ROAD TO ZERO

POST-VISIT ACTIVITY:
CALM DOWN! SPEED AND TRAFFIC TREATMENTS INVESTIGATION

Traffic calming treatments are installations such as speed reduction humps or portable rumble strips designed to slow, deter or redirect traffic. Traffic calming devices aim to encourage safer, more responsible driving in changing and risky conditions. Using streets local to the school, students explore the effect of a traffic calming treatment on vehicle speed. Students then analyse the data and consider the effectiveness of the treatment.

Victorian curriculum alignment

Numeracy	**Intermediate and Senior Unit 1**
	Learning Outcome 1 - Numerical skills and processes
	Learning Outcome 3 - Planning and organising
Personal Development Skills	The activity could be extended to cover Personal Development Skills.

Learning intention

To understand the effects of traffic calming treatments on vehicle speed

Success criteria

◊ Collect accurate data about vehicle speeds in two different road environments
◊ Calculate the average speed of the vehicles in two different road environments
◊ Analyse the results to decide if traffic treatments slow the speed of vehicles.

Resources

Student investigation sheet	**Calm down! Vehicle speeds and road treatments**
Website	**www.towardszero.vic.gov.au**
Other	**Metre wheel or long measuring tape** **Stopwatches**

TAC   VICTORIA State Government   MELBOURNE MUSEUM

Activity duration

Approximately 2–3 lessons

Learning activity description

Pre-class preparation

Location scout!

For this investigation, you or the students need to locate two roads (or two sections of the same road) that have the same speed limit, but differ in design:

○ a straight stretch, 100m long with no traffic calming treatments

○ a straight stretch, 100m long with a traffic calming treatment approximately midway, e.g. raised safety platform, road hump, kerb outstand, chicane, slow point.

Selection criteria

We are looking for roads:

○ close to your school

○ with clear sight lines for student observation of the road (minimal roadside vegetation and parking zones)

○ 50km/h speed zones or lower.

Safety note

Your students will be collecting data by observing vehicles travelling on active roads. Please plan a safe route to the chosen location and choose a safe spot for students to observe the vehicles.

Lesson 1 — Planning

1. Remind students of the four principles of *Towards Zero* (listed below). All of these will contribute to achieving the goal of a future where there are zero lives lost and zero serious injuries on the roads. Explore the *Towards Zero* website (www.towardszero.vic.gov.au) for more information.

   Safe roads – Roads must be designed to both prevent crashes and, in the event of a crash, reduce the severity and minimise the chance of injury.

   Safe speeds – The appropriate speed for the conditions, including the state of the road, amount of traffic, number and type of other road users as well as weather. Speed limits indicate the safe speed for that road in normal weather conditions, but if the weather or light is poor, then drivers should reduce their speed to be safer.

   Safe people – Road safety is a shared responsibility. Everyone can play an important role in helping reduce road trauma and death shouldn't be seen as an inevitable consequence of making a mistake on our roads.

   Safe vehicles – Vehicle safety has gradually improved over time. Vehicles are getting better at helping to avoid a crash and better protecting drivers and passengers in crashes. If everybody upgraded their vehicle to the safest in its class, road trauma would drop by a third.

2. Inform students that they are going to conduct an investigation about how roads can be designed using treatments that encourage drivers to maintain lower speeds and be aware of other road users. These treatments are known as traffic calming treatments. Discuss treatments that students are aware of and create a list.

3. Distribute *Student investigation sheet: Calm down! Vehicle speeds and road treatments*.

Lesson 2 — Data collection

What to do

Students should work in groups of three.

○ Use a metre wheel or long measuring tape to measure 100m of the straight length of road with no traffic calming treatments.

○ Position a student (A) at the start of the 100m course, and another student (B) at the end. A third student (C) is responsible for timing.

○ When a vehicle passes A, they raise their arm, signalling to C to start the stopwatch. When the car passes B, they signal to C to stop timing. Student C records the time on the student investigation sheet.

○ This should be done 10 times.

○ Repeat the steps described above with the second stretch of straight road, with the traffic calming treatment at the midway point.

Lesson 3 — Individual group analysis

The students should then answer the questions on the worksheet about the differences in time and speed and comment on the effectiveness of the traffic calming treatment as a means of encouraging slower speeds and driver concentration.

The maths students will need to use in this activity are:

○ the use of the formula

$$speed = \frac{distance}{time} \quad (s = d/t)$$

○ conversions between metres per second (m/s) and kilometres per hour (km/h). There is information in the box on the next page about how to do this conversion.

○ working out averages.

Class discussion and conclusions

Groups should compare their findings and discuss reasons for any differences in their findings.

Finally, ask the students to suggest other local roads which could benefit from traffic calming treatments.

How to work out the speed of a vehicle

To work out the speed of a vehicle, students need to use the formula

$$speed = \frac{distance}{time} \quad (s = d/t).$$

To do this you need to know the distance the vehicle travelled and divide this by the time it took to travel that distance.

For example, if a car travels 100 metres and takes 10 seconds to travel that distance, the speed it travelled at would be 10 metres per second.

We would write this as:

$$s = \frac{d}{t} = \frac{100}{10} = \textbf{10 metres per second}$$

Or, 100 ÷ 10 = 10 metres per second

The vehicle travelled at 10 metres per second.

Now we need to convert metres per second (m/s) to kilometres per hour (km/h), which is the most commonly used unit for describing the speed of vehicles.

Converting from m/s to km/h

What you need to know:

- There are 60 seconds in 1 minute
- There are 60 minutes in 1 hour
- There are 3,600 seconds in 1 hour (60 x 60 = 3,600)
- There are 1,000 metres in 1 kilometre.

For every metre you travel in a second, you will travel 3,600 times as many metres in an hour – because there are 3,600 seconds in an hour.

So, 1 m/s = 3,600 m/h (and 2 m/s = 7,200 m/h; 3 m/s = 10,800 m/h, and so on)

But there are 1,000 metres in a kilometre, so we need to change the metres to kilometres. To do this, we divide by 1,000.

1 m/s = 3,600 m/h = 3,600 ÷ 1,000 km/h

1 m/s = 3.6 km/h

A simple way of doing this conversion

Multiply the metres per second by 3.6 (called the conversion factor).

So, if a vehicle was travelling at 15 m/s you can multiply this number by 3.6.

15 x 3.6 = 54

The vehicle travelled at 54 km/h

ROAD TO ZERO

STUDENT INVESTIGATION SHEET: CALM DOWN! VEHICLE SPEEDS AND TRAFFIC TREATMENTS

Research question: What effect can road design have on car speeds?

Background information:

In local streets and near schools, there are many different types of road users, including vulnerable pedestrians and cyclists. One very effective way to make roads safer in these areas is to reduce the speed limit to 40km or lower. But, what happens if someone is speeding, or not paying attention? Have you considered that a road can be designed to force drivers to keep their speed down, and/or pay attention at dangerous spots, such as near schools or at pedestrian crossings? Today you will collect data to explore if road treatments that calm (slow) traffic on roads can make people drive more safely.

Data table 1 – Straight road (no traffic calming treatments)
Length of road: 100m

Location:

Trial number	Time vehicle takes to travel 100 metres in seconds	Speed of vehicle in metres per second (m/s) (speed = distance (100 metres) ÷ the time the vehicle took)	Speed of vehicle in kilometres per hour (km/h) (multiply the speed in m/s by 3.6)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Data table 2 – Straight road with traffic calming treatment
Length of road: 100m

Location:

The traffic calming treatment we are investigating is:

Describe and draw the traffic calming treatment.

Trial number	Time vehicle takes to travel 100 metres in seconds	Speed of vehicle in metres per second (m/s) (speed = distance (100 metres) ÷ the time the vehicle took)	Speed of vehicle in kilometres per hour (km/h) (multiply the speed in m/s by 3.6)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Analysing the data

What did you find out? How effective was the traffic calming treatment at reducing vehicle speeds On the road with no treatment, what was the **average time** the vehicles observed took to travel 100 metres?	
On the road with traffic calming treatment, what was the **average time** the vehicles observed took to travel 100 metres?	
On average, **how much longer** did a vehicle take to travel 100 metres on the road with traffic calming treatment?	
On the road with no traffic calming treatment, what was the **average speed**, in kilometres per hour, of the vehicles observed?	
On the road with traffic calming treatment, what was the **average speed**, in kilometres per hour, of the vehicles observed?	
On average, **how much faster or slower** (in kilometres per hour) did a vehicle go to travel 100 metres on the road with traffic calming treatment?	

Further analysis

Why do you think there was a difference in speed?	
On the road with no traffic calming treatment, what was the highest speed in kilometres per hour (km/h)?	
On the road with no traffic calming treatment, what was the lowest speed in kilometres per hour (km/h)?	
On the road with traffic calming treatment, what was the highest speed in kilometres per hour (km/h)?	
On the road with traffic calming treatment, what was the lowest speed in kilometres per hour (km/h)?	
On the road with no traffic calming treatment, how many cars exceeded the speed limit? List the amount they were over the speed limit.	
On the road with traffic calming treatment, how many cars exceeded the speed limit? List the amount they were over the speed limit.	

Was the traffic calming treatment effective in encouraging the driver to slow down? Why?	
Was this a good use of a traffic calming treatment? Why? Do you think a different traffic calming treatment would have been more effective? Why?	
Do you thing this traffic calming treatment should be used in other streets? Why?	