevent passengers from being thrown out of the vehicle.

Write a paragraph explaining how, referring to Newton's first law of Inertia, seat belts (and head rests) **are important safety features.**



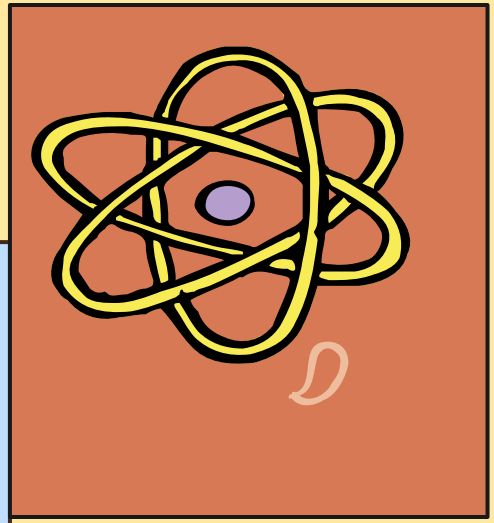
Sentence starters:

When a car stops suddenly, because of Newton's law of inertia, the passenger....

Seatbelts work by...

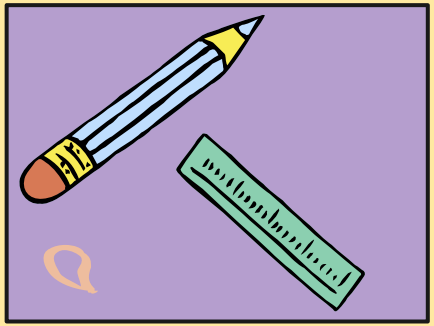
Seatbelts therefore prevent...

Y7 Science - Car safety



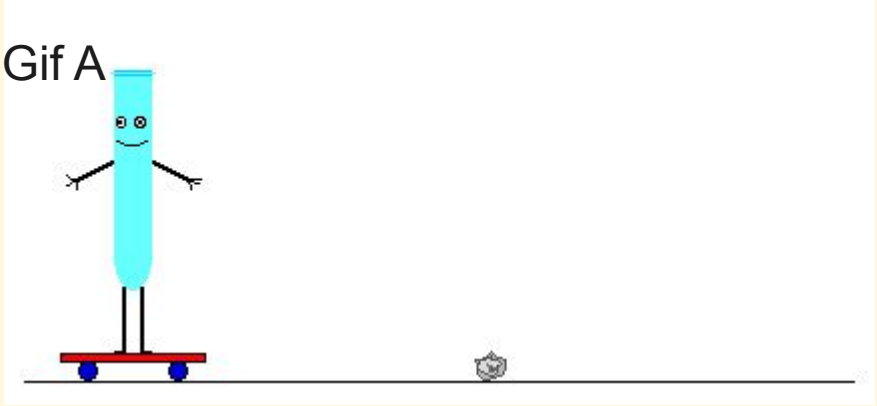
Hei mahi:

LI: To investigate the danger of distraction when driving

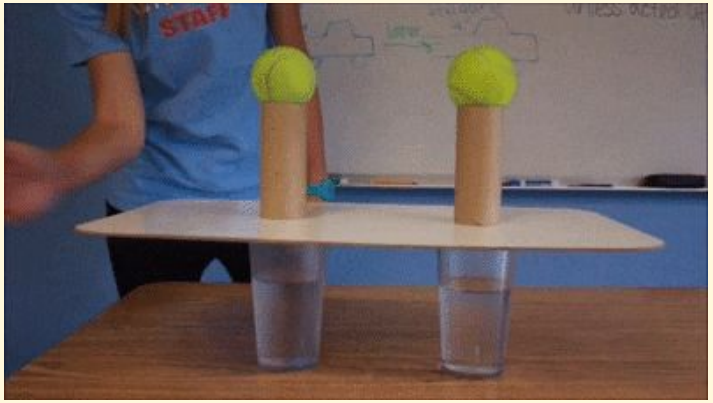


Write a sentence explaining how each gif demonstrates Newton's law of Inertia

Gif A



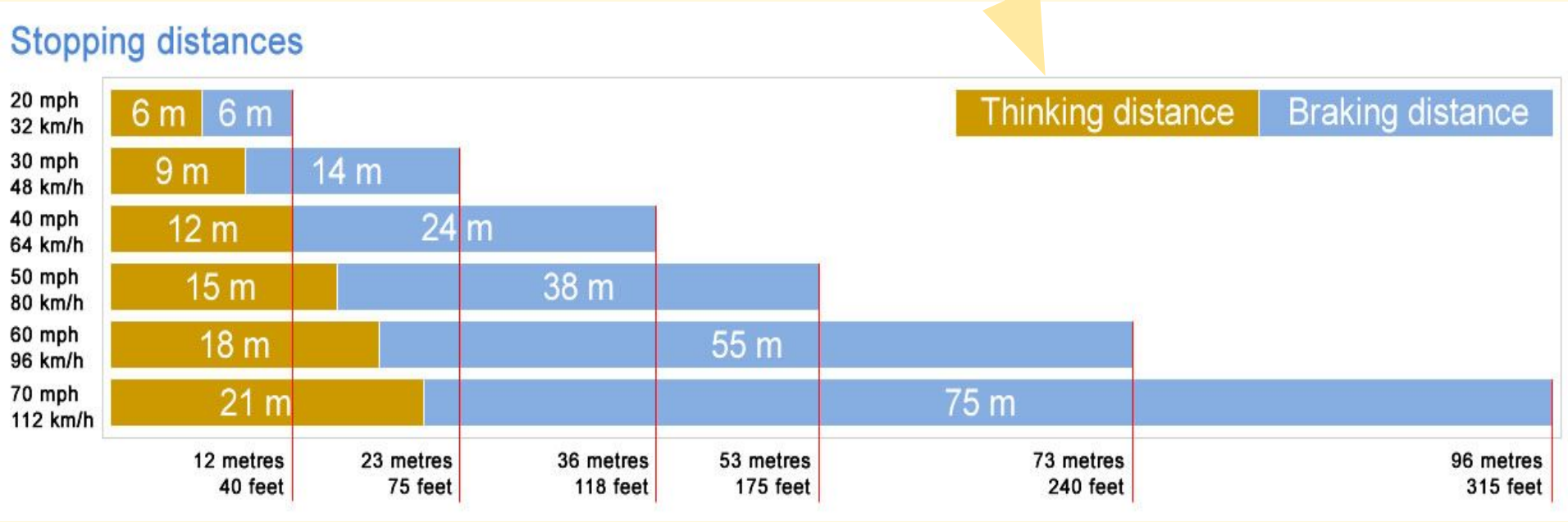
Gif B



Gif C

Gif D

How could distractions affect your 'Thinking distance'?

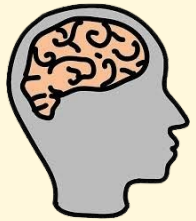


Types of distractions:

- **Visual** - takes your *eyes* off the road

- **Manual** - takes your *hands* off the steering wheel

- **Cognitive** - takes your *mind* off driving



Can you think of some examples of each?

INVESTIGATION 1

Work in pairs.

1. Have one person hold a 30cm ruler at the 30cm marked end and let it hang straight down.
2. The other person places their thumb and forefinger on either side of the ruler at the 0cm mark (but not holding the ruler).
3. Without warning, the person holding the ruler lets go and the other person tries to catch it as soon as possible. Try to be tricky and not let your partner know when you will drop the ruler! You may each try this several times to get the technique right before you start recording your results.
4. Measure the distance above where the ruler is caught.
5. When you are happy with the technique, complete 5 trials, recording your result each time on the table.

Now swap over and repeat steps 1 - 5.

INVESTIGATION 2

This investigation uses the same method as Investigation 1 but introduces a ***distraction***:

- you are trying write a sentence with your other hand

While you are doing one of these things your partner will drop the ruler and then you record the measurement.

Take 10 measurements, then swap over so your partner has a turn being distracted. Record all results.

Calculate the average catch-distance…

Questions to answer:

1. Comparing your averages for each investigation. Did your reaction time get better or worse?
2. How many steps inside your body are involved between **seeing** the ruler falling and being able to **grab it**?
3. Based on what you have seen about reaction times and distraction, what **recommendations** would you make t other students who are scooting, biking or walking to school?

Questions to answer:

1. What happened to your average reaction time when distracted?
2. Are you sure of your results? Was it tempting to be competitive and change the results slightly?
3. How many steps inside your body are involved between seeing the ruler falling and being able to grab it?
4. Based on what you have seen about reaction times and distraction, what **recommendations** would you make to other students who are scooting, biking or walking to school?

Hei mahi:

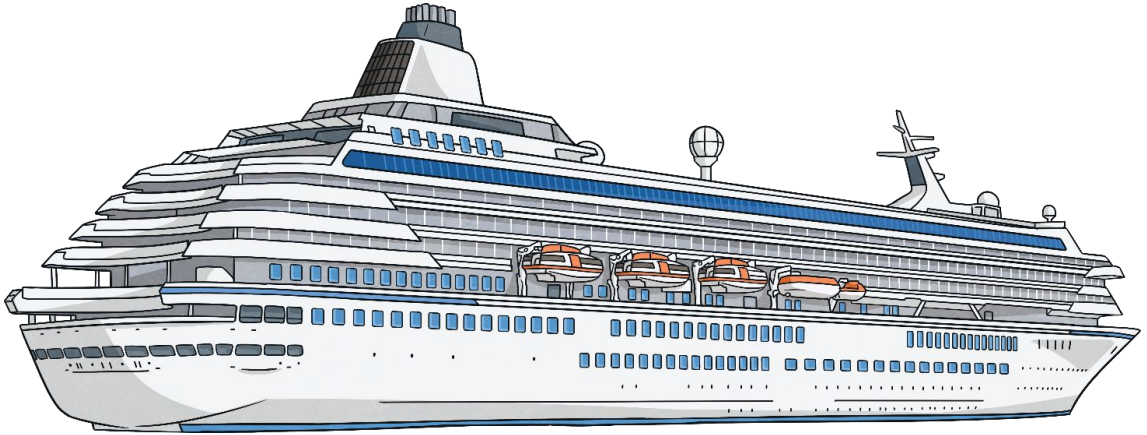
1. **Learning intention:**
   To explore buoyancy: why objects float and sink

2. **Brainstorm:** All the objects/materials that float that you can think of…

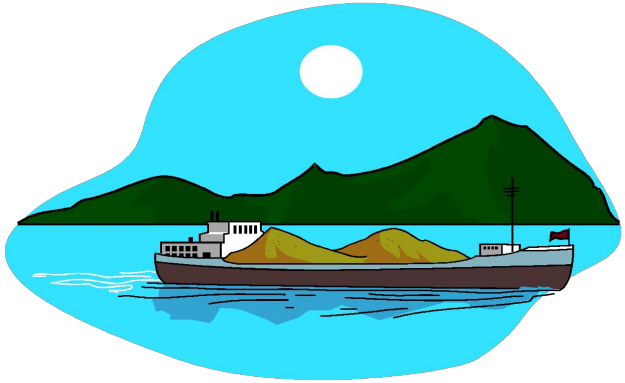
Will it float or sink?

Buoyancy Force

Have you ever wondered why a small pebble sinks when you throw it into a lake, but a huge cruise ship that is much heavier floats?



Why do you think this occurs?



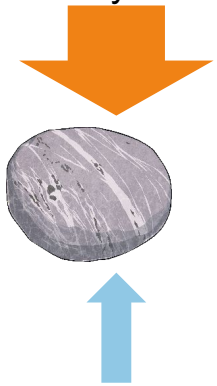
Buoyancy

Buoyancy is the ability of an object to float.

The Ship and the Pebble

Have you worked out why the ship doesn't sink but the pebble does?
It is all to do with **buoyancy force**.

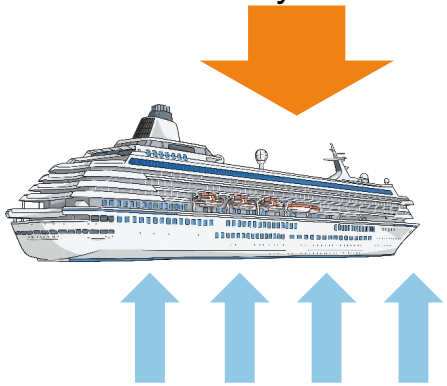
Gravity force



Bouyancy force

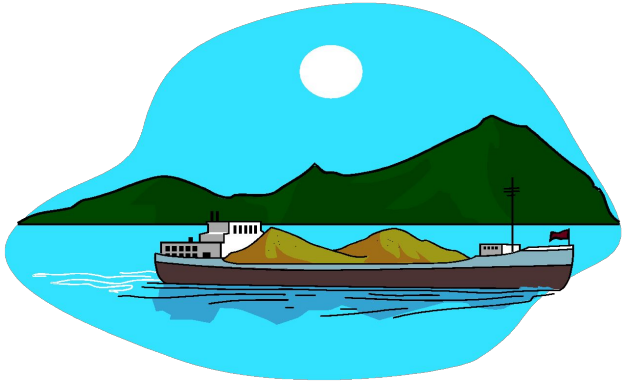
The gravitational force pushing down on the solid pebble is greater than the buoyancy force pushing up, so the pebble sinks.

Gravity force



Bouyancy force

The buoyancy force acting on the ship is greater than the gravitational force the ship exerts and therefore it floats.



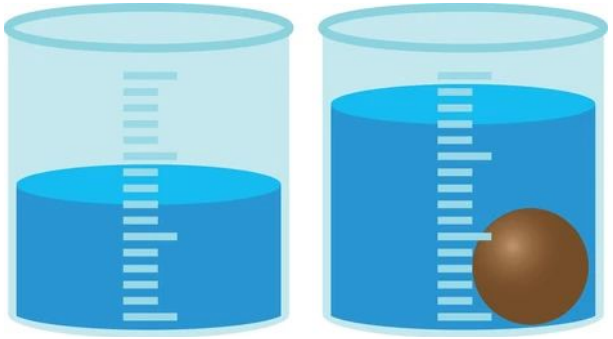
Buoyancy

Buoyancy is the ability of an object to float. It is related to the object's ***density and displacement*.**

Density and displacement

Density - how tightly packed matter is in an object

Displacement - how much water is pushed away by an object



Task:

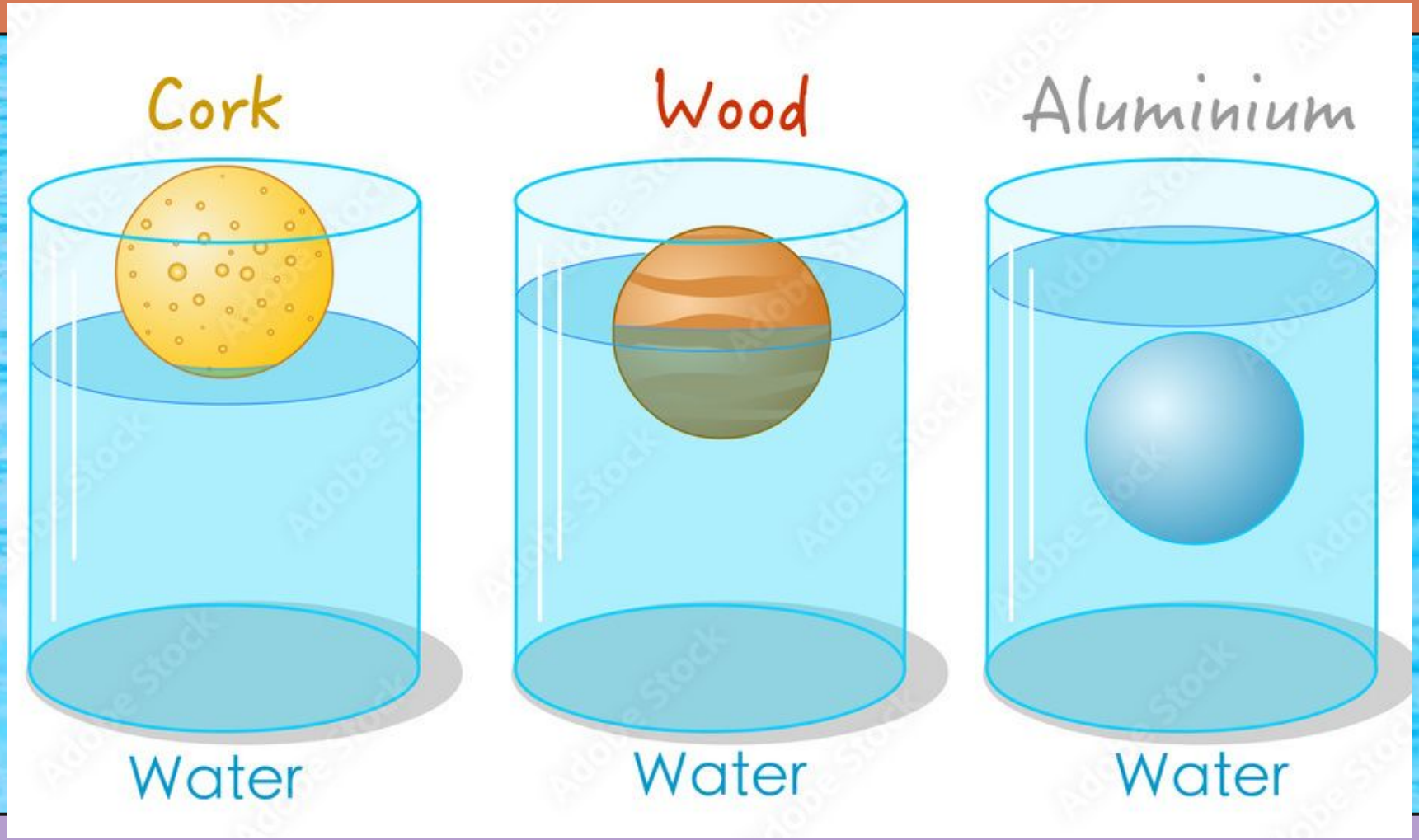
Brainpop - Bouyancy

Hei mahi:

Fill in the blanks - stick in your book and complete

When we put things in water, they either float or sink because of something called_____. If an object is _____ than water, it will _____because the water pushes it up. If it's _____ than water, it will _____ because gravity pulls it down more than the water pushes it up. For example, a _____ floats since it is _____ for its size, but a _____ sinks because it is dense and _____ for its size.

Rock **Light** **Denser** **Heavy** **Sink** **Buoyancy**
Float **Balloon** **Less dense**


Cork
Wood
Aluminium
Water
Water
Water

Tinfoil boat competition - creation

1. In pairs or 3s, create a sketch of the shape you will make your boat in your book - think about keeping the water out!

2. Use your tinfoil to create your boat

Tinfoil boat competition - testing

1. With 2 other groups, place your boat in a grey tray filled with water
2. Gently place 1 marble in each boat
3. Place another marble in one at a time, until the last boat is floating!
4. Winning boats compete with the rest of the class

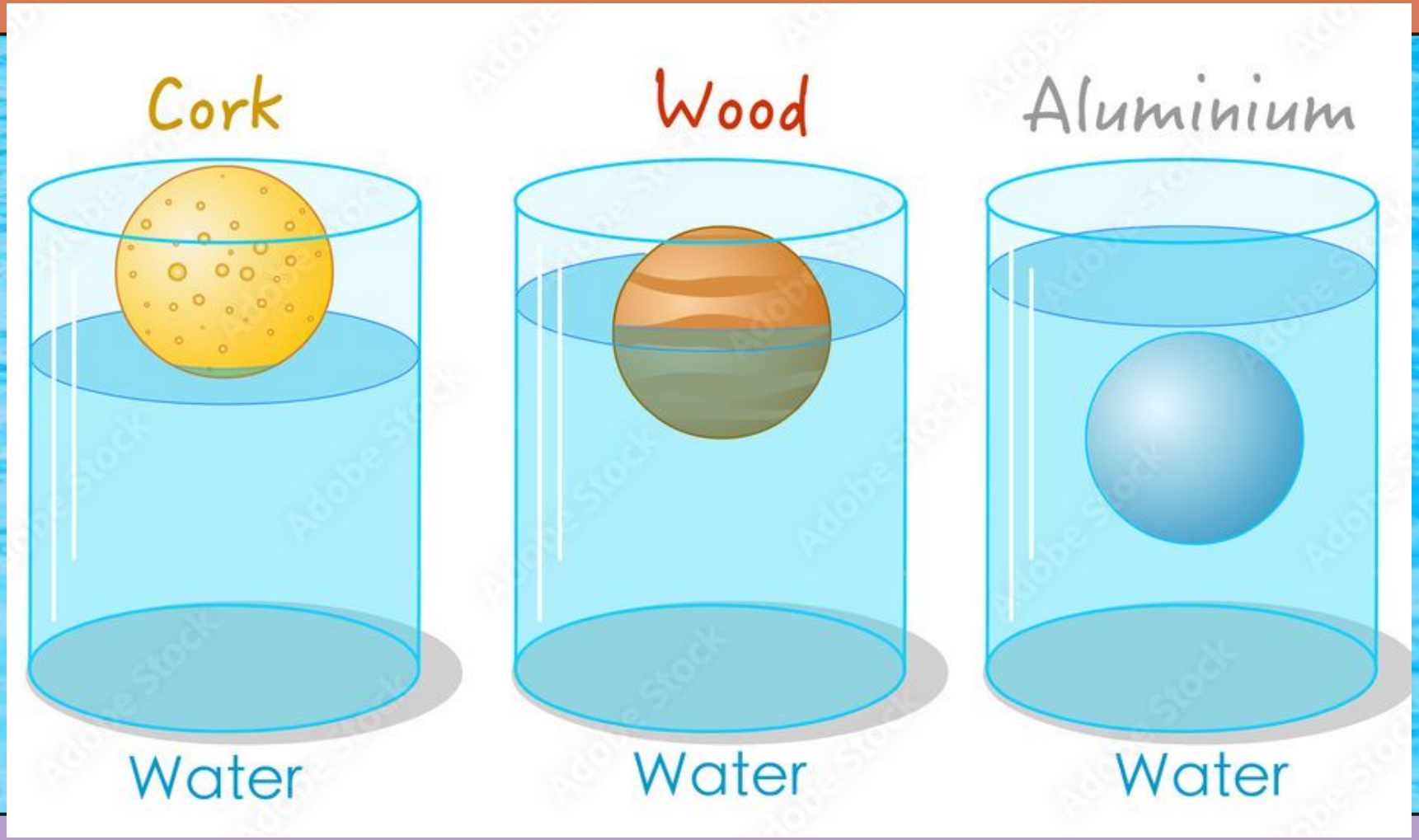
Reflection

1. What went well?
2. What didn't go well?
3. What would you do differently next time?

Hei mahi:

Write down the LI:

To examine how flotation devices enable us to float safely in water.


Cork
Wood
Aluminium
Water
Water
Water

Less dense or more dense than water?

Less dense or more dense than water?

Less dense or more dense than water?

Less dense or more dense than water?

Less dense or more dense than water?

Less dense or more dense than water?

Less dense or more dense than water?

Less dense or more dense than water?

Less dense or more dense than water?


SURVIVING WHILE
LOST AT SEA
FLOTATION DEVICE

3 Task Thursday!

1. In your book, ***design and draw*** a lifejacket. *Label* its safety features - what makes it float?
2. Even if you can swim, *why* is deep or rough water still dangerous to be in without a flotation device? Summarise in 3+ sentences your book.
3. **Research and summarise:** How does a submarine change its buoyancy to dive and rise to the surface?

Task 2: Submarine scien

Your task: 1. Find a video that explains how submarines are able to control their buoyancy in order to function.

2. Paste the link here:

3. Watch the video and write a short summary (2-3 sentences) explaining how submarines are able to control when they float and sink:

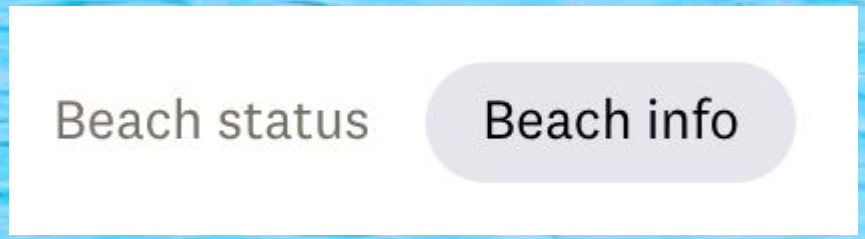
Is it safe to swim at our beaches?

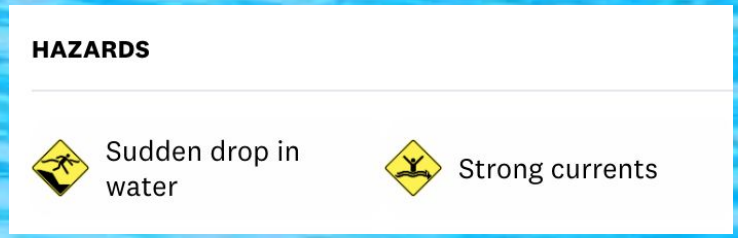
https://safeswim.org.nz/

Explore this web page to answer the questions on the board…

Click on a local beach

Hazard Icons

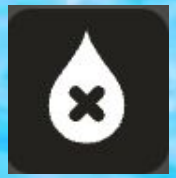
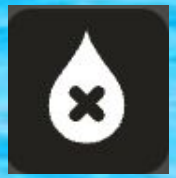




Icons are used to show us the dangers - rather than tell

Find a beach with 4 + hazards (go to 'beach info') and draw these icons in your book.

Safe swim bingo!

1. What does this symbol mean? 	2. Name a place with this safety warning. <u>Why does it have it?</u> 	3. Find a place with this icon. What does it mean? 
4. List 3 beaches with ‘Good water quality’ 	5. Name a beach with this icon today 	6. Why does the beach have this icon? 

Hinemoa and Tutanekai

https://whakarewarewa.com/how-hinemoas-unrelenting-love-for-tutanekai-conquered-all/

Discuss:

- What did Hinemoa use to help her float?
- What strokes could she have used to help her survive the long swim?
- Why did she remove her clothes to swim?

Hei mahi:

Write down the LI:

To investigate the danger of rip currents

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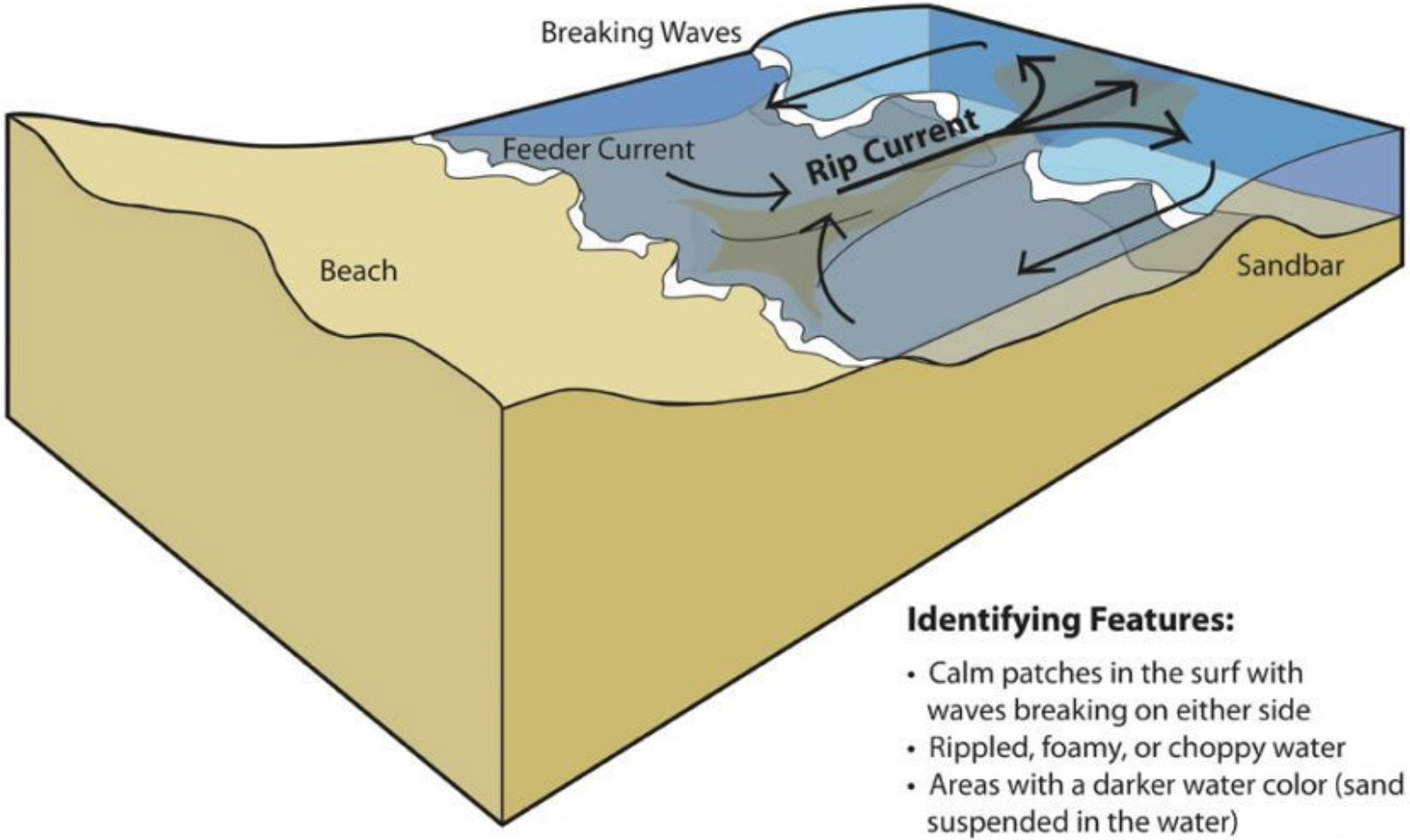
Where do you think is safest to swim? discuss



Identifying Features:

- Calm patches in the surf with waves breaking on either side
- Rippled, foamy, or choppy water
- Areas with a darker water color (sand suspended in the water)
- Adjacent sand bars, reefs, or inshore

Rip statements

There are 5 statements about rips that are true, and 5 that are false.

In your groups, figure out which are true and false and sort them into groups!

In groups of 2-3 create a **slideshow** to present the following information:

- What is a rip?
- What are the parts of a rip?
- What causes rips?
- What are the signs of a rip?
- How do you survive or escape a rip?

Summer in the Sun

Learning intention:

To explore the benefits and negatives of sunlight.

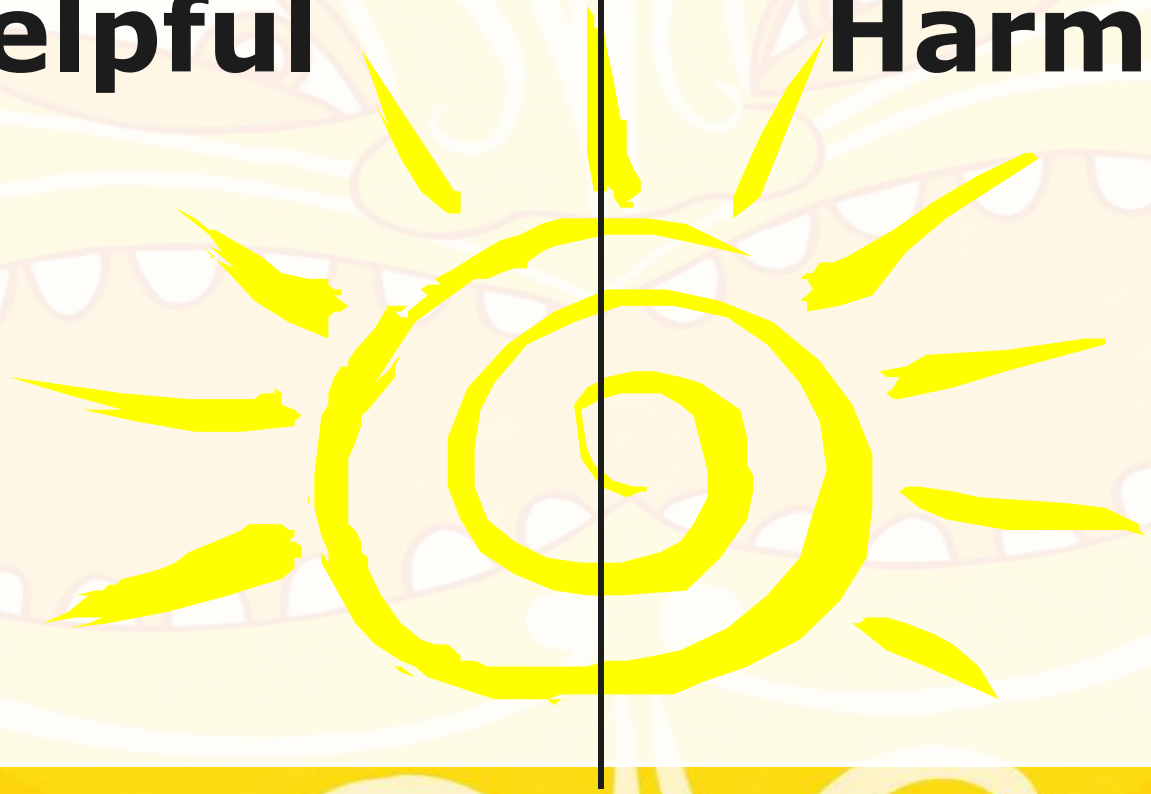
Questions from video:

1. Why did Maui want to capture the sun?
2. What plant did Maui and his brothers make ropes out of?
3. What was the name of the spell Maui cast?
4. According to this legend, why does the sun move slowly in the sky during Summer?

The Sun: How is it...

Helpful

Harmful



The Sun

Helpful

Harmful

Helpful and Harmful Effects of Sunlight

Helpful

- Keeps Us Warm
- Vitamin D Synthesis
- Helps Plants Grow
- Kills Germs
- Makes Us Feel Good
- Provides Light To See By

Harmful

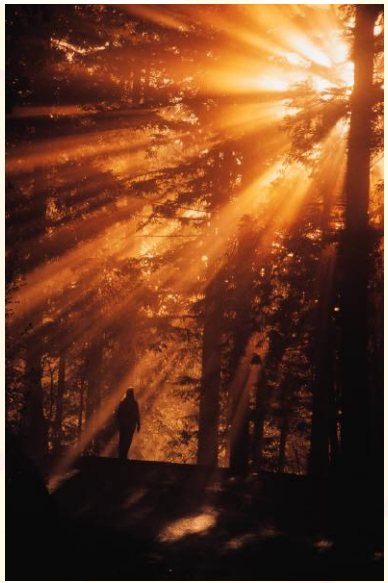
- Produces Suntan and Sunburn
- Causes Skin Cancer
- Photosensitivity (allergic reaction)
- Makes Your Skin Wrinkle
- Causes Eye Damage

The Sun...

…is essential for life on Earth.

It helps plants to grow, and provides warmth and light.

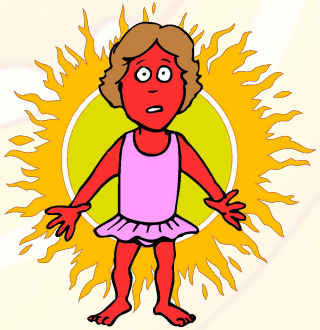
Sunlight also helps people to be happy and healthy.



The Sun…

…produces light and warmth but also Ultraviolet (UV) radiation. UV radiation cannot be seen or felt.

It is UV radiation, not the warmth or brightness of the sun that causes changes to skin color, damage to eyes, and other bad health effects.

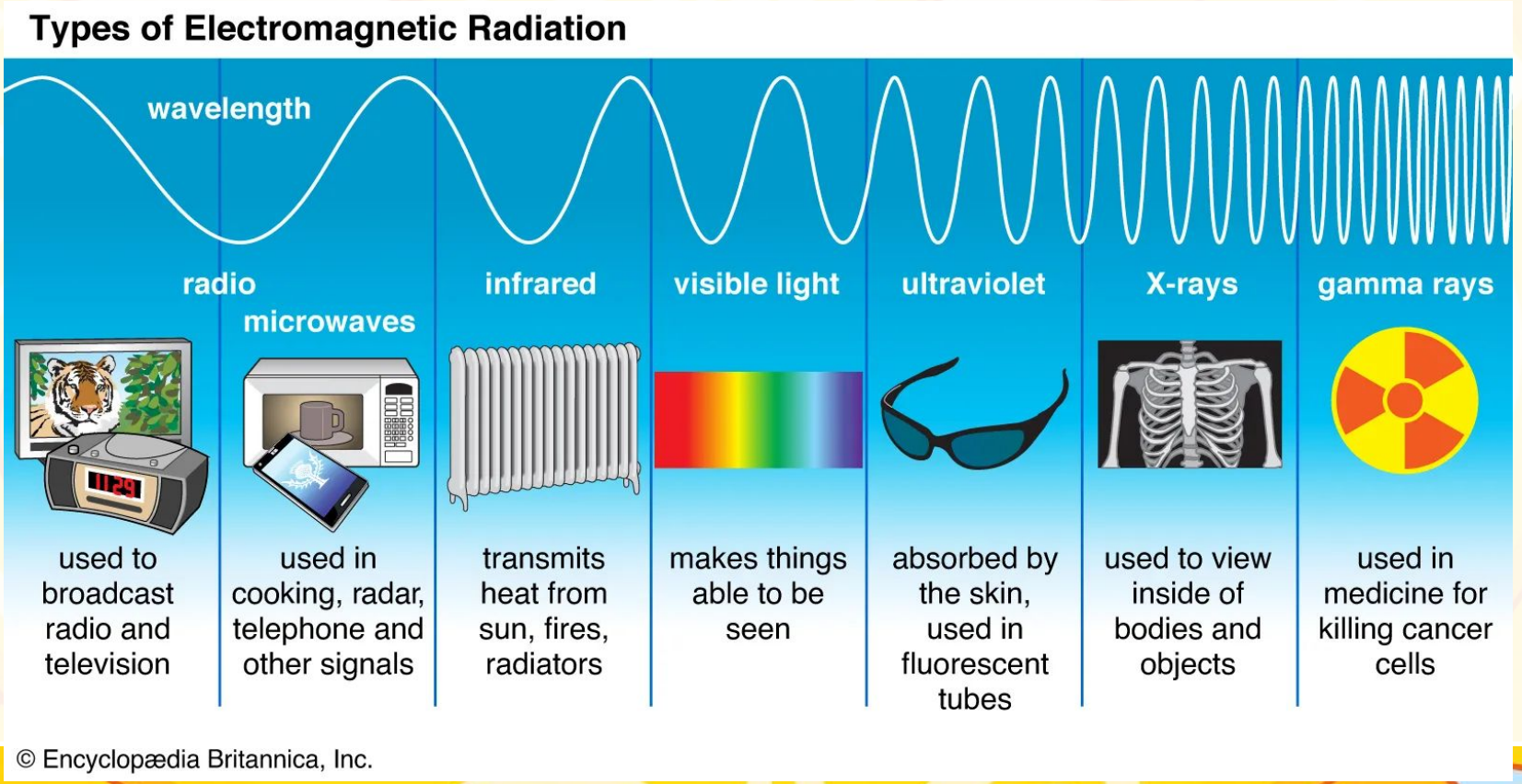


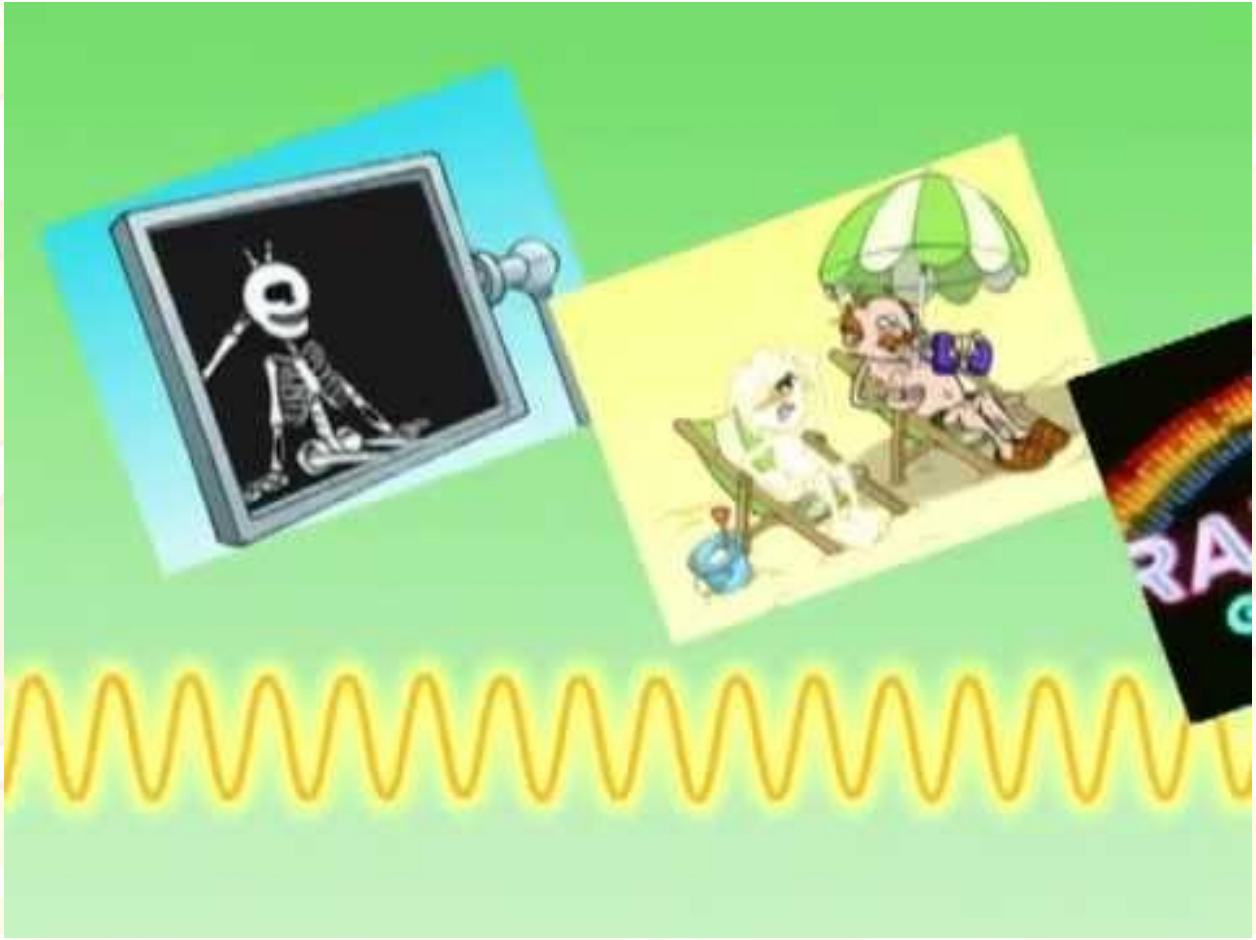
Sun safety

Learning intention:

To explore the electromagnetic spectrum

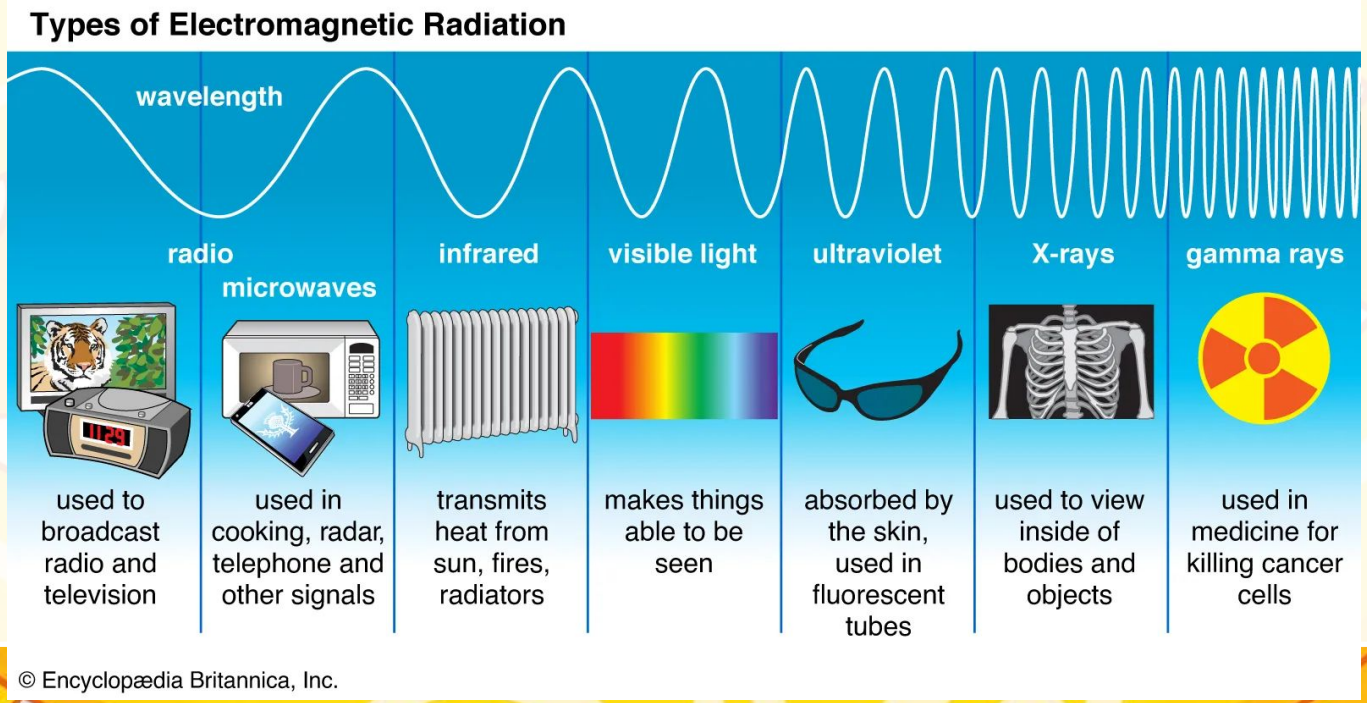
Wait….what are UV rays?





What is the electromagnetic spectrum?

The complete range of **electromagnetic radiation** from the shortest waves (gamma rays) to the longest (radio waves).



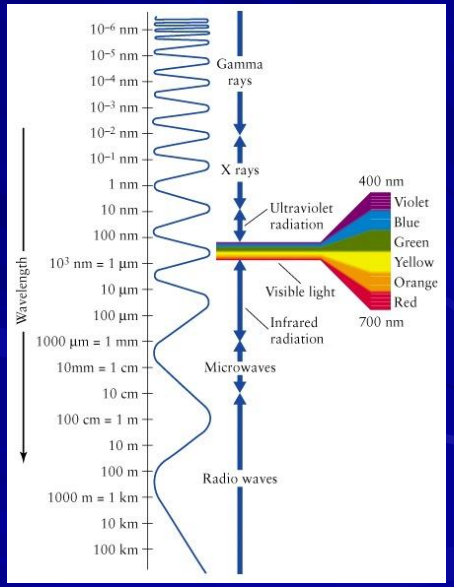
The Waves (in order…)

Radio waves: Have the longest wavelengths

- Used in: **cooking food, satellite transmissions, radios, cellphones, televisions, Police radars**

Infrared waves

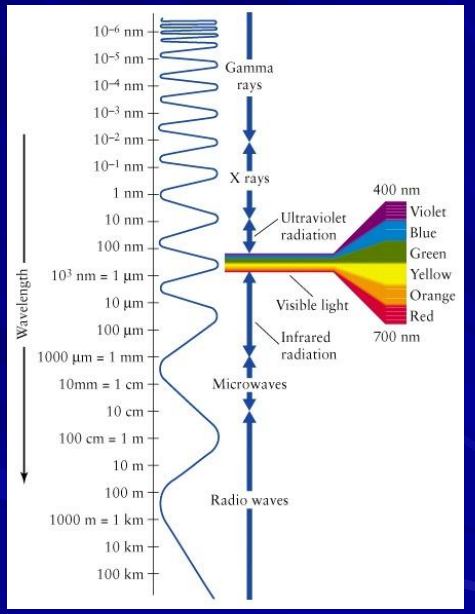
- Used for finding people in the dark and in TV remote control devices



Visible light:

- These are the waves in the EM spectrum that **humans can see.**

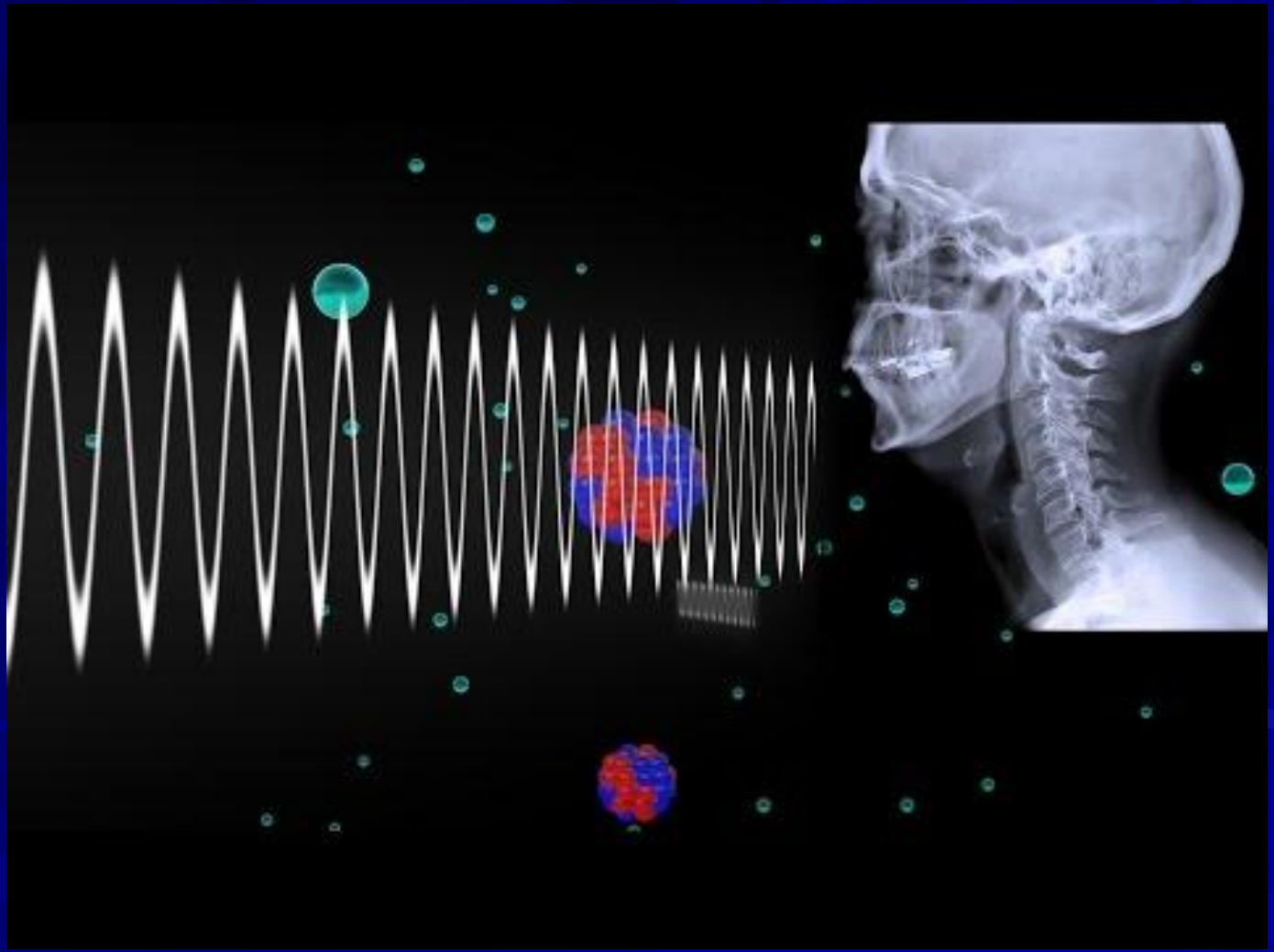
From the **sun, light bulbs and lasers**



Bee Vision

Ultraviolet Light: The energy is high enough with UV rays to penetrate living cells and cause them damage.

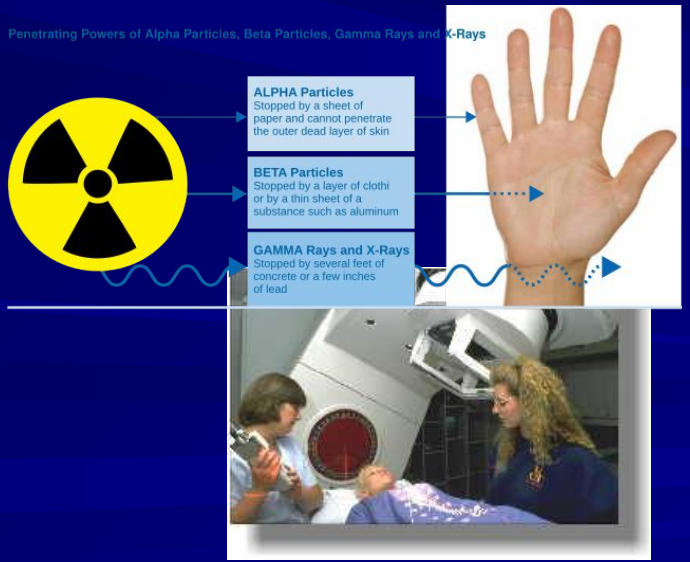
- Although we cannot see UV light, bees, bats, butterflies, some small rodents and birds can.
- UV on our skin produces vitamin D in our bodies. Too much UV can lead to sunburn and skin cancer. UV rays are easily blocked by clothing.
- Used for sterilization because they kill bacteria.



X-Rays: These rays have enough energy to penetrate deep into tissues and cause damage to cells; are stopped by dense materials, such as bone.

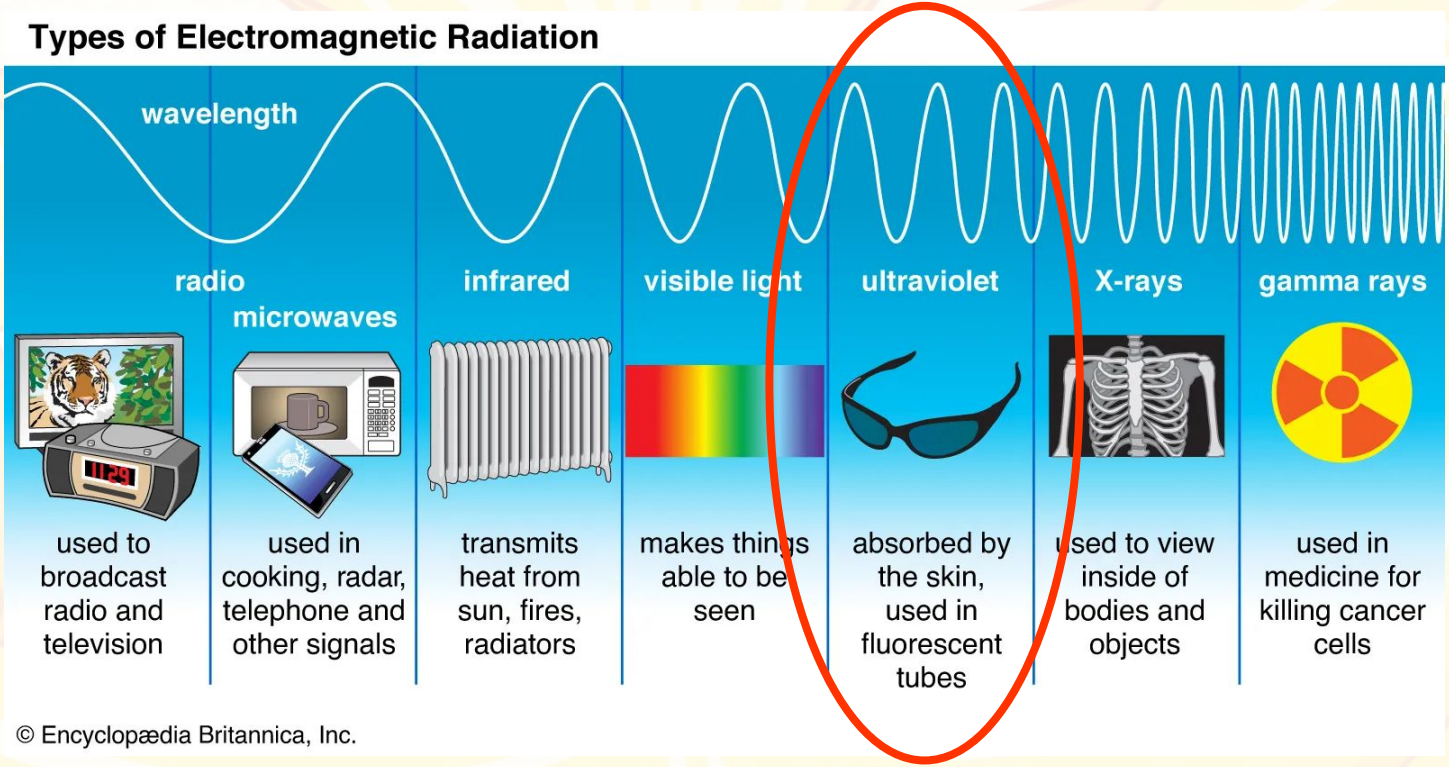
Gamma Rays: Carry the most energy and have the shortest wavelengths

- Gamma rays have enough energy to go through most materials easily; you would need a 3-4 ft thick concrete wall to stop them!



- Gamma rays are released by nuclear reactions in nuclear power plants, by nuclear bombs, and by naturally occurring elements on Earth.
- Sometimes used in the treatment of cancers.

Wait….what are UV rays?

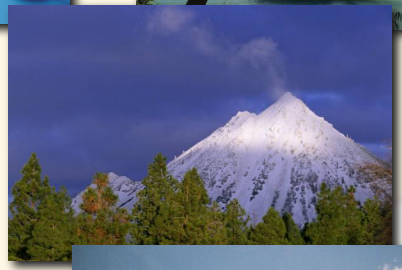


The Ozone Layer…

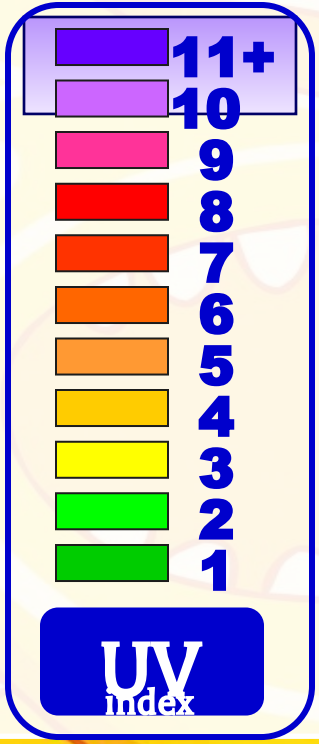
- …is a thin shield high up in the sky. It protects life on Earth from the sun's ultraviolet (UV) rays.
- In the 1980s, scientists began finding the ozone being depleted allowing more UV radiation to reach the Earth's surface.
- The level of UV radiation that reaches the Earth’s surface can vary, depending on a variety of factors.

UV radiation levels vary depending on:

- Time of day
- Time of year
- Latitude
- Altitude
- Weather Conditions
- Environment-Reflection
- Stratospheric Ozone



How do we measure UV radiation levels?



We use the UV Index Scale.

Reported on a scale of 1 -11+.

Take special care when the UV Index is 5-6 or higher.

Introduction

Summer

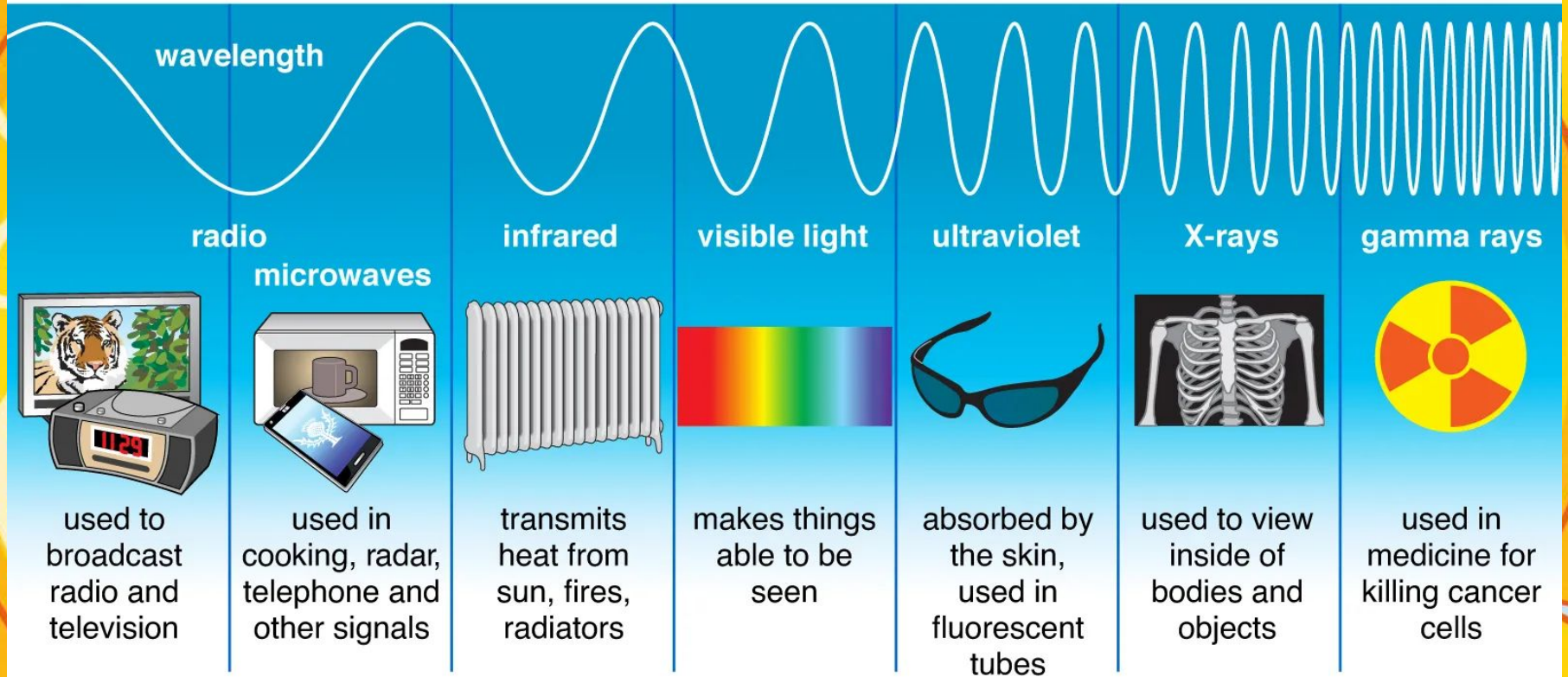
Learning intention:

To explore light and the colour spectrum

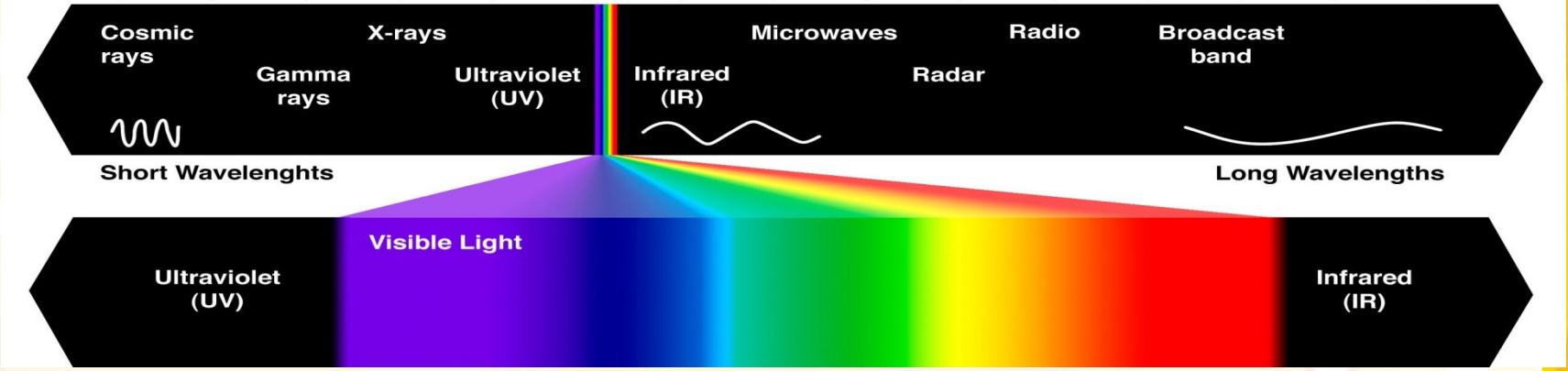
Hei mahi:

Can you name all the colours of the rainbow?

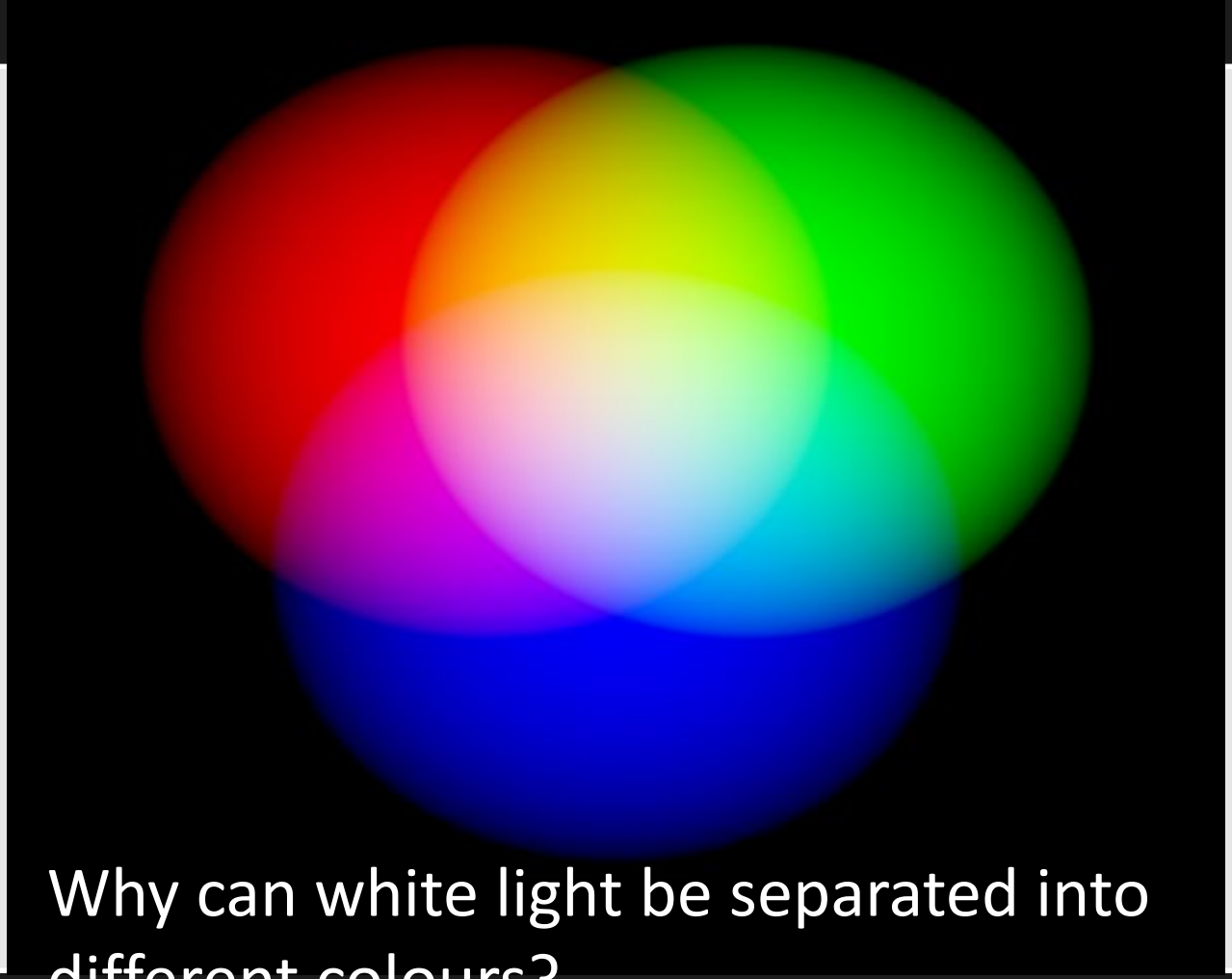
Types of Electromagnetic Radiation



The Visible Light Spectrum



These colours blend together to produce ‘white light’



Why can white light be separated into different colours?

What Is a Rainbow?

A rainbow is a meteorological phenomenon formed when light, generally from the Sun, passes through water droplets hanging in the **atmosphere.** The atmosphere is a **layer of gas** that surrounds the Earth which enables us to breathe and protects us from harmful radiation from the Sun.

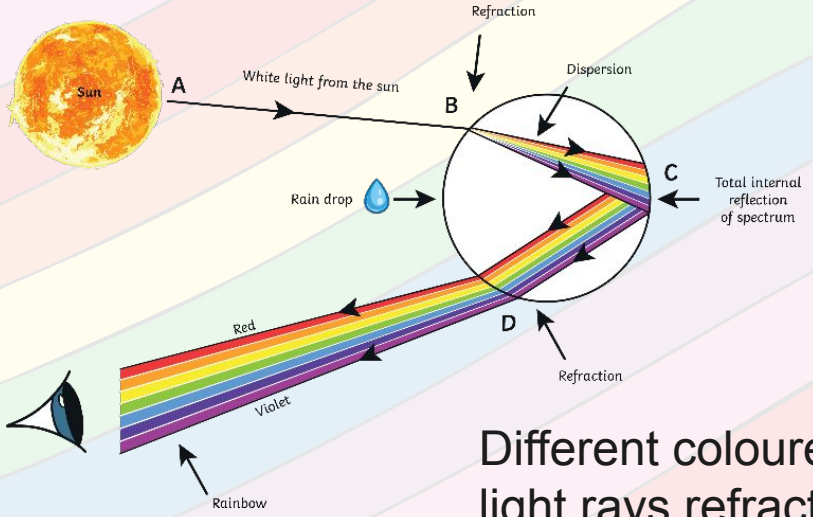
As the waves of light pass through the water droplets, they change direction, resulting in a multicoloured circular arc.

To be able to see a rainbow, you normally need to have your back to the Sun. Rainbows will usually appear in the section of sky directly opposite the Sun.

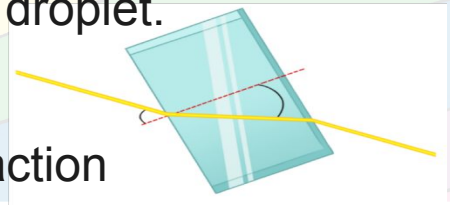
The Physics behind a Rainbow

A rainbow is the result of three scientific phenomena: reflection and refraction of light.

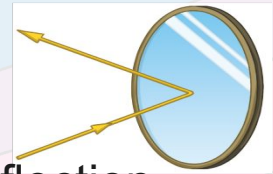
White light from the sun enters the droplet of water and is r**efracted into the spectrum of colours.** Inside, at the back of the droplet, this spectrum is reflected and refracted once again when leaving the droplet.



Different coloured light rays refract (bend) different amounts!



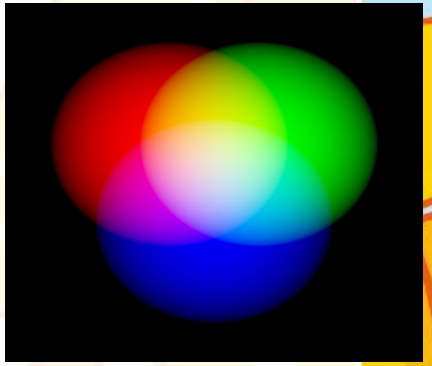
refraction



reflection

prism

Light and colour



Hei mahi: Fill in the blanks:

1. White light is made up of _____ different colors.
2. The process of splitting white light into its colors is called re_____.
3. A _____ is a tool used to break light into a spectrum.

True or **False**?

1. White light contains all the colors of the rainbow.

2. A prism reflects light instead of bending it.

3. Rainbows are created when sunlight passes through raindrops.

4. The colors of the spectrum are arranged randomly.

The Physics behind a Rainbow

A rainbow is the result of three scientific phenomena: reflection and refraction of light.

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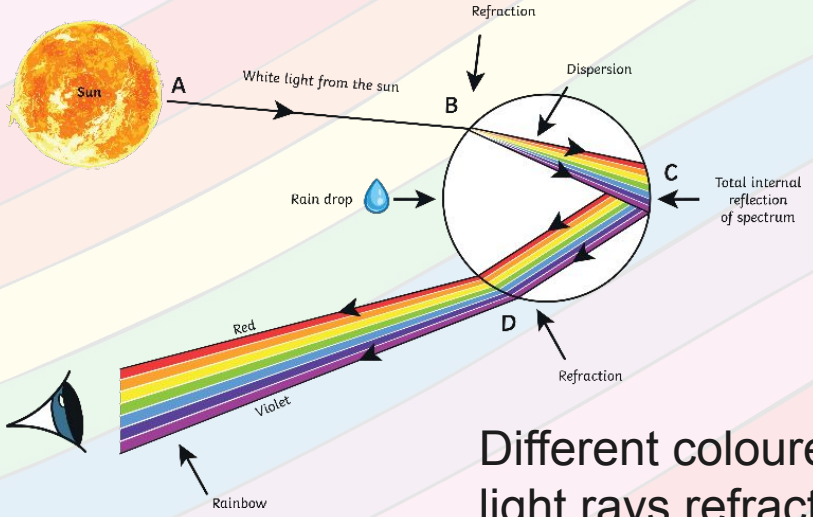

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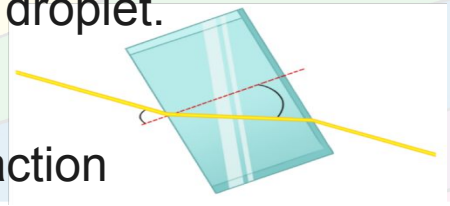
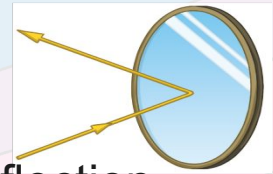


refraction



reflection

prism

Instructions:

1. **Draw and cut out a circle**
2. **Divide the Circle into Equal Sections:**
   - Use a ruler to divide the circle into **seven equal sections:**
3. **Color the Sections:**
   - Starting at any section, color the seven parts of the circle in the order of the rainbow:
     Red, Orange, Yellow, Green, Blue, Indigo, Violet.
4. **Create Two Small Holes:**
   - Use a hole punch or a sharp pencil to make two small holes near the center of the circle.
   - The holes should be about 1 cm apart and equally spaced from the center.
5. **Thread the String:**
   - Take a piece of string and thread it through the two holes.
   - Tie the ends of the string together to form a loop.


Newtons Disc
Reverse RAINBOW

Match the colors with their approximate wavelength range:

Color	Wavelength (nm)
Red	_____ (700-635 nm)
Orange	_____ (635-590 nm)
Yellow	_____ (590-560 nm)
Green	_____ (560-520 nm)
Blue	_____ (520-450 nm)
Indigo	_____ (450-425 nm)
Violet	_____ (425-400 nm)

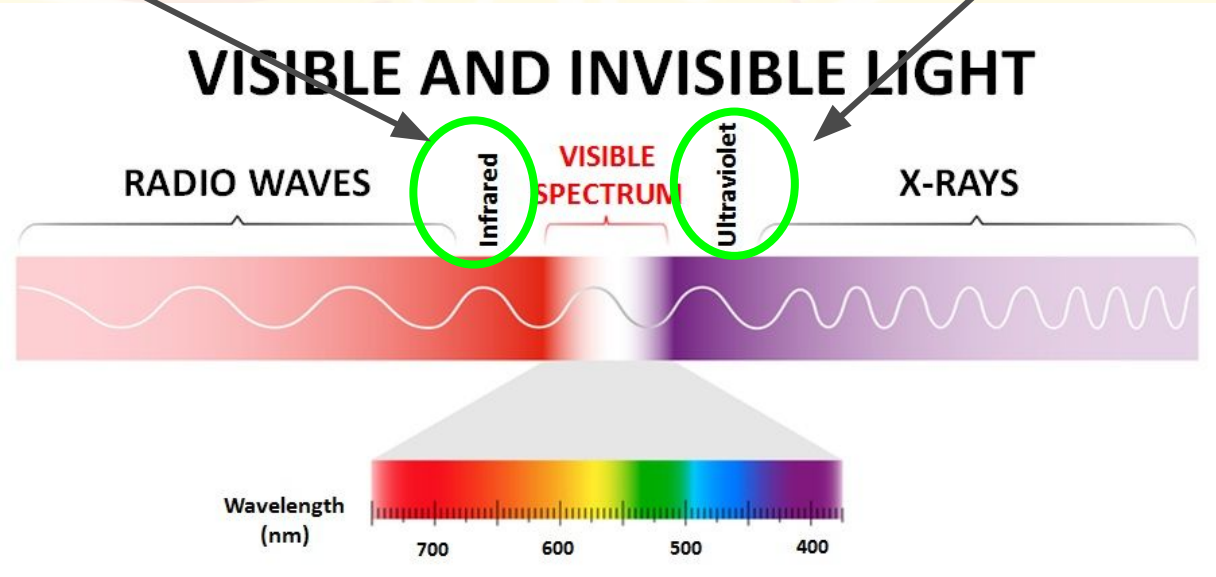
Summer Ready

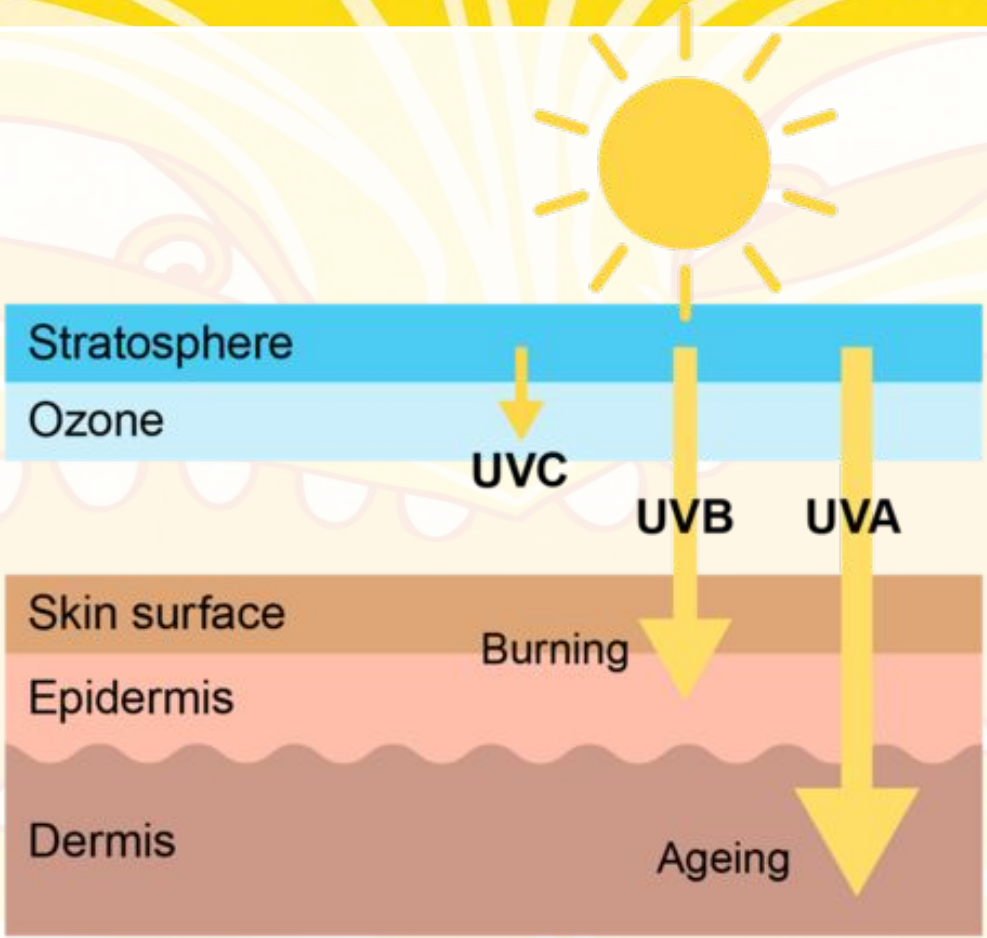
Sun safety

Hei mahi:

LI: to explore the dangers of UV light exposure

On the electromagnetic spectrum, **Ultraviolet and Infrared light** are on either side of visible light. We can NOT see them.





Task:

Read about UV rays here: https://www.sunsmart.org.nz/sunsmart-facts/uv-radiation/

1. What do UVA rays do to the skin?

2. What do UVB rays do to the skin?

Task:

Read about an example of UV light causing skin damage here: https://www.cbsnews.com/news/trucker-accumulates-skin-damage-on-left-side-of-his-face-after-28-years-on-the-road/

1. What type of UV radiation was the trucker mostly exposed to?

2. Why was mainly one side of his face affected?

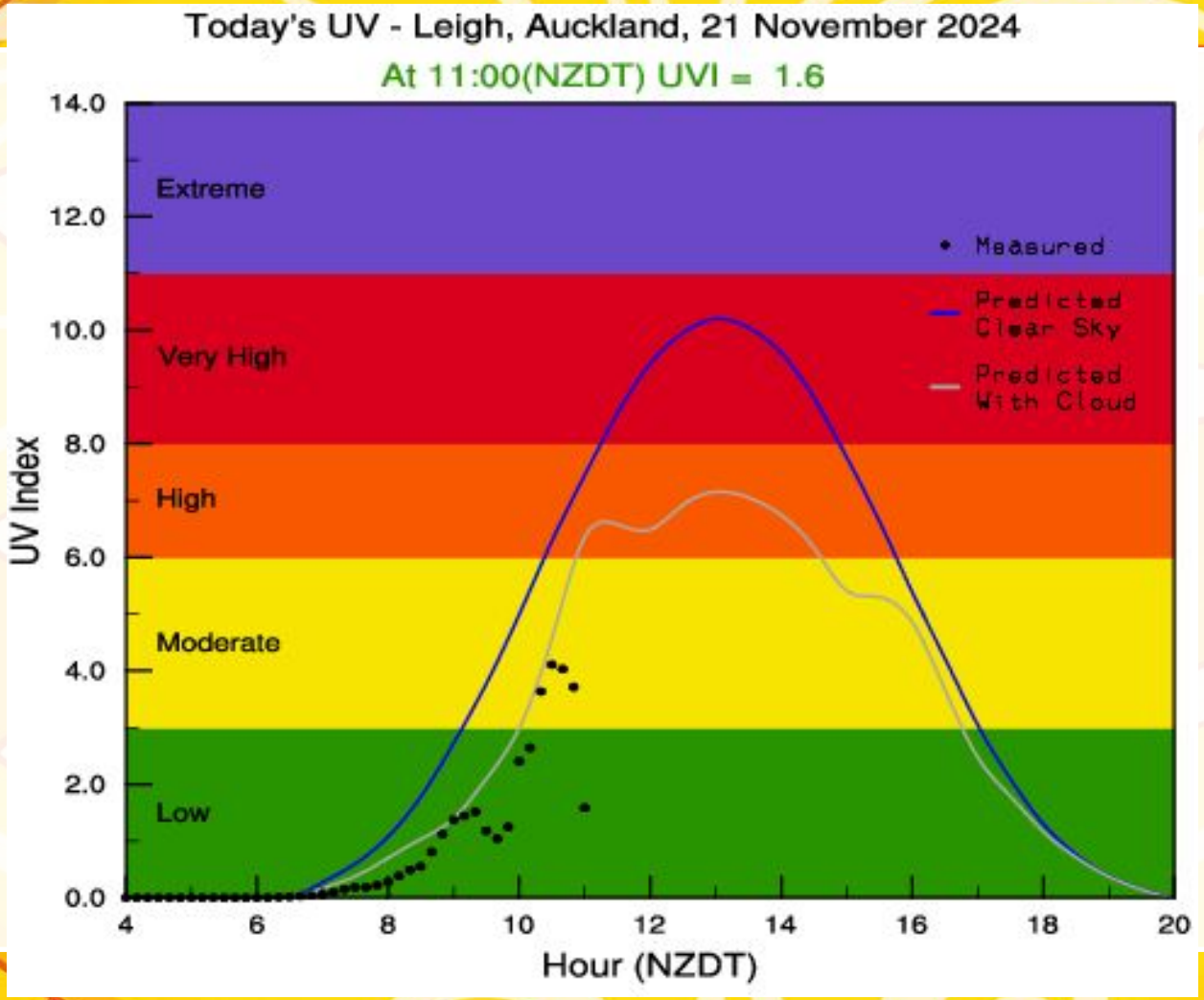
Task:

Have a read through how to be Sunsmart: https://www.sunsmart.org.nz/be-sunsmart/

1. What does it mean to slip, slop, slap and wrap?

2. What time of the year is it most important to slip, slop, slap and wrap?

UV-index level	Recommended sun protection precautions
1 - 2: Low	**No protection required.** You can safely stay outside.
3 - 5: Moderate	**Protection required** when spending long periods in the sun, especially if you have fair skin.
6 - 7: High	**Protection essential.** Slip, slop, slap and wrap.
8 - 10: Very high	**Seek shade.** Slip, slop, slap and wrap. Cover up and reapply sunscreen regularly.
11+: Extreme	**Reschedule outdoor activities for early morning and evening.** Full protection essential.


Today's UV - Leigh, Auckland, 21 November 2024
At 11:00(NZDT) UVI = 1.6
Extreme
Very High
High
Moderate
Low
Measured
Predicted Clear Sky
Predicted With Cloud
UV Index
Hour (NZDT)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
4
6
8
10
12
14
16
18
20

Task: Use the information on the previous 2 slides to answer these questions

1. When UV levels are 1-2 (low), what protection is required?

2. What time did the UV level move from **moderate** to **high** on Thursday?

3. What sort of protection was needed at 12pm on Friday?

Task: IN YOUR BOOKS

Imagine you are looking in a magic mirror that can see into the future.

Draw a full body picture of what you would look like if you **didn't** protect yourself from UV. Clearly label the parts of your body most affected.

Task:

Make an educational **infographic/poster** explaining/presenting:

1. What is UV light?
2. Why do people need to protect themselves from too much UV light?
3. How to protect ourselves from harmful levels of UV light