



LESSON PLAN

Lesson 5: Vehicle safety features

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



LEVEL

Years 9-10



LESSON NUMBER

5 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).



VICTORIAN CURRICULUM 2.0 ACHIEVEMENT STANDARDS

- **Science:** Students examine the relationship between science, engineering and technologies. (Level 9 & 10).

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.....



KEY VOCABULARY

- **active safety** – vehicle features that help prevent a crash from occurring (e.g. automatic emergency braking, lane-keeping assist)
- **passive safety** – vehicle features that protect people if a crash occurs (e.g. seatbelts, airbags, crumple zones)
- **assistance** – support provided to help a person or system complete a task
- **autonomous** – able to operate independently without human input; a fully autonomous vehicle drives itself
- **ADAS** – advanced driver assistance systems



MATERIALS REQUIRED FOR THE LESSON

Student

- Active and Passive Safety (Key Resource 4) – 1 per student, printed
- Advanced Driver Assistance Systems Jigsaw Worksheet (Resource 5.1) – 1 per student, printed (including printed copies of the resource sets for each jigsaw group)

Teacher

- Video on Collision Avoidance Technologies from ANCAP available on [Vimeo](#) and also on the [ANCAP website](#)
- Supporting Slide Deck – as needed, display on screen or use a document camera or write on whiteboard
- Teacher Workbook – as needed for reference, including for display on screen or with a document camera



LEARNING OBJECTIVE

- We will understand how active safety features improve vehicle safety.

SUCCESS CRITERIA

- I can explain the difference between active and passive vehicle safety features.
- I can interpret information on specific active safety features.
- I can explain how specific active safety features improve safety.



TEACHING CONSIDERATIONS

- Further resources: The following may be useful to supplement the material in this lesson:
 - [ADAS assist website](#)
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Structure of lesson:

1

INTRODUCTION



TIMING: 5 mins

Activate prior knowledge

- **Show** students Slide 31 of the Supporting Slide Deck. **Instruct** students to complete a quick write in response to the prompt provided. Ensure students are clear that this involves writing down their thinking for a period of 2 minutes, without editing or correction.
- **Instruct** students to share their responses with a partner. **Check for understanding** by sampling student responses using a suitable mode of response. Use questioning to support students to elaborate on their thinking and make connections.

Introduce learning objective

- **Show** the learning objective.
 - **Explain** how students can achieve this through the success criteria.
 - **Show** students Slide 32 of the Supporting Slide Deck and explain that this lesson will focus on the safer vehicles part of the safe system.
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2

ACTIVE AND PASSIVE SAFETY



TIMING: 5 mins

Explicitly teach vocabulary

- **Show** students Slide 33 of the Supporting Slide Deck with the graphic on active and passive safety. Explain that these two terms are used to describe different ways that we can make safer vehicles.
- **Distribute** the Active and Passive Safety Worksheet (Key Resource 4) to students (or if using the Workbook, direct students to page 5). Use this resource to explain to students the definitions for active safety and passive safety. **Elaborate** on the terms.

Explanation and modelling

- **Explain** that this lesson will focus on active crash protection. Refer to the Active and Passive Safety Worksheet (Key Resource 4) and use a think aloud to unpack the examples of ways that active safety systems can help to prevent crashes and reduce severity.
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LESSON PLAN

Lesson 5: Vehicle safety features

.....

3

ADVANCED DRIVER ASSISTANCE SYSTEMS



TIMING: 45 mins

Explicitly teach vocabulary

- **Show** students the [Vimeo video on collision avoidance technologies from ANCAP](#).
- **Explain** that the acronym ADAS – advanced driver assistance systems – is commonly used to describe the many active safety features that are found in modern cars. Clarify that this is different to autonomous vehicles – self driving cars – as the ADAS systems only assist the driver and do not take full control of or responsibility for the vehicle.

Explanation and modelling

- **Distribute** the Advanced Driver Assistance Systems Jigsaw Worksheet (Resource 5.1) to students (or if using the Workbook, direct students to page 39).
- **Ask** students to read Part 1 of the worksheet. **Explain** that there are lots of different technologies in use, and that in this lesson we will use a jigsaw protocol to explore some of them in more detail
- **Explain** to students that they will work in groups of 6, with each group member being responsible for summarising and explaining one ADAS technology.
- **Assign** students to groups, and assign each student one of the 6 jigsaw topics (A. Lane Keep Assist, B. Driver Attention Detection, C. Automatic Emergency Braking (AEB), D. Intelligent Speed Assistance, E. Reversing Camera or Warning, F. Blind Spot Warning)

Guided and independent practice

- **Instruct** students to work independently on part 2 of the jigsaw worksheet. Explain that they can use the resources provided for their topic. You may provide students with only what is in the worksheet. Consider also printing out or providing access to the ADAS fact sheets on each topic as these have valuable further information.
- **Enable** students by using the videos in further resources as alternate sources of information.
- **Monitor** student progress by circulating as they complete this individual task.
- **Instruct** students to move on to part 3 of the jigsaw worksheet. **Explain** that they are to pair up with someone else who worked on the same topic and take turns sharing what they wrote in their summary. Instruct them to use this time to add to and improve their summary. Ensure that all students can pair up for this task and use a specified timeframe and prompts to ensure they remain focussed.
- **Ask** students to return to their groups of 6 for part 4 of the jigsaw.

Explanation and modelling

- **Explain** that for part 4, each student will take turns to share, and everyone else will summarise the key ideas in the space provided. **Model** what a summary might include using the example provided on Electronic Stability Control (ESC).

Guided and independent practice

- **Instruct** students complete part 4 in their groups. Monitor progress by circulating to all groups, prompting students to ensure that they are on track with the process as well as to support deeper thinking and connections.
 - After the groups have worked through all the sections, **check for understanding** and facilitate whole-class sharing by sampling student responses from part 4. Prompt students to use this discussion to update and improve their summaries. Use questioning to support students to elaborate on their thinking and make connections. **Respond** by addressing errors and clarifying any misconceptions.
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LESSON PLAN

Lesson 5: Vehicle safety features

.....

4

CONCLUSION



TIMING: 5 mins

Reflection on learning

- **Show** the learning objectives and success criteria.
 - **Instruct** students to respond to the prompts on slide 34 in the Supporting Slide Deck.
 - What is the difference between active and passive safety systems?
 - Why are ADAS systems not the same as autonomous systems or self-driving cars?
 - Explain one way that an ADAS system can 'assist' a driver that improves road safety.
 - **Check for understanding** by sampling all student responses using mini whiteboards or another suitable mode of response. **Respond** by prompting students to make connections and extend their thinking. Address any errors and misconceptions.
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