



LESSON PLAN

Lesson 1: The Safe System

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UNIT TITLE: Safer by Design - Investigating Forces, Motion and Road Safety



LEVEL

Years 9-10



LESSON NUMBER

1 of 9



LESSON LENGTH

60 minutes



VICTORIAN CURRICULUM 2.0 CONTENT DESCRIPTIONS

- **Science as a Human Endeavour:** advances in technologies have enabled advances in science, while science has contributed to developments in technologies and engineering. (VC2S10H02).
- **Statistics:** analyse claims, inferences and conclusions of statistical reports in the media and other places, by linking claims to displays, statistics and representative data, including ethical considerations and identification of potential sources of bias. (VC2M10ST04).



VICTORIAN CURRICULUM 2.0 ACHIEVEMENT STANDARDS

- **Science:** Students examine the relationship between science, engineering and technologies. (Level 9 & 10).
- **Mathematics:** Students analyse inferences and conclusions in the media, noting potential sources of bias. (Level 10).

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KEY VOCABULARY

- **safe** – not in danger or likely to be harmed
- **system** – a set of connected things or devices that operate together (etymology originating from terms for stand and together)
- **technology** – tools, devices or systems created by humans to solve problems or improve how we do things
- **brakes** – a device in a vehicle that applies friction to slow down or stop the wheels
- **speed** – the distance an object travels per unit of time (e.g. metres per second, m s⁻¹)
- **lives lost** – the number of fatalities in a specified time period, in this context road-related fatalities



MATERIALS REQUIRED FOR THE LESSON

Student

- Safe System Worksheet (Key Resource 2) – 1 per student, printed
- Vocabulary Worksheet (Key Resource 3) – 1 per student, printed

Teacher

- Supporting Slide Deck – as needed, display on screen or use a document camera or write on whiteboard
- TAC Video: How can Auto Emergency Braking reduce crashes? (Supporting Slide Deck Slide 2, or on [YouTube](#))
- Vocabulary Worked Example (Resource 1.1) – as needed, display on screen or use a document camera or write on whiteboard
- Safe System Worked Example (Resource 1.2) – as needed display on screen or use a document camera or write on whiteboard

Additional/supplementary resource

- The Safe System approach fact sheet



LEARNING OBJECTIVE

- We will understand important strategies that are used to make roads safer for everyone.

SUCCESS CRITERIA

- I can explain what the safe system is.
- I can identify ways we make road travel safer and how they fit in safe system.
- I can interpret road safety data to identify safety risks to safety strategies.



TEACHING CONSIDERATIONS

- **Please note:** The Safe System approach is increasingly being referenced with a fifth pillar, *Post-Crash Care*, being incorporated into broader discussions of road safety. However, for the purposes of this unit of work, learning and assessment will focus on the traditional four Safe System pillars: Safe Roads, Safe Speeds, Safe Vehicles and Safe Road Users.
- Potential misconceptions:
 - Road Safety Strategies in the Safe System: students may identify items that are not road safety strategies, such as broader factors that may impact road safety
- Further resources: The following may be useful to supplement the material in this lesson:
 - [Victorian Road Crash Data Map and Dashboard](#) (Transport Victoria)
 - [Road Safety Statistics](#) (Transport Accident Commission)
 - [Road Safety Monitor](#) (Transport Accident Commission)
 - [Crash Dash National Data](#)

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Structure of lesson:

1

INTRODUCTION



TIMING: 10 mins

Activate prior knowledge

- **Explain** to students that science contributes to developments in technology and engineering, and that efforts to improve the safety of roads for everyone are an example of this.
- **Show** the TAC video *How can Auto Emergency Braking reduce crashes?* to students using the Supporting Slide Deck Slide 2 or the YouTube link.
- **Instruct** students that they are to identify one message the video is communicating about how to improve safety on roads. **Repeat** the video and **ask** students to write down the message they identified.
- **Instruct** students to share the message they identified with a partner and discuss any similarities and differences. **Call on** non-volunteers to share. **Discuss** the responses with the whole class, drawing together ideas and connecting themes.
- **Enable** students using prompts connected to the messages in the video such as 'I noticed that', 'why might the video have included'.

Introduce learning objective

- **Show** the learning objective (Supporting Slide Deck Slide 1)
- **Explain** how students can achieve this through the success criteria.

Explicitly teach vocabulary

- **Show** students the definitions for safety and system. **Elaborate** on the terms.
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ORGANISING VOCABULARY



TIMING: 10 mins

Explanation and modelling

- **Explain** to students that there is a lot of specific vocabulary used in this unit and a glossary will be used to organise this information and to help build their vocabulary.
 - **Distribute** the Vocabulary Worksheet (Key Resource 3) to students (or if using the Workbook, distribute it to them and direct students to pages 3-4).
 - **Show** students the worksheet and ask them to follow on their copy as you explain its contents. **Explain** that it is organised into sections: *everyday* words that have their usual meaning; *scientific* terms that have a specific meaning in physics; *road safety* terms that are specific to road safety. Emphasise that there are differences in the layout of each section, with the scientific terms having space for symbols, units and formulas.
 - **Model** adding the following terms to the glossary, using the Vocabulary Worked Example (Resource 1.1) if needed: safety, system, technology, brakes, speed. **Guide** students to add these terms to their glossary.
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THE SAFE SYSTEM



TIMING: 20 mins

Activate prior knowledge

- **Prompt** students to brainstorm specific things that make travel on roads safer for everyone.
- **Enable** students by providing some examples, such as seat belts, school speed limits, roadside barriers. **Extend** students by prompting them to be more specific in their responses, or to think of less well-known examples.

Explanation and modelling

- **Distribute** the Safe System Worksheet to students (or if using the Workbook, direct students to page 2).
- **Explain** that in many countries across the world, including Australia, a model called the Safe System is used to organise the strategies that we put into place to improve road safety. **Clarify** that when talking about road safety we mean for all road users including drivers, passengers, pedestrians, cyclists.
- **Show** students the partially complete Safe System Worked Example (Resource 1.2). Explain that school speed zones are a safer speeds strategy; airbags are an example of making vehicles safer; roadside safety barriers are used to improve the safety of the roads we travel on; and P-plate restrictions are a safer people strategy.

Guided and independent practice

- **Ask** students to categorise the safety features they have identified. **Enable** students by providing additional examples and prompts using the completed worked example or examples from the class.
 - **Check for understanding** by asking non-volunteers to share their responses and their reasoning. **Model** organising the responses by adding them to the partial example used previously. **Provide feedback** to students and address any misconceptions or misunderstandings.
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INTERPRETING ROAD SAFETY DATA



TIMING: 15 mins

Explanation and modelling

- **Explain** that road fatalities are the most common data we hear about related to road safety, and that this is sometimes called the 'road toll', however in most of the data you will see it referred to as 'lives lost'. Emphasise that looking at this data in more detail can help to understand what might be impacting road safety and how strategies connected to the safe system may help improve safety for all road users.
- **Distribute** the Road Safety Data Worksheet (Resource 1.3) to students (or if using the Workbook, direct students to page 2).
- **Explain** that we will use the DIAL structure to help analyse data. Show the structure to students (Slide 4 in the Supporting Slide Deck) and explain each term briefly: data, interpretation, analysis, limitations. Emphasise that the structure and the prompting questions can help us to undertake a comprehensive analysis of data.
- **Model** interpreting data set 1 with students, going through the data, interpretation, analysis and limitations. Explain that all parts of the safe system work towards improving this data – by making roads safer, the lives lost should decrease.

* continued overleaf

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Guided and independent practice

- **Think aloud** to model interpreting data set 2 with students. Ensure that you cover both what the data is clearly showing (more lives are lost in cars more than 10 years old) and limitations (having a different grouping in the data may show more nuance and detail in the trend). **Check for understanding** by providing opportunities to discuss in pairs and share their perspectives for each section. Follow-up to elaborate on thinking and address any misunderstandings. **Prompt** students to identify connections to the safe system.
 - **Ask** students to look at datasets 3 to 6. **Explain** that they need to pick 2 of the remaining datasets to interpret and analyse using the prompting questions in the worksheet.
 - **Enable** students by monitoring progress closely and using prompts or targeted questions to assist them to complete the activity.
 - **Enable** students by using the additional/supplementary Safe system approach fact sheet.
 - **Extend** students by providing access to more detailed data sets or interactive data sets which include more detail and allowing them to complete a more open-ended analysis to connect the data to the safe system.
 - **Check for understanding** by calling on students to share their responses. Follow-up to elaborate on thinking and address any misunderstandings.
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CONCLUSION



TIMING: 5 mins

Reflection on learning

- **Show** the learning objectives and success criteria.
 - **Instruct** students to answer the following questions without referring to their notes or workbook (Slide 12 in the Supporting Slide Deck).
 - What are the four parts of the safe system? (speeds, vehicles, people, roads)
 - What were the three most significant things that you found out from analysing and interpreting the road safety data?
 - **Check for understanding** by sampling student responses using mini whiteboards or choral response. **Respond** to address any errors, misunderstandings or misconceptions.
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