



# Schools Tree Day – Alternative car technologies – Years 9 & 10

## Teacher preparation

**Overarching learning goal:** By participating in this lesson students will understand why current vehicle technologies are unsustainable and will recognise a range of different vehicle technologies and how they might contribute to sustainability and human health.

**Teacher content information:** There are now over 17 million cars on our roads in Australia! Many of these cars are still a cause of concern in terms of air pollution (cars emit harmful substances such as carbon monoxide, nitrogen oxides and hydrocarbons) and in terms of climate change (road traffic is responsible for about 15% of Australia's greenhouse gas emissions). So it's no surprise that there is a growing interest in cars that are more sensitive to the environment and less harmful to human health.

There are a range of alternative technologies available to car driving for consumers seeking to have a lower environmental impact, such as electric vehicles, hybrid technologies and hydrogen-fuel cell technologies. These innovations are leading the way in supporting people in their transport needs whilst also ensuring a healthy environment both now and in the future.

Another great way of helping to address the impact of transport on our environment is by getting outside and planting trees! This activity has



been designed to support student learning around [Schools Tree Day](#).

## Teaching sequence

15 minutes - Flipped classroom (done as homework prior to class)

10 minutes - Introduction, answering questions and class discussion

35 minutes - Researching and creating guides

15 minutes - Presenting guides and giving feedback

### **Preparation: Flipped classroom - Hybrid Synergy Drive Technology**

Prior to class ask students to review the video on the Student Worksheet in their own time. This flipped learning strategy provides the opportunity for students to build their knowledge, attitudes and values independently, thereby freeing up class time for hands-on work.

### **Work through this resource material in the following sequence:**

**Step 1.** Assess what your students already know about car technology by asking students to answer the following questions about car technologies (questions also available on the Student Worksheet):

- What types of technologies are available (e.g. petrol, gas, electric, hydrogen-cell?) Which ones are widely used and which ones would be considered 'emerging technologies'?
- Why are we exploring different technologies?
- What are the problems with current technologies (e.g. environmental and human health?)
- What types of technologies does a hybrid car use?

Ask students to share their answers in a class discussion. Suggest answers that include:

- **Climate change** - Cars emit carbon dioxide (CO<sub>2</sub>), one of the gases that contributes to climate change. The transport sector



accounts for about 15% of Australia's annual greenhouse gas emissions.

- **Other environmental costs** - Pollution from cars contributes to air quality. Manufacturing and disposal of cars requires considerable resource use.
- **Air pollution and human health risks** - Air pollution kills about 3000 people a year in Australia and around the globe; about 7 million premature deaths are annually linked to air pollution.
- **Peak oil** - Like all natural resources our oil reserves are a finite resource. More cars on the road and declining oil reserves will mean price hikes in oil prices and eventually a drop in the availability of oil.

**Step 2.** Explain to students that there are a range of emerging technologies that provide cleaner and more energy efficient modes of transport both now and in the future. These include:

- Petrol
- Electric
- Hydrogen fuel cell
- Hybrid

In groups of 3-4 students, investigate these alternative technologies and create an alternative technology guide for the confused car buyer.

Students can use the questions and resources (websites and videos) on the Student Worksheet to guide their research. They should answer all the questions and use their answers in their consumer guide.

## Assessment

Ask groups to share their guides with other groups for assessment. Assessment criteria could include:

- Meeting the requirements of the guide
  - Information about each technology (using your answers



- above)
- Information about this type of technology in terms of long-term sustainability
- An assessment and comparison of all technology types (such as a rating or a comparison table)
- Information about why alternative technologies are important
- Supporting images
- Quality of written expression
- Suitability of images
- Would this guide help a confused car buyer? Why or why not?

## Extension

Ask students to address one or more of the following points:

- Hypothesise the design features that could increase a car's fuel efficiency. Discuss how aspects of the engine, body, and other components of the car could be modified to minimise the amount of fuel the car requires.
- Describe the reasons why people might be reluctant to abandon their SUVs/4WDs and trucks in favour of more fuel efficient cars or to give up their traditional cars for electric vehicles or other alternative energy cars.
- Discuss what events could cause car manufacturers to drastically change the fuel efficiency or energy sources of their cars.