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

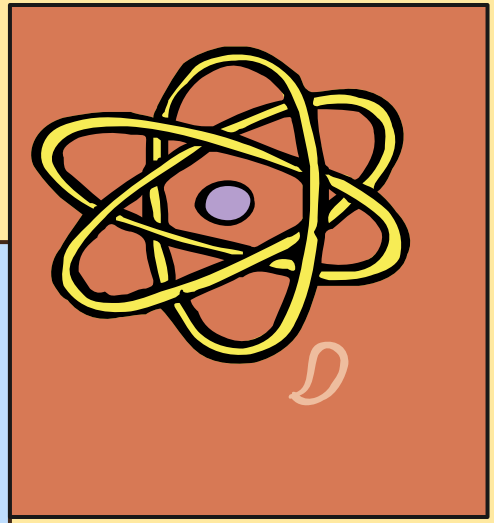
1. Car, driver, and passenger safety

2. Water safety - rips and staying afloat

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

4. Food safety - avoiding food poisoning

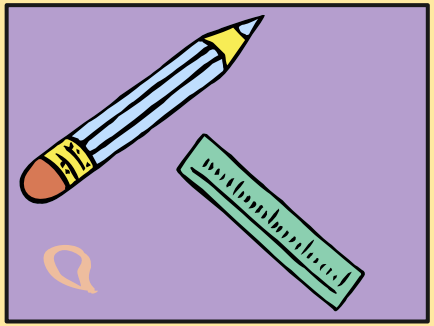
Y7 Science - Car safety



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?

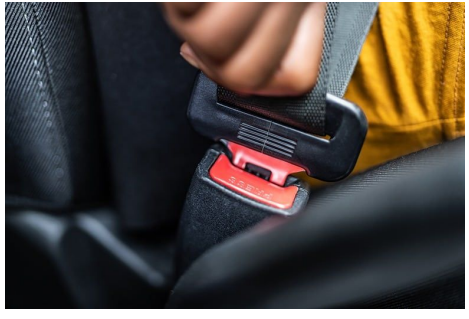
- ✔ walking safely, cycling safely, and being safe in cars
- ✔ keeping yourself safe - and your friends and family too
- ✔ making smart choices
- ✔ making sure you don't get hurt – or even killed

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:

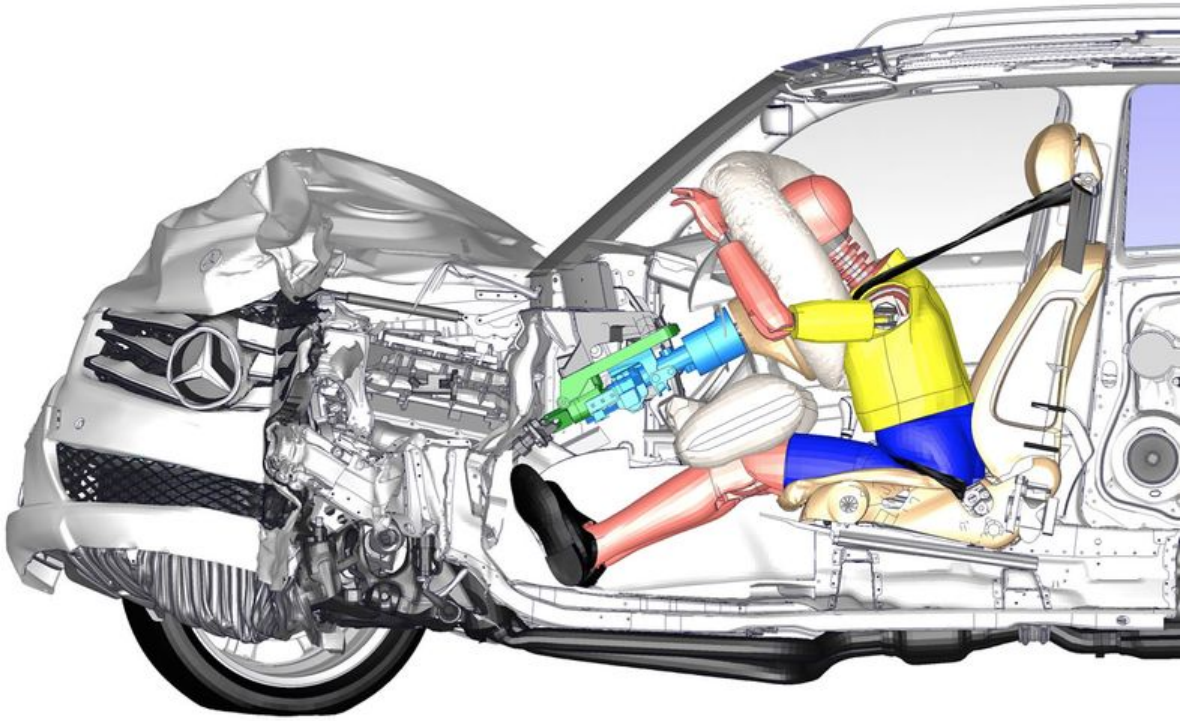
1. Cars are designed to <u>crumple</u> in the front before stopping. Why?



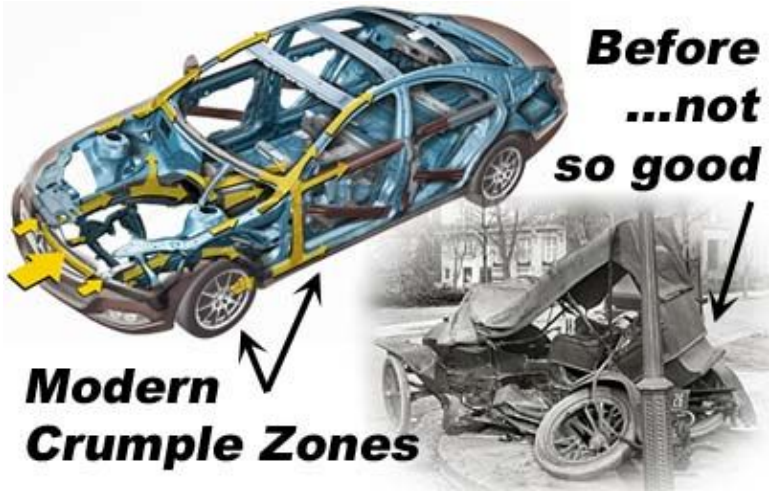
2. Cars have <u>seatbelt</u> for every passenger. Why?

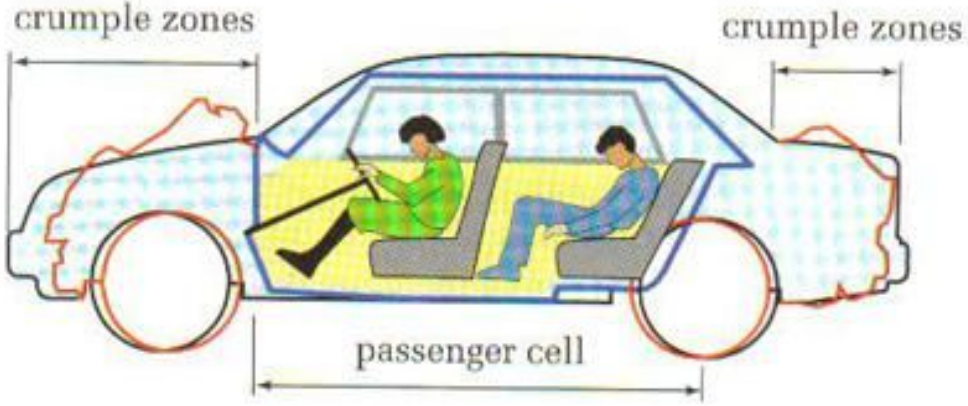
3. Cars have “<u>air bags</u>” for driver and often for passengers. Why?

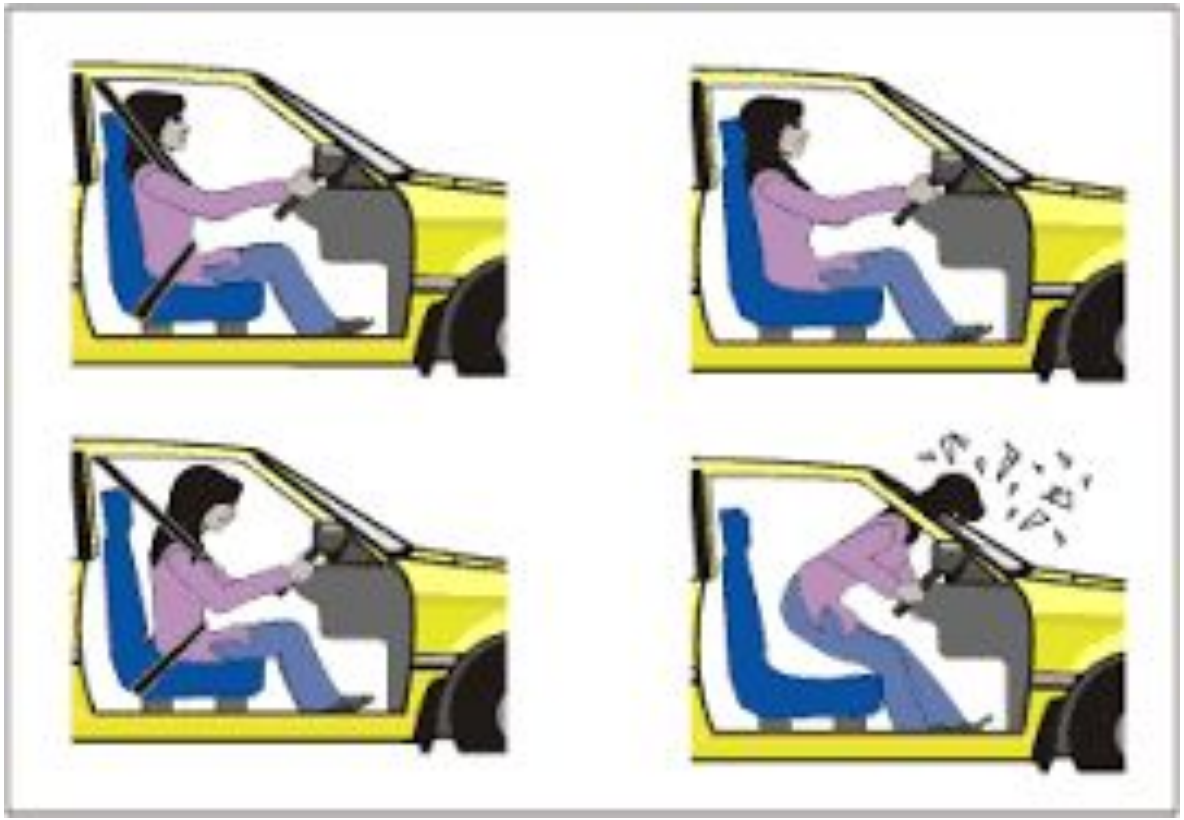
Safety features of a car



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?

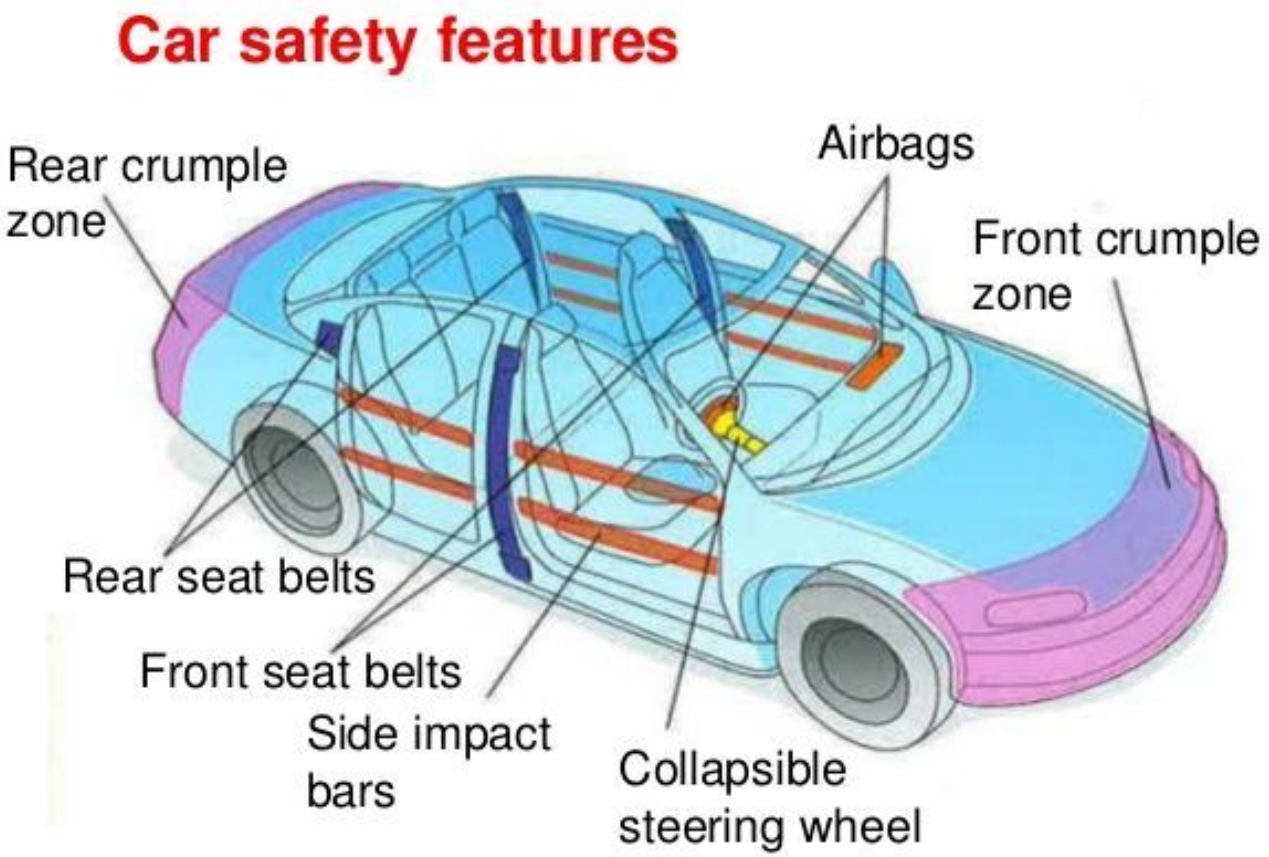
a. The could slip out. b. The air bag may hurt them

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

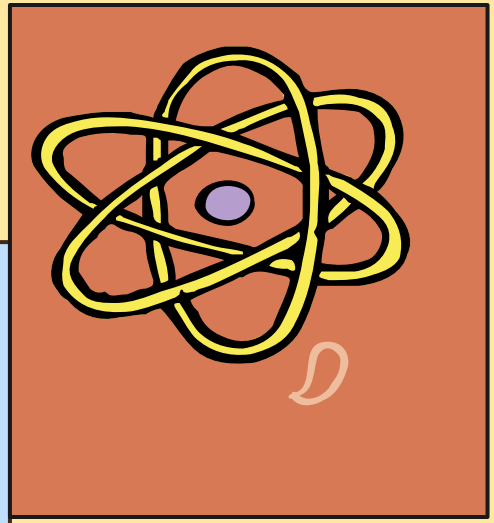
e. all of the above

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



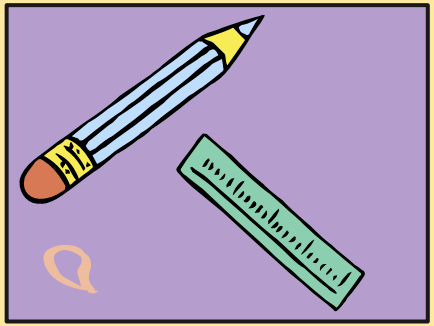
Y7 Science - Car safety



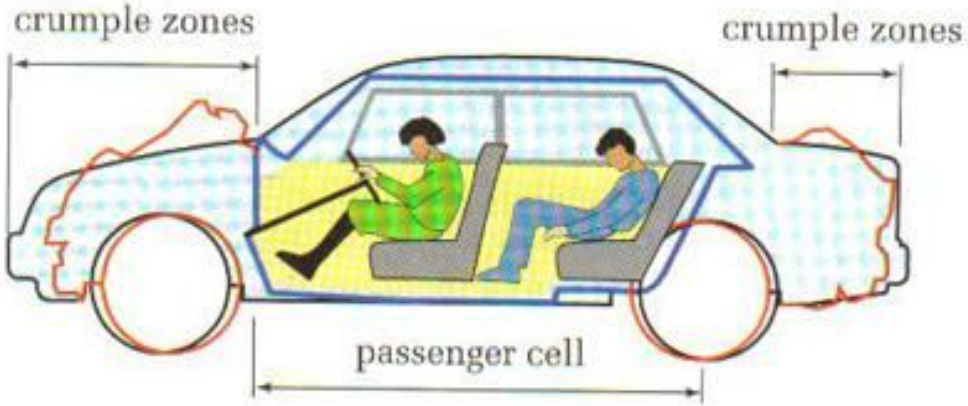
Hei mahi:

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

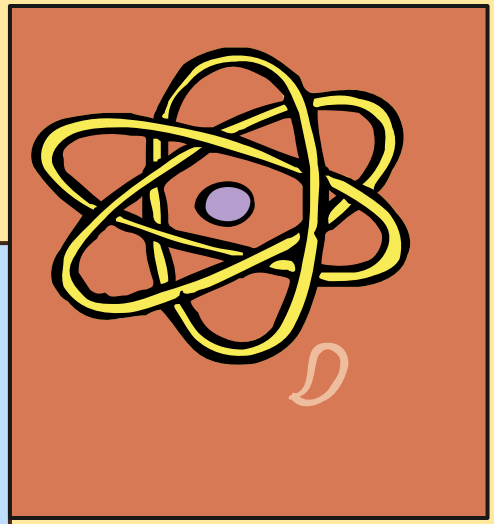
Why do cars have crumple zones?



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

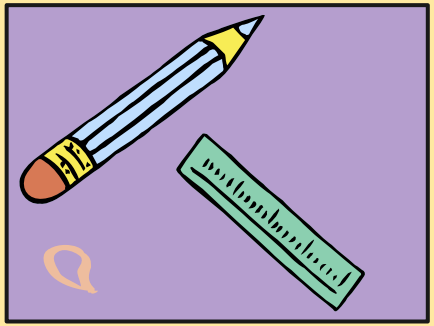


Y7 Science - Car safety



Hei mahi:

Write down today's LI:
To investigate the science behind why seatbelts are an important safety feature in cars



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.**

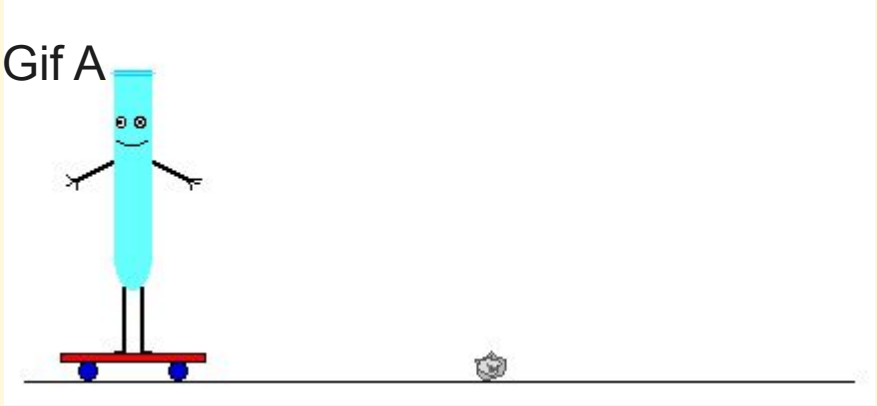
For example, a football that is on the ground won't move unless you kick it. When you kick the football, it won't change direction or speed unless it is kicked again, hits something or friction slows it down.

Newton’s First Law of Motion - Inertia

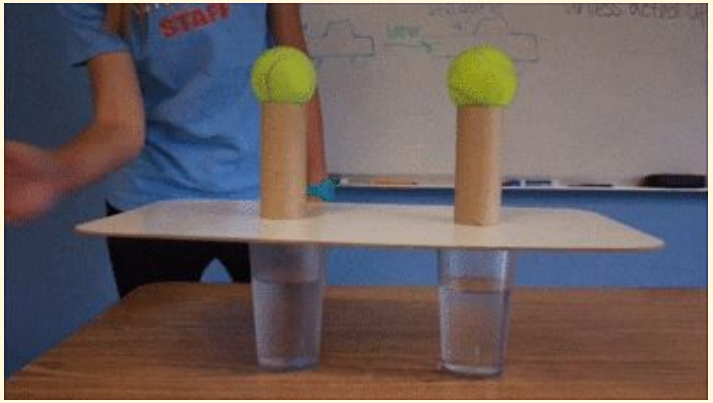
Newton’s First Law of Motion - inertia

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

Gif A



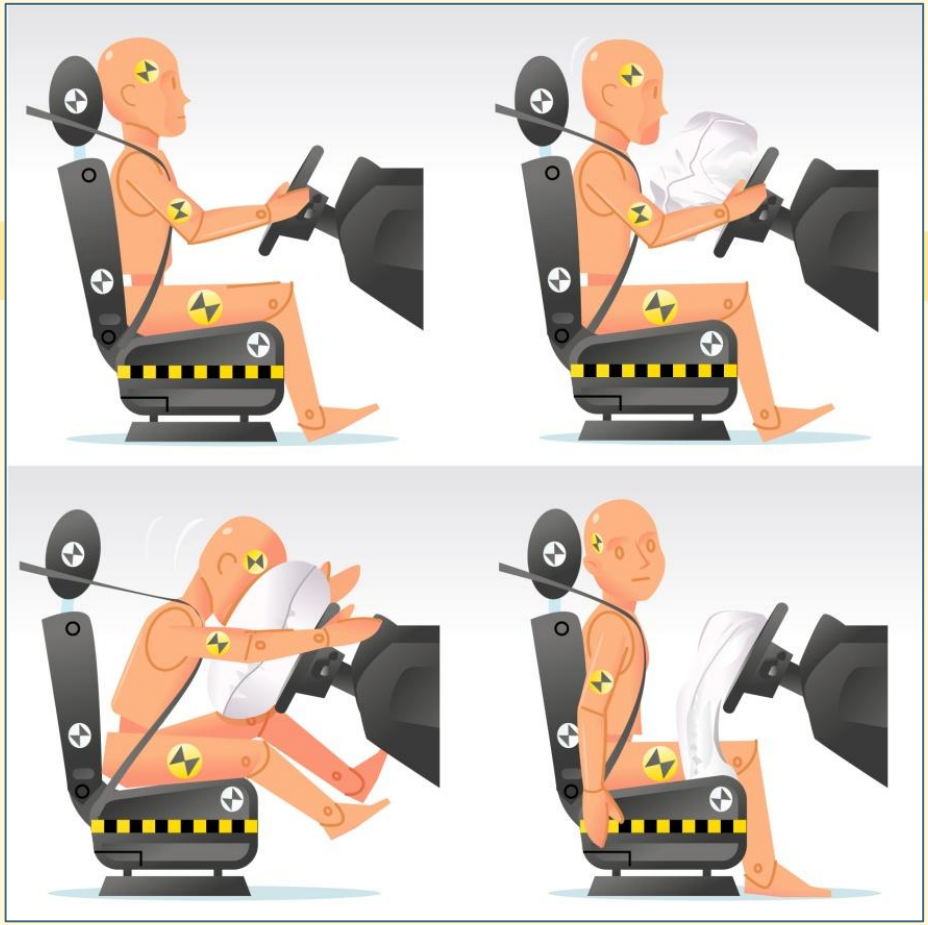
Gif B



Gif C

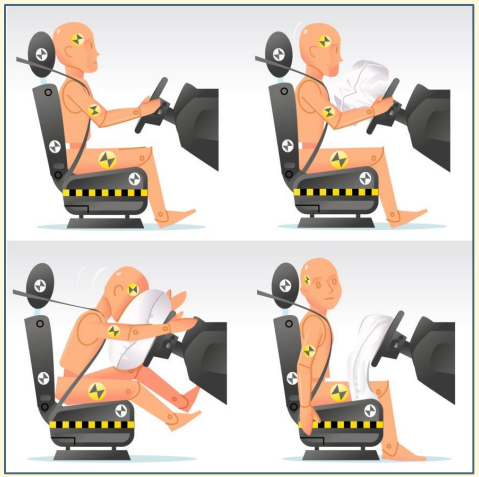
Gif D

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.**



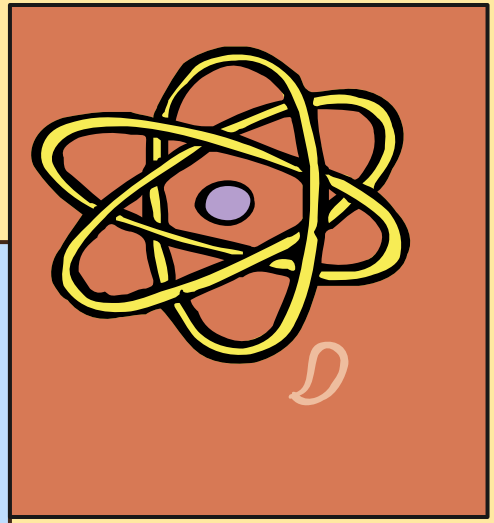
Sentence starters:

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

Seatbelts work by...

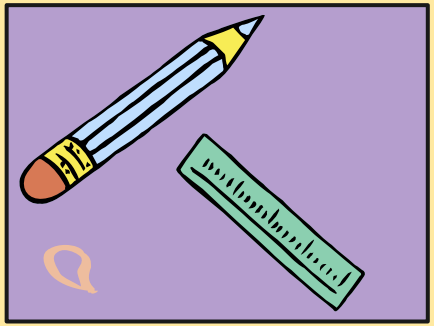
Seatbelts therefore prevent...

Y7 Science - Car safety



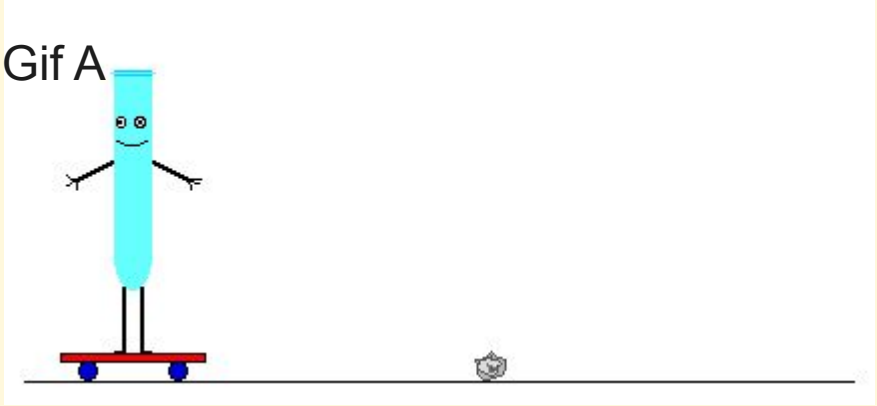
Hei mahi:

Write down today's LI: To investigate the danger of distraction when driving

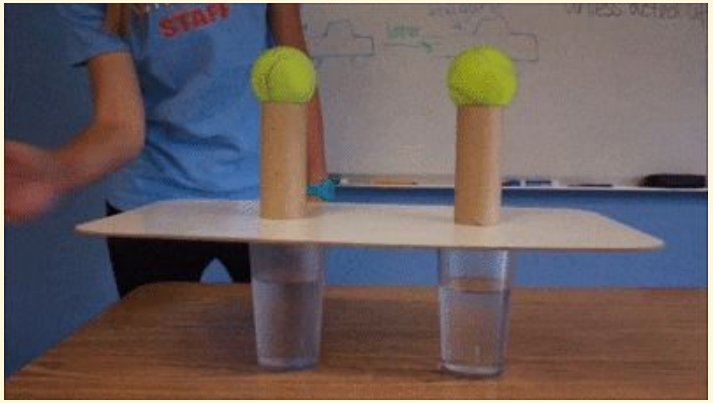


Write a sentence explaining how each gif demonstrates Newton's law of Inertia

Gif A



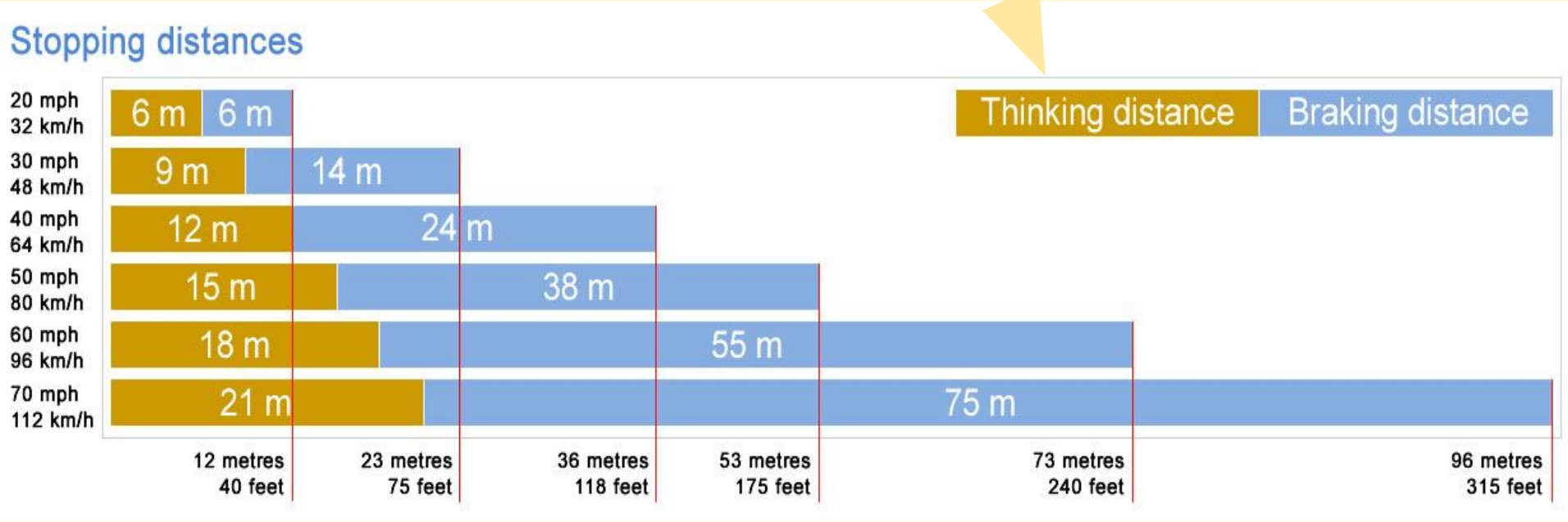
Gif B



Gif C

Gif D

How could distractions affect your 'Thinking distance'?

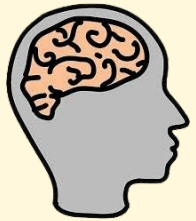


Types of distractions:

- **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 10 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*** - something that will **take your attention** away from what you are doing. This needs to involve using your other hand or looking in another direction:

- 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. Comparing your averages for each investigation, what happened to your 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?