

Take off 5 – Is it worth it?

Lesson plan description

Students discuss the effect of speed on the road toll and individual responsibilities associated with using the roads. They analyse braking distance data obtained from a simulation activity and apply the Equations of Motion and Newton's Laws to determine stopping distances and forces involved. They then relate these to road safety issues and design a poster or prepare a storyboard for a video commercial about the effects of speed and braking distances.

Year levels

Later adolescence (16–18 years)

Explicit values focus

- Care and compassion
- Fair co
- Integrity
- Respect
- Responsibility

Key Learning Area

- Physics

Lesson plan

Getting started

Students view the short video on vehicle crashes produced by the Victorian Traffic Accident Commission (TAC) at <http://www.tacsafety.com.au/jsp/content/PrintContent.do?areaID=13&tierID=2&pageID=211>.

The class discuss this video clip in the light of the effect that motor accidents have on the community and the responsibilities of road users, police and governments in reducing the road toll.

Using a Think, Pair, Share technique they consider the factors you might need to take into consideration in a calculation of braking distances and prepare a Mind Map that links these factors to consequences that they might have in the real world.

They then explore the The Lea@rning Federation (TLF) digital learning object *It's a Drag* to become familiar with its features before designing a suitable experiment to collect data on the relation between the factors discussed above and braking distances.

Discovering

Students work in teams to design an experiment that quantifies the effects of one of the factors on braking distance – taking into account necessary controls – using data from the TLF digital learning object.

They use a spreadsheet to record their results and perform calculations using the [Equations of Motion](#) to determine acceleration and time taken to stop in different

situations, and the principles of [Conservation of Energy](#) to determine the energy involved in collisions.

They prepare a report of their investigation outlining the factors they were investigating, the method of investigation, a summary of results that includes tables and graphs, and conclusions that can be drawn from their investigation.

Bringing it together

Students discuss the results of their investigations and their implications for driving using the following questions:

- Should speed limits be obeyed?
- Are speed limits always appropriate?
- Should driver behaviour be affected by road and vehicle conditions?
- Whose responsibility is it to control driver behaviour?
- How can one person's irresponsible behaviour affect others?
- How can a person demonstrate care on the road?

Students discuss the values being addressed in road safety campaigns and draft a poster or prepare a storyboard for a short video commercial for their own road safety campaign using knowledge of braking distances.

Notes for teachers

This activity refers to the Victorian Transport Accident Commission (TAC) Wipe Off 5 road safety campaign but it can be related to road safety campaigns in other States and Territories.

The TAC Wipe Off 5 website at

<http://www.tacsafety.com.au/jsp/content/NavigationController.do?areaID=13&tieRID=2&navID=13347671&navLink=null&pageID=211> contains background information and statistics related to the Victorian campaign.

The Road Safety – South Australia site at

http://www.transport.sa.gov.au/rss/content/safer_people/issues/speed.htm provides information related to South Australia.

The ACT government website at

http://www.transport.act.gov.au/roadsafety/speedandspeeding#road_safety_workshop_on_speed contains a PowerPoint® presentation given at a road safety workshop on speed held in Canberra on 3 September 2003.

The Roads and Traffic Authority, NSW webpage at

<http://www.rta.nsw.gov.au/roadsafety/speedandspeedcameras/speedingresearch.html> provides statistics relating to speed and motor vehicle accidents.

The Office of Road Safety, WA website at

<http://www.officeofroadsafety.wa.gov.au/> has fact sheets and outlines of safety campaigns in Western Australia including short downloadable video clips.

The Queensland Government site at

http://www.roadsafety.qld.gov.au/qt/LTASinfo.nsf/index/rs_campaigns_speeding has details of speeding campaigns in Queensland including video clips of TV commercials.

The Vehicle Design & Research – Australia website at

<http://www4.tpg.com.au/mpaine/roadsafe.html> provides links to Australian and worldwide road safety weblinks.

Equations of Motion

$$V = u + at$$

$$V^2 - u^2 = 2aS$$

$$S = ut + \frac{1}{2} at^2$$

Conservation of Energy

$$\text{Kinetic Energy lost} = \text{Kinetic energy gained} = \frac{1}{2} mv^2$$