



Science and road safety program

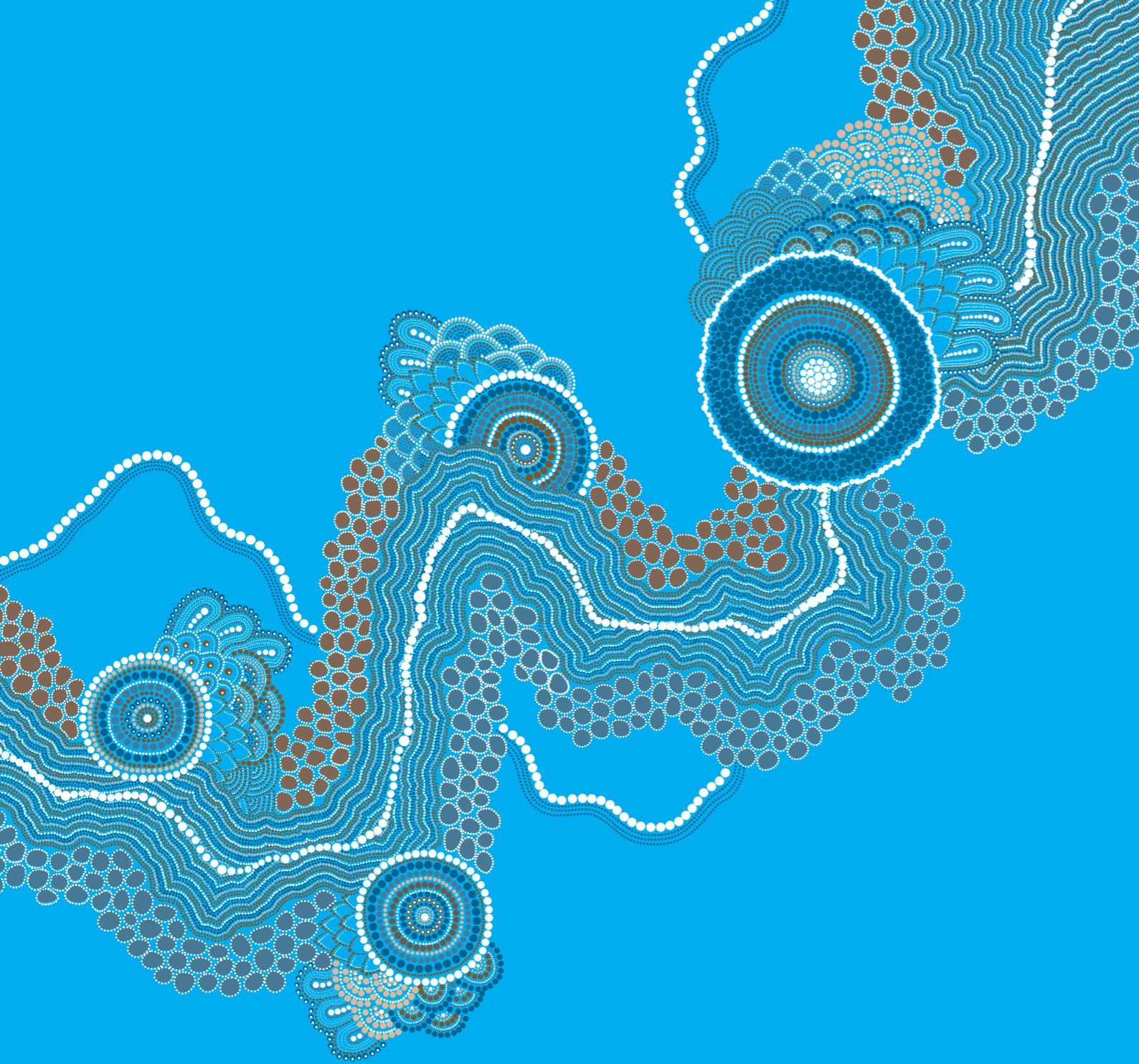
Student workbook
Stage 3

Name: _____

Class: _____

In partnership with Fizzics Education





Helmets

Bicycle riders are required by law to wear an approved helmet that is securely fitted and fastened. In NSW, there are no exemptions from wearing an approved helmet.

A bicycle helmet that is not correctly fitted and fastened does not provide enough protection in a crash.

64,000 injured cyclists were involved in research conducted by the University of NSW in 2016.

Helmet use was found to be associated with about a

70% reduction in serious head injuries

50% reduction in head injuries of any severity

65% reduction in fatal head injuries

Helmet variations

As demonstrated in the show, it is essential that you wear the correct helmet for your activity. Each helmet is designed for different functions to give the wearer the ultimate protection.

The most important part of wearing a helmet is choosing the right type and fitting it correctly.



Bicycle helmets

are designed for higher speeds.

- Single impact – designed to protect the front of your head by compressing the foam upon impact.
- More aerodynamic.
- Better ventilation.



Scooter helmets

are designed for slower speeds.

- Multi-impact – designed to withstand the typical range of skateboarding crashes.
- Cover the back of the head as riders tend to fall backwards.

Welcome to Country

The NRMA acknowledges the Traditional Custodians of the land and waterways on which our business operates. We pay our respects to Aboriginal and Torres Strait Islander Elders past, present and future.

Helmets

Fitting your helmet

In a crash, most of the impact energy is absorbed by the helmet, rather than your head and brain. Therefore, it is critical that your helmet is fitted correctly so it can do its job.

Follow these 3 steps to fit your helmet correctly.



Place the helmet on your head and push it forward so that there are only two finger spaces between your eyebrows and the helmet.



Ensure the straps around your ear are fixed into a V shape with the toggle positioned under your earlobe.



Once the buckle is fastened, check that you can only fit two fingers between your chin and the strap.



Helmet safety

Activity

Time to do an experiment to explore the importance of wearing a helmet and fitting it correctly.

Crash test helmet experiment

What you need:

- 3 eggs per group (strawberries for those with egg allergies)
- Egg carton – cut into individual cups
- Masking tape/regular tape
- Tissue paper
- Textas

Method:

- Draw a face on each egg and brainstorm a name for each of the eggs.
- Take the first egg and drop it from waist height. Discuss why the egg broke and record what happened. (This step is best done outside or on an easily cleanable surface.)
- Now take the second egg. Wrap it in tissue paper and place it in an egg cup. Drop this from the same height and record what happens.
- With your final egg, wrap it in tissue paper. Then place an egg cup at either end of the egg and secure it with tape. Now, drop this one from the same height as the others and record what happens.

Results:

Discuss the results in your group.

Choose someone from your group to report the findings back to your class.

Conclusion:

Write a report on your experiment and your research. Remember to compare the egg being protected in the cup with the importance of wearing a helmet.

Teacher callout

A fun extension idea – give your student groups some materials and hold your own helmet design challenge for their egg. The experiment and extension activity fits within the Stage 3 STEM Learning Framework.

Seatbelts

Newton's Law of Motion

Imagine you are in a car travelling at 60km/h. You and everything in your car are also travelling at 60km/h. Inertia is an object's tendency to keep moving until something else works to change that motion. If your car were to crash into a tree, it would stop. However, you and every other object in the car will still be travelling forward at 60km/h. This is when seatbelts kick into action to stop you from flying through the windshield or slamming into the dashboard. The seatbelt has a 'lock', which stops the belt unreeling in a crash. Most cars have 'pre-tensioner' seatbelts, which tighten as soon as they detect a crash.



The hard facts:

Seatbelts have been mandatory in NSW since 1971.
 Seatbelts are the key safety component for all occupants of any vehicle.
 Each year, on average, 30 people are killed and 220 are injured from crashes in NSW involving seatbelt non-compliance.

Fitting your seatbelt correctly

The seatbelt has a lap part that should sit across your hip bones and a sash that should sit across the centre of your chest and rest on your collarbone. Never take off your seatbelt, even if your car has stopped at traffic lights or has broken down. There are other cars around you travelling at speed that could crash into you and cause serious injury.

Activity

Conduct a deep dive exploration into the what, why and how seatbelts have changed the landscape for road safety. Using the research components of the design thinking cycle, create a brief report on how seatbelts work and the impact they have on safety.

Things to remember:

Consider the theory of inertia and Newton's first law of motion!

Teacher callout

This activity fits well into the Stage 3 STEM Learning Framework in the Research and Plan phase.

The front seat

It is recommended that children remain in the back seat until they are at high school.

Front airbags are designed to provide protection to adults as they will make impact with their chest. With a child, however, they would make impact their neck and face, causing injury.

Activity

During the show, we looked at occasions where you might choose to sit in the front seat. Based on this and the conversations with your class teacher, complete the table below.

3 reasons why the back seat is the safest	3 sensible reasons why you may need to sit in the front seat	3 ways to make yourself safe when sitting in the front seat

Teacher callout

This activity can be done as a written text or as an oral activity. Encourage students to think logically about their argument for sitting in the front seat that is mindful of safety and legalities.

Driver distraction

Driver distraction is, increasingly, one of the major causes of road crashes.

Remember we used the skill tester game in the show to demonstrate how passengers can unintentionally distract their driver, which can increase the risk of a crash?

Driving a vehicle takes an enormous amount of concentration.

Safety strategies

- Avoid distracting your driver by minimising noise and disruptions.
- Pack your own entertainment and snacks for the journey.
- Set a good example for younger passengers.



Poster presentation

In groups of 3-4, create a poster to educate other children on how to avoid distracting the driver.

Present your poster to another group or class.

Things to remember:

Include at least one safety strategy in your masterpiece.

Teacher callout

As an introduction to this activity, discuss with your class examples of when they have experienced distractions that have impacted their performance, such as playing a game/computer game/reading.

Pedestrian safety

Inattentional blindness is the failure to notice a fully visible but unexpected object because your attention has been engaged by another task, event or object.

17% Pedestrian trauma accounts for 17% of all deaths on NSW roads.

More than 1,900% pedestrians are killed or hospitalised from road traffic crashes each year.

New research conducted by the NRMA has found that over **1-in-3** pedestrians are behaving like '**smombies**' (smartphone zombies) by crossing busy city streets while engrossed in their smartphone or wearing earphones.

Findings from our observational study of **26,390** pedestrians across three intersections in the Sydney CBD and one in Parramatta found that **36%** crossed the road while distracted by their smartphone or wearing earphones.

Safety strategies

- Remove one earphone as you walk.
- Look up from your device before you cross.
- Check cars have stopped before you step out.
- Pause your conversation before crossing.



Role-play activity

In groups of 3-4, create a role-play to demonstrate a distracted pedestrian and what could happen to them due to their distraction.

Things to remember:

- It must include at least one of the above mentioned safety strategies.
- The script must have a beginning, middle and end.
- Finally, it must be informative yet entertaining!

Teacher callout

A great stimulus for class discussion can be found in the 2019 Look Up Report: Keeping Pedestrians Safe. <https://www.mynrma.com.au/-/media/documents/advocacy/look-up-keeping-pedestrians-safe.pdf>

Independent travel

Now that you are older, you may be travelling more independently or with your friends. More than ever, you need to be thinking of your own safety and that of your mates.

With a partner, discuss and answer the following questions:

1. What visibility considerations do I need to think about before I leave home?
E.g. Will I be riding home at dusk?

2. What are the basic rules of using cycle paths?

3. What should I be aware of when travelling as a group on bicycles/skateboards/scooters?

4. Why is it important to use caution near driveways?

5. What would you do if you felt a friend was taking unnecessary risks?

6. Create a list of five things that would prompt you to think about your safety before leaving home, e.g. mobile charged, hi-vis clothing, safety equipment, etc.

7. What would you do if your travel plans changed unexpectedly?

Teacher callout

Invite students to reflect on their own circumstances where they travel independently, such as for sport, school, catch-ups etc.

Electric vehicles

Enrichment activity

The NSW Government's EV strategy intends to increase sales of EVs to more than 50% of total car sales by 2030. Australian governments agree that the overwhelming majority of vehicle sales will be electric by 2035.

Your generation will lead the way on the road safety considerations for the increasing number of silent vehicles, such as hybrid, electric and hydrogen vehicles, on our roads.

Group activity

Imagine you are a group of road safety officers for your local community. It is your job to raise awareness on this new road safety issue, and teach residents an appropriate safety strategy to use to stay safe.

Your goal is to avoid any pedestrian-related injury as a result of silent vehicles. In your small group, decide how to communicate this message to your community, e.g. via letters, flyers, posters, advertisements, TV/radio commercials, newspapers, schools, libraries, etc.



Things to note:

Discuss your communication method with your teacher before you start.
Your communication must engage all ages and be simple to understand.
Remember to create a clear safety strategy for this new road safety issue.

Information for parents

If you are reading this, it means that your child has participated in the NRMA Science and Road Safety Program, where we merged science with theatrics to create a fun and memorable educational experience – one that empowers children to know how to keep themselves and others safe.

Ask your child to tell you what they learnt today and teach you some of the safety strategies we shared. Use this workbook to help prompt the conversation or scan this QR code to visit our parents' hub for more information on what we covered on the stage.

Road safety is the responsibility of all. We need you and your school community to help instil safe behaviours to keep our children safe.



To learn more about road safety,
visit mynrma.com.au/roadsafetyday

Teacher callout

View the curriculum links in the teacher pack.