



# Local Transport, Global Impact

## Summary

In this lesson students look at the transport choices they can make when travelling to school. Students understand the environmental impacts of vehicles and the links between vehicle use, carbon emissions and global warming. They identify the benefits of active travel and set goals to increase the amount of time they walk and cycle to school.

Use the information in this guide to help you complete the activity with students. See also [Links to Western Australian Curriculum](#) on page 10.

Year level: Years 4 – 8  
Teaching and learning resource.

## Learning outcomes

Students will be able to:

- Understand that vehicles have an impact on the environment in terms of: air quality, greenhouse gases, water quality, use of natural resources and noise;
- Understand that vehicles emit carbon dioxide (CO<sub>2</sub>) which plays a role in global warming;
- Use mathematics skills to calculate CO<sub>2</sub> emissions from cars;
- Identify some of the benefits of walking, riding and catching public transport; and
- Set realistic goals to increase the amount of time they walk or cycle to and from school.

## Preparation

### Resources

- One student worksheet per student.
- Tablet or computer for further research.



## Background notes

As of 31 January 2021, there were almost 20.1 million motor vehicles registered in Australia. These vehicles travelled 238,499 million kilometres (an average of 12.1 thousand kilometres per vehicle), the equivalent of driving 58 million times from Australia's most western point (Steep Point, WA) to the most eastern point (Cape Byron, NSW)<sup>1</sup>. All vehicles have an impact on the environment in terms of air quality, greenhouse gases, water quality, use of natural resources and noise pollution.

### Air quality

Air pollution arises when the atmosphere contains substances that negatively affect human health, wildlife, and ecosystems. It encompasses a blend of minuscule particles, liquid droplets, and various gases. The predominant contributor to air pollution, including greenhouse gases, stems from the extraction and combustion of fossil fuels such as oil, gas, and coal.<sup>2</sup>

There are also thousands of chemicals that come out of the exhaust pipes of motor vehicles that have an '*internal combustion engine*' (ICE) and many of these air pollutants are invisible. In major cities throughout Australia, a primary contributor to air pollution stems from motor vehicle emissions, resulting from the combustion of diesel and petroleum fuels.<sup>3</sup> Emissions from vehicles include carbon monoxide, nitrogen dioxide (NO<sub>2</sub>), sulphur oxides, ozone-forming substances, hydrocarbons and fine particulate matter (PM). Air pollution has negative health effects, especially for vulnerable people, including those with allergic and respiratory conditions, such as hay fever and sinusitis, respiratory and lung conditions and asthma. Air pollutants like benzene are carcinogenic.<sup>4</sup>

A recent New Zealand study, HAPINZ 3.0 showed internationally peer-reviewed assessments of the health and economic impacts of air pollution in New Zealand. Utilizing both NO<sub>2</sub> and PM data, the study attributes approximately 3,300 premature deaths annually to man-made air pollution, with over two-thirds (>2,200) of these attributed to motor vehicles. This pollution burden costs the New Zealand economy an estimated \$15.5 billion annually. Motor vehicles were found to contribute 17% of PM emissions and 100% of NO<sub>2</sub> emissions, establishing them as the primary source of anthropogenic air pollution in New Zealand.<sup>5</sup>

In Australia, robust estimates of the health and economic impacts of vehicle emissions in Australia have not been established for some time. In 2005 it was estimated that in a single year, air pollution from motor vehicles causes between 900 and 2,000 early deaths and between 900 and 4,500 cases of bronchitis, cardiovascular and respiratory disease, costing between \$1.5 and \$3.8 billion<sup>6</sup>. Scaling New Zealand's results for PM and NO<sub>2</sub> emissions from motor vehicles up to the Australian population yields the following estimates for motor vehicle emissions: 11,105 premature deaths (adults), 12,210 cardiovascular hospitalizations (all ages), 6,840 respiratory hospitalizations (all ages), and an asthma prevalence of 66,000 (0 – 18 years)<sup>7</sup>.

<sup>1</sup> Australian Bureau of Statistics. Motor Vehicle Census, Australia, 31 Jan 2021.

<sup>2</sup> NSW Environmental protection agency. About air pollution. Accessed at <https://www.epa.nsw.gov.au/your-environment/air/air-nsw-overview/about-air-pollution>

<sup>3</sup> Better health (Vic), Air pollution. Accessed at <https://www.betterhealth.vic.gov.au/health/healthyliving/air-pollution>

<sup>4</sup> RAC WA website - RAC Air Health Monitor <https://rac.com.au/about-rac/community-programs/air-health-monitor>

<sup>5</sup> Kuschel, G., et al. (2022). "Health and air pollution in New Zealand 2016 (HAPINZ 3.0): Volume 1–Finding and implications."

<sup>6</sup> Bureau of Transport and Regional Economics, Health impacts of transport emissions in Australia: economic costs, 2005, Department of Transport and Regional Services, Canberra, p. 147, <http://www.btre.gov.au/docs/workingpapers/wp63/wp63.pdf>

<sup>7</sup> University of Melbourne, 2020, Health impacts associated with traffic emissions in Australia – Expert Position Statement.

## Water quality

When it rains, car oil, particles from the wear of tyres, brakes and other components, petrol and diesel residues and air pollution from vehicles, all get washed into stormwater drains and pollute waterways and oceans. Oil and pollutants can be toxic to aquatic life and kill plants and animals. Detergents from washing the car can also contaminate waterways.

## Noise pollution

In urban areas, road traffic is one of the biggest sources of community noise pollution. Noise can cause disturbance to work, relaxation and sleep and create mental stress. Noise increases with the size and speed of the vehicle, size of the road, speed limits and the proximity to residential areas. Noise pollution can have wide-ranging negative impacts on physical health, mental well-being, social interactions, and the environment.

Research has revealed direct correlations between noise and health with issues stemming from noise exposure including stress, elevated blood pressure, speech impediments, hearing impairment, disturbances in sleep patterns, and decreased productivity<sup>8</sup>. Noise pollution can also result in economic costs related to healthcare expenditures for treating noise-related health issues and decreased property values in noisy areas.

## Use of natural resources

When considering the energy consumed by a motor vehicle, our focus usually shifts to its fuel efficiency and few people reflect on the energy invested in a car's construction, including the energy required to transform raw materials into vehicle components. Referred to as '*embodied*' or '*embedded energy*', this is the energy used in manufacturing the materials integral to building the vehicle, such as steel, glass, plastic, logic boards and rubber. German research shows that during its lifetime or '*lifecycle*', each car produces around 26.5 tonnes of rubbish<sup>9</sup>.

Equally, the '*embodied energy*' or '*life cycle energy*' (LCE) can be defined as the energy used in the manufacture, delivery, operation, maintenance and disposal of a product such as a motor vehicle. The product or vehicle also produces greenhouse gases and other emissions. The '*embodied carbon*' also known as '*carbon footprint*' can be used to measure the carbon emissions, both direct and indirect, associated with the manufacture, delivery, operation, maintenance and disposal of a product or motor vehicle<sup>10</sup>.

A carbon footprint can also include all the greenhouse gas (GHG) emissions attributable to an individual, an organisation, a building or even an event. It is determined by totalling the emissions from every phase of the item's life cycle from '*cradle to grave*'<sup>11</sup>. Theoretically the carbon footprint of a vehicle could also include the energy required for the infrastructure and services associated with vehicle use, such as the energy used to build roads, car parks, car yards, service centres and even the hospital wards needed for road trauma victims.

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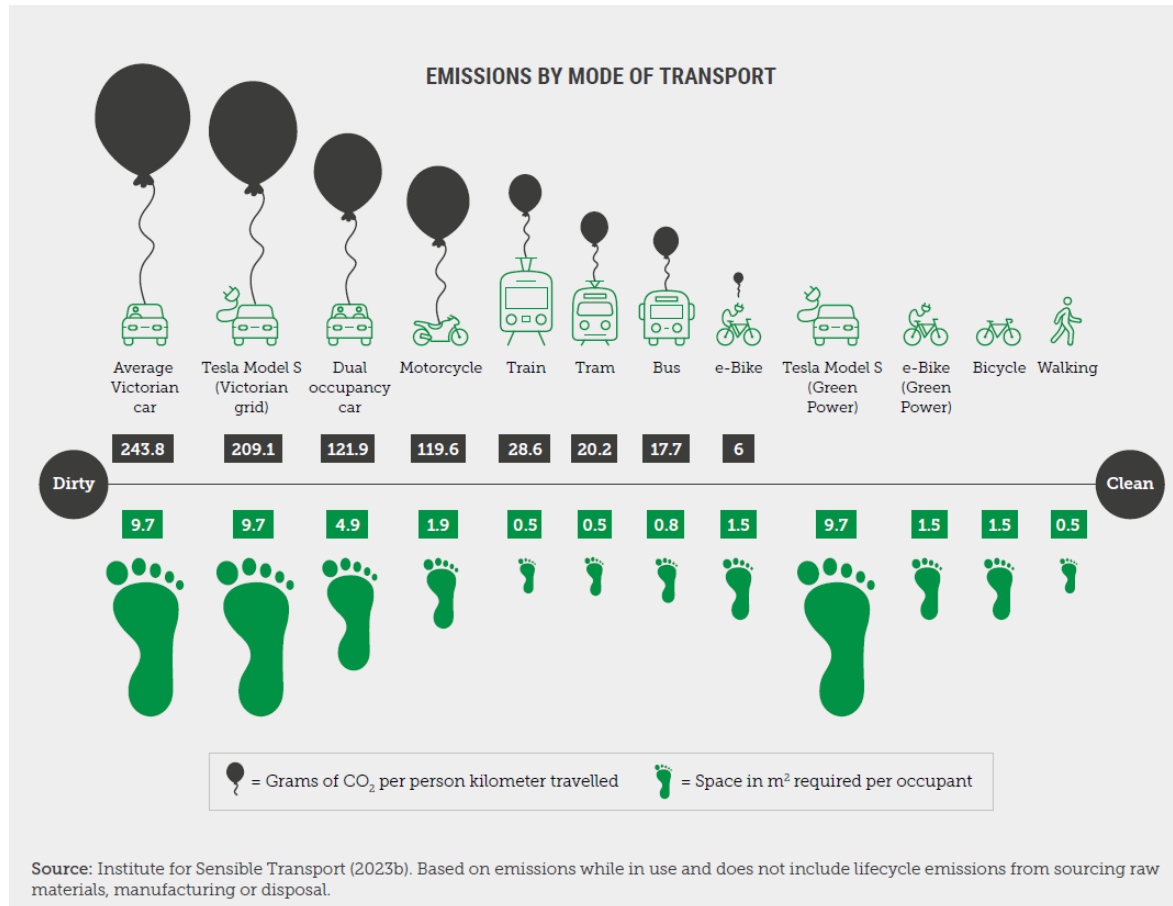
<sup>8</sup> United States Environmental Protection Agency - Clean Air Act Title IV - Noise Pollution, <https://www.epa.gov/clean-air-act-overview/clean-air-act-title-iv-noise-pollution>

<sup>9</sup> Whitelegg, J., undated, Dirty From Cradle to Grave, <http://www.ecologica.co.uk/DirtyfromCradletoGrave.pdf>

<sup>10</sup> Embodied carbon: What it is and how to tackle it - [www.rpsgroup.com/services/environment/sustainability-and-climate-resilience/what-is-embodied-carbon](http://www.rpsgroup.com/services/environment/sustainability-and-climate-resilience/what-is-embodied-carbon)

<sup>11</sup> Carbon footprint factsheet – Centre for Sustainable Systems, 2003, <https://css.umich.edu/publications/factsheets/sustainability-indicators/carbon-footprint-factsheet>

A typical ICE family car embodies 475 gigajoules of energy, or 41 tonnes of CO<sub>2</sub> equivalents and over one million litres of water in its life cycle. In contrast, a typical bike would embody 8.8 gigajoules of energy, 0.75 tonnes of CO<sub>2</sub> equivalents and 19,000 litres of water<sup>12</sup>.



Source: Climate Council of Australia Ltd: Shifting gear: the path to cleaner transport.

## Electric vehicles

Unlike ICE vehicles, electric vehicles (EV's) offer consumers and the planet a significant benefit in a minimal carbon footprint during operation (if powered by renewable energy). However, if EV's are powered mostly by fossil fuels, their CO<sub>2</sub> emissions are only slightly less than an ICE vehicle (see image above from the Climate Council of Australia).

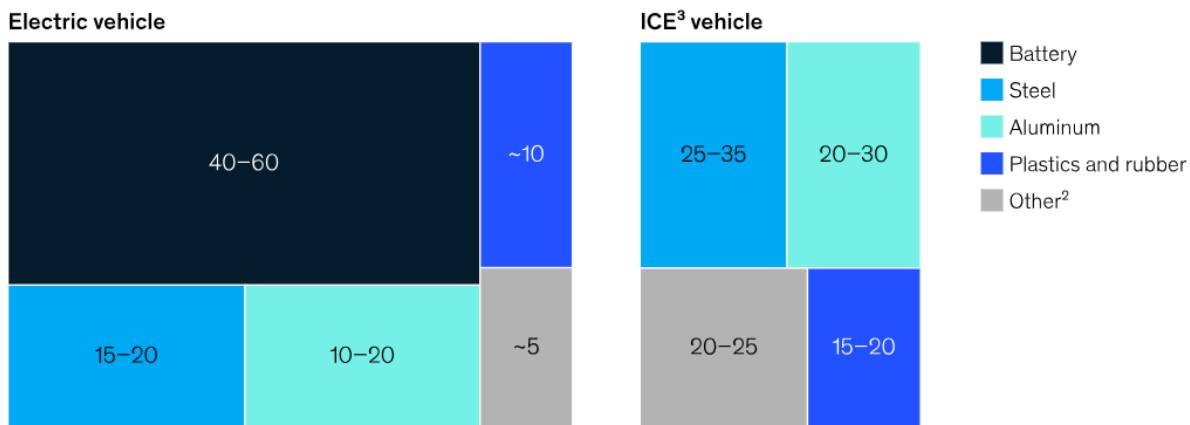
EV's also face an emissions challenge in the production of their batteries, which is a highly carbon intensive process. The largest contributor to the embodied energy of EV's, including cars and trucks, is in the production of their large lithium-ion batteries, responsible for approximately 40 to 60 percent of total production emissions.

The good news is that steep reductions in the life cycle energy (LCE) and carbon footprint from EV battery production are possible in the next five to ten years if planned weight savings and new battery technology are further developed and implemented.<sup>13</sup>

<sup>12</sup> Treloar, G., et al, 2000, Analysing the life-cycle energy of an Australian residential building and its householders, Building Research & Information, Vol 28(3), pp.184–195.

<sup>13</sup> McKinsey & Company, 2023, The race to decarbonize electric-vehicle batteries, <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/the-race-to-decarbonize-electric-vehicle-batteries>

**Typical upstream battery-electric-vehicle emissions,<sup>1</sup> %**



<sup>1</sup>Including all upstream emissions from raw material extraction to the OEM, including logistics.  
<sup>2</sup>Including glass, copper, electronics, textiles, and logistics.  
<sup>3</sup>Internal-combustion engine.  
 Source: McKinsey analysis

Source: McKinsey & Company, 2023, *The race to decarbonize electric-vehicle batteries*

Recent studies on the LCE of vehicles equipped with alternative powertrains such as hybrids, plug-in hybrids (PHEV) and EV’s indicate that EV’s manufactured by renewable energy sources or an electric/fossil fuel mix can significantly decrease operational LCE compared to ICE vehicles. However, if fossil fuels are predominantly used to manufacture EVs, these alternative powertrains might even end up with a higher LCE than a comparable ICE vehicle.<sup>14</sup>

## Greenhouse gases

The 2018 special report from the Intergovernmental Panel on Climate Change (IPCC) underscores the alarming outcomes of allowing global temperatures to surpass the 1.5-degree mark, highlighting profound repercussions for both ecosystems and human communities. According to the report, to cap global warming at 1.5°C, emissions must decrease by approximately 45% from 2010 levels by 2030, ultimately reaching net zero by 2050<sup>15</sup>.

Cars and trucks with an ICE produce greenhouse gases (GHG) like carbon dioxide, nitrous oxide and methane. In 2022, the transport sector made up 19% of Australia’s emissions. Passenger cars and light commercial vehicles alone contributed 60% of Australia’s transport emissions and over 10% of Australia’s total emissions.<sup>16</sup>

When it comes to public transportation, electrifying the modes and powering them with renewable energy would eliminate emissions. However, until that transition occurs, fossil-fuelled public transport still emits significantly fewer emissions compared to moving the same number of people by private car. Specifically, rail transport emits nine times less and buses emit 14 times less than individual car journeys<sup>17</sup>.

<sup>14</sup> Monteiro, Alonso, Gonçalves, Iten, Caetano, Life cycle energy of vehicles on lightweighting and alternative powertrain strategies—A review, Energy Reports, Volume 8, Supplement 3, 2022, <https://doi.org/10.1016/j.egy.2022.01.037>.

<sup>15</sup> The Intergovernmental Panel on Climate Change (IPCC), 2018 Special Report, Global Warming of 1.5 C. <https://www.ipcc.ch/sr15>

<sup>16</sup> Department of Climate Change, Energy the Environment and Water 2023 - <https://www.dcceew.gov.au/energy/transport>

<sup>17</sup> Climate Council of Australia Ltd: 2023, Shifting gear: the path to cleaner transport. [https://www.climatecouncil.org.au/wp-content/uploads/2023/05/CC\\_MVSA0354-CC-Report-Road-to-Personal-Transport\\_V5-FA-Screen-Single.pdf](https://www.climatecouncil.org.au/wp-content/uploads/2023/05/CC_MVSA0354-CC-Report-Road-to-Personal-Transport_V5-FA-Screen-Single.pdf)

Operational energy and emission figures by transport mode		
Transport mode	Operational energy use (MJ per passenger-km)	Operational emissions (g CO <sub>2</sub> -e per passenger-km)
Petrol Car	3.7	286
Motorcycle (1000 cc)	2.3	178
Bus	0.30	20
Train (electric)	0.04	14
Bike, scooter or skateboard	0	0
Walk	0	0

Source: Emissions intensity figures - Australian Greenhouse Office, *AGO Factors and Methods Workbook 2006*.

In WA, transport emissions contribute about 16% of total greenhouse gas emissions, a 45% increase from 2005<sup>18</sup>

The average passenger vehicle emits about four tonnes of carbon dioxide each year<sup>19</sup>.

- 1 litre petrol generates approx. 2.7 kilograms of GHG
- 1 litre diesel generates approx. 2.9 kilograms of GHG<sup>20</sup>

## Household GHG emissions

When we look at household GHG emissions, transport emerges as the greatest energy user and the biggest factor in household greenhouse emissions<sup>21</sup>. Worldwide, a 2014 UN report<sup>22</sup> found that motor vehicles are likely to be the fastest-growing source of greenhouse emissions right through to 2050 on current trends.

Motor vehicles not only impose environmental, health, and social costs but also entail significant financial burdens on households, making private car ownership one of the most expensive items for many people. These expenses include fixed costs like the initial purchase price, depreciation over time, registration fees, mandatory third-party insurance, and potential interest on car loans. Variable costs include fuel, maintenance, repairs, car insurance, roadside assistance and parking fees.

In the December 2022 quarter, the average weekly transport costs for Australians stood at nearly \$385, with a predominant portion (an average of 94.4 percent) attributed to car-related expenses, while the remaining 5.5 percent was allocated to public transportation<sup>23</sup>.

Increasing greenhouse gas emissions, mainly through burning coal and oil, is increasing the average temperature of the Earth, affecting local climates including temperature and rainfall. To find out more, refer to the Your Move *CO<sub>2</sub> Experiment and Greenhouse Effect* lesson plan.

<sup>18</sup> State and territory greenhouse gas inventories - WA Greenhouse Gas Inventory, 2019

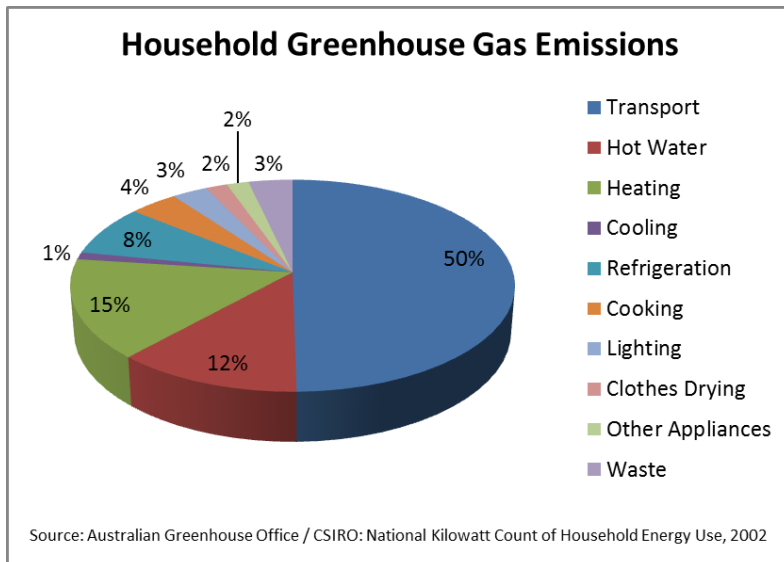
<sup>19</sup> Carbon Neutral carbon calculator - <https://carbonneutral.com.au/carbon-calculator/>

<sup>20</sup> Full Fuel Cycle emissions - National Greenhouse Accounts Factors, July 2011

<sup>21</sup> Australian Greenhouse Office / CSIRO: National Kilowatt Count of Household Energy Use, 2002

<sup>22</sup> <http://www.bloomberg.com/news/2014-04-08/cars-become-biggest-driver-of-greenhouse-gas-increases.html>

<sup>23</sup> Climate Council of Australia Ltd: 2023, Shifting gear: the path to cleaner transport. [https://www.climatecouncil.org.au/wp-content/uploads/2023/05/CC\\_MVSA0354-CC-Report-Road-to-Personal-Transport\\_V5-FA-Screen-Single.pdf](https://www.climatecouncil.org.au/wp-content/uploads/2023/05/CC_MVSA0354-CC-Report-Road-to-Personal-Transport_V5-FA-Screen-Single.pdf)



Australian household greenhouse gas emissions by type

## Benefits of active transport

Using active modes of transport such as walking, scooting, and biking not only results in health benefits, but generates zero emissions. Even e-bikes, which rely on a predominantly fossil-fuel-based power grid, emit 40 times fewer emissions than the average internal combustion engine (ICE) passenger car. Encouraging people to shift from cars to active transport is crucial for significantly reducing emissions in the transportation sector and therefore reduce pollution in our cities and local community's<sup>24</sup>.

Aside from reducing environmental impacts, walking, riding and catching public transport has many benefits for the school community including:

### Benefits for teachers

Practical reinforcement of sustainability and road safety education, morning exercise before school starts, improved student learning and concentration in class and improved time management skills.

### Benefits for students

More time outdoors; reduced air pollution around school; feel empowered to 'play your part' in reducing CO<sub>2</sub> emissions; improved fitness and health from exercise; spend quality time with parent or guardian on the way to school and from school; time to hang out with friends; streets 'feel' safer as there are less cars; fun way to learn road safety skills; greater independence and resilience as you are responsible for yourself; stronger 'sense of place' as you get to know and



The benefits of the Your Move Schools program

<sup>24</sup> Climate Council of Australia Ltd: 2023, Shifting gear: the path to cleaner transport. [https://www.climatecouncil.org.au/wp-content/uploads/2023/05/CC\\_MVSA0354-CC-Report-Road-to-Personal-Transport\\_V5-FA-Screen-Single.pdf](https://www.climatecouncil.org.au/wp-content/uploads/2023/05/CC_MVSA0354-CC-Report-Road-to-Personal-Transport_V5-FA-Screen-Single.pdf)

connect with your local neighbourhood; better concentration in class; improved time management skills; a great excuse to walk the dog and no more stress in car traffic.

## Benefits to parents and the community

Safer streets from reduced traffic around schools; safer streets as there are more people on footpaths and more ‘eyes on the street’; more parking spaces at school for parents and visitors who need it; no need to spend huge amounts expanding parking; frees up space for playgrounds, veggie beds, bike parking, etc.; feel more connected and get to know your neighbours and your neighbourhood on the walk/ride to school; quality time spent with children; provides opportunities for conversations without car driving distractions; improved fitness and health from walking/riding to school; reduced air pollution around school; save money on petrol and car maintenance and better maintenance of footpaths and shared paths as more people use them.

## Teaching and learning ideas

Teachers are encouraged to use a range of the teaching and learning ideas provided. The teaching and learning ideas provide opportunities to address multiple learning areas. Teachers can modify and extend ideas for different year levels and phases of schooling. Teaching ideas have been aligned to the Western Australian curriculum including identification of learning area, strand and sub-strand.

## Activity 1 – Travel survey and environmental impacts

1. Survey all students regarding their mode of transport to school. Include modes of transport from table included and allow other modes to be included.
2. Display the results.

How did we get to school today?		
Mode of Transport	Number of students	Percentage of students
Car		
Bus		
Train		
Bike / scooter / skateboard		
Walk		
Total		

Fill out this class-based hands up travel survey form to see how students get to school.

3. Ask students to calculate totals and the percentages for each mode of transport and display this on the board.
4. Ask students to construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies.
5. In small groups, interpret and compare results.
6. Ask students “Why do you think I’m so interested in your choice of transport to school?”



*(Traffic congestion, road safety, health and fitness, air pollution, greenhouse gas emissions, water quality, use of natural resources, noise)*

7. Lead a discussion that allows students to become aware of the environmental impacts of vehicles based on these factors below: (refer to '[Background](#)' section for more details).
  - a. **Air quality** - There are more than 4000 chemicals that come out of the exhaust pipes of cars and many of these air pollutants are invisible.
  - b. **Water quality** - When it rains car oil, petrol and air pollution from cars all get washed into stormwater drains and pollute waterways.
  - c. **Noise** - Noise increases with the size and speed of the vehicle. In Perth, road traffic is the greatest *single source of community noise*.
  - d. **Greenhouse gases** - cars burn fuel to enable them to run, carbon dioxide is one of the gases produced from the burning of this fuel and carbon dioxide is a greenhouse gas. The average car emits about four tonnes of carbon dioxide each year. Transport activity is around half of most household's emissions.
  - e. **Use of natural resources** - Building and looking after vehicles uses non-renewable resources such as metals (for car bodies), petroleum (for plastics and fuel), and other fossil fuels (e.g. coal for production of electricity). It also uses a lot of water.
8. Distribute a copy of the '[Student Worksheet](#)', ask students to copy the results of the hands-up survey into the second column of Activity 1. Then ask students to calculate the kilograms of CO<sub>2</sub> emitted from the class's journey to school that day and fill in their impact evaluations (high or low).
9. Ask students to consider the negative impacts on air pollution, water quality, use of natural resources and noise from each mode of transport and complete columns 5 to 8.
10. Ask students to identify the mode of transport that has the greatest impact on the environment and expand of their answer to include why.

## Activity 2 - Identifying benefits of active travel and setting goals

1. Revisit the results from the hands-up travel survey (in Activity 1).
11. Ask students to consider alternative ways to travel to school. For example, can they walk, ride their bike, scooter or skateboard, or catch public transport?
12. Brainstorm strategies that promote a healthy lifestyle.
13. Lead a discussion that allows students to become aware of the benefits of walking, riding and catching public transport to school. (Examples of benefits: more time outdoors; reduced air pollution around school; improved fitness and health from exercise; spend quality time with parent; an excuse to hang out with friends; streets 'feel' safer as there are less cars and more 'eyes on the street'; greater independence; you get to know and connect with your local neighbourhood; a great excuse to walk the dog and no more car sickness!)
14. Students locate and collect information and/or data from a range of appropriate primary sources and secondary sources on ways to increase active transport distance (e.g. museums, media, library catalogues, interviews, internet).

15. Students represent information and/or data using appropriate formats to suit audience and purpose (e.g. tables/graphs, visual displays, models, timelines, maps, other graphic organisers).
16. Ask them to list some of these benefits on their Student Worksheet in Activity 2.
17. Ask students to consider how they could walk, ride or catch public transport more often? For example, can they walk once or twice a week to school? If they live a long way from school, can they walk part of the way to school? If they already walk to school, could they also walk to the shops?
18. Ask students to propose and implement opportunities to increase their physical activity levels at school, at home and to and from school. Include active transport distance goals per week.
19. Encourage students to discuss alternatives with a partner, and identify the benefits of each. Then ask students to complete the “goal template” on their Student Worksheet. Ask them to set at least two realistic goals to decrease the amount of time they spend travelling to school in a car. The goals need to be realistic and followed for at least the next week. Some examples are:
  - a. I will walk to school on Wednesday and Friday morning next week.
  - b. Instead of asking mum to drive me, I will ride my bike to school once next week
  - c. I will ask mum to take me to school on public transport.
20. As homework, ask them to take their goal sheet home to their parents or guardians, explaining why they have set these goals and ask for help to achieve them.
21. After the week is over, students should reflect on how successful they were in achieving their set goals. Did they achieve their goals? Why/why not? What did they find difficult and/or easy? What could be changed to make it easier to achieve their goals?
22. Students research and create routes to increase active transport distance per day/week to meet goal.
23. Ask students to create a 2D or 3D map using a variety of techniques and forms such as sculpture, mixed media, printing, drawing and painting.
24. Reflect on at least two aspects of the tasks, identify new understandings and act on findings in different ways (e.g. suggest additional questions to be investigated, propose a course of action on an issue that is significant to them).

## Extension

- If the students are successful at achieving the goals set in activity 2, encourage them to continue with this change for the remainder of the term.
- If students were unsuccessful in achieving their goals, ask them to set a new goal which is more realistic or to identify a change so they can meet their goal (e.g. buy an umbrella, ask Dad to fix bike).
- Conduct a hands-up travel survey of the whole school and calculate the kilograms of CO<sub>2</sub> emitted from the school’s journey to school that day.
- To learn more about carbon dioxide, do the “CO<sub>2</sub> Experiment and Greenhouse Effect” classroom activity.

## Assessment ideas

- Did student contribute to class discussion on environmental impacts of vehicles?
- Using Student Worksheets, assess the data collected and calculations made.
- Did student correctly calculate the CO<sub>2</sub> emitted from the class's journey to school that day?
- Did student contribute to class discussion on benefits of walking and cycling to school?
- Did student identify two realistic goals?
- Did student reflect on how successful they were in achieving their set goals?

## Weblinks

Please also refer to links to sources in footnotes in the '[Background](#)' section.

<http://www.carbonneutral.com.au/carbon-calculator/vehicles-and-fuel-use.html> - the Carbon Neutral carbon calculator helps you calculate the greenhouse gas emissions from your vehicle or fuel use.

<https://www.greenvehicleguide.gov.au> - The Green Vehicle guide helps you by rating new Australian vehicles based on greenhouse and air pollution emissions.

<http://www.abs.gov.au/> - This website can be used to discover figures for car use and CO<sub>2</sub> emissions in Australia.

## Links to the Western Australian Curriculum

**Table 1: Science**

Strand	Sub-strand
Science understanding	<ul style="list-style-type: none"> <li>• Earth and space sciences</li> </ul>
Science as a human endeavour	<ul style="list-style-type: none"> <li>• Nature and development of science</li> <li>• Use and influence of science</li> </ul>
Science inquiry skills	<ul style="list-style-type: none"> <li>• Processing and analysing data and information</li> <li>• Evaluating</li> <li>• Communicating</li> </ul>

**Table 2: Humanities and Social Sciences**

Strand	Sub-strand
Geographical knowledge and understanding	<ul style="list-style-type: none"> <li>• The Earth's environment sustains all life (year 4)</li> <li>• Factors that shape the human and environmental characteristics of places (year 5)</li> </ul>
Humanities and Social Sciences skills	<ul style="list-style-type: none"> <li>• Questioning and Researching</li> </ul>

Strand	Sub-strand
	<ul style="list-style-type: none"> <li>Analysing</li> <li>Evaluating</li> <li>Communicating and Reflecting</li> </ul>

**Table 3: Mathematics**

Strand	Sub-strand
Statistics and probability	<ul style="list-style-type: none"> <li>Data representation and interpretation</li> </ul>

**Table 4: Health and Physical Education**

Strand	Sub-strand
Personal, social and community health	<ul style="list-style-type: none"> <li>Being healthy, safe and active</li> </ul>
Movement and physical activity	<ul style="list-style-type: none"> <li>Understanding movement</li> <li>Learning through movement</li> </ul>

**Table 5: The Arts: Visual Arts**

Strand	Sub-strand
Making	<ul style="list-style-type: none"> <li>Developing skills and processes</li> <li>Ideas</li> <li>Skills</li> <li>Production</li> <li>Inquiry</li> </ul>

**Cross Curriculum Links:**

- Maths, English

**Cross Curriculum Priorities:**

- Sustainability

**General Capabilities:**






- Literacy, Numeracy, Critical and creative thinking,
- Personal and social capability, Ethical understanding

# Student Worksheet

Name: \_\_\_\_\_

## Activity 1: Travel Survey and Environmental Impact

How did we get to school today and what are the environmental impacts?

Impact	Car 	Bus 	Train 	Bike, scooter or skate 	Walk 	Total
Student No.						
Total g of CO2 emitted per passenger km						
Total kg of CO2 emitted per km						
Air pollution (H, L)						
Water pollution (H, L)						
Use of natural resources (H, L)						
Noise pollution (H, L)						
Which mode has greatest impact on environment?						

# Student Worksheet

Name: \_\_\_\_\_

## Activity 2: Benefits of Active Travel

### Goal-setting

Think about different ways to travel to school. Can you walk, ride your bike, or catch public transport? Can you ride your scooter or skateboard? If you live a long way from school, can you walk part of the way to school? If you already walk to school, could you also walk to the shops?

Set at least two realistic goals to reduce the time you travel in a car for at least the next week. For example:

- I will walk to school on Wednesday and Friday morning next week.
- Instead of asking mum to drive me, I will ride my bike to school once next week.
- I will ask mum to take me to school on public transport.

**My goal next week is to:**

**I want to achieve this goal because:**

**My goal next week is to:**

**I want to achieve this goal because:**