LESSON PLAN

# Lesson 2: Footprints, Fuel, and Future Choices

## LESSON SUMMARY

Students explore how their everyday travel choices impact the environment, climate, and connection to Country. They are introduced to key environmental concepts such as carbon emissions, greenhouse gases, climate change, and sustainable travel, building their understanding of how transport contributes to Australia's carbon footprint. By examining real-world data and applying simple calculations, students gain insight into the environmental impact of different transport modes and consider more eco-friendly alternatives. The lesson empowers students to think critically about their own habits, identify areas for change, and set personal goals for more sustainable travel. It encourages young people to see themselves as capable of leading positive environmental change in their communities through small, meaningful actions.

**SEQUENCE TITLE:**
TRAVEL WISE – Empowering independence through active, safe and sustainable travel

**LEVEL**
**Years 7-8**

**LESSON NUMBER**
**2 of 7**

**LESSON LENGTH**
**50 - 60 minutes**

## CURRICULUM AREAS

### LEARNING AREAS

- Health and Physical Education
- Science
- Mathematics

### CAPABILITIES

- Critical and Creative Thinking

### CROSS-CURRICULUM PRIORITIES

- Country and Place
- Sustainability

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## Victorian Curriculum 2.0 Content Descriptions

### LEARNING AREAS

**Health and Physical Education**

**VC2HP8P10** Plan and implement strategies, using health resources, to enhance their own and others' health, safety, relationships and wellbeing.
**VC2HP8M07** Design and justify a physical activity plan that incorporates strategies to increase physical activity levels to achieve health and wellbeing outcomes.

**Science**

**VC2S8I04** Data and information can be organised and processed by selecting and constructing representations including tables, graphs, keys, models and mathematical relationships.
**VC2S8H03** Proposed scientific responses to socio-scientific issues impact society and may involve ethical, environmental, social and economic considerations.

**Mathematics**

**VC2M8M07** Use mathematical modelling to solve practical problems involving ratios and rates, including distance-time problems for travel at a constant speed and financial contexts; formulate problems; interpret and communicate solutions in terms of the situation.

### CAPABILITIES

**Critical and Creative Thinking**

**VC2CC8Q02** When and how judgment is suspended to support generating and evaluating alternative ideas and possibilities.

### CROSS-CURRICULUM PRIORITIES

**Country and Place:**

**VC2CCPACP1** Aboriginal and Torres Strait Islander communities of Australia maintain a deep connection to, and responsibility for, Country and Place and have holistic values and belief systems that are connected to the land, sea, sky and waterways.

**Sustainability**

**VC2CCPSIS3** Economic, social, environmental and cultural systems influence the sustainability of Earth's systems.

### PRIOR KNOWLEDGE

- General awareness of environmental issues and basic sustainability concepts.
- Some familiarity with emissions, climate change and active travel from primary school.

### VOCABULARY

**Active travel** – walking, bike riding, or scooting instead of using motorised transport.
**Sustainability** – meeting our needs without harming future generations.
**Carbon emissions** – carbon dioxide released by vehicles and industry.
**Greenhouse gases** – gases that trap heat in the Earth's atmosphere.

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**Climate change** – long-term shifts in temperatures and weather patterns attributed directly or indirectly to human activity.
**Carbon footprint** – the total amount of greenhouse gases we produce.
**Mitigation** – actions taken to reduce the severity of climate change.

## MATERIALS REQUIRED

- Whiteboard and markers.
- Devices with Google Maps or printed local maps.
- Carbon Crunch Travel Challenge Game Rules and Cards.
- Travel Emissions Comparison Worksheets.
- Low Emissions Dash Game Rules and Travel Action Cards.
- Videos:
  Agriculture Victoria - Victoria's Climate 101
  Zero Emissions - What does that mean? - BTN
  Connection to Country - Parks Victoria
  Teens File Class Action Lawsuit Against the Government - BTN

## LEARNING OBJECTIVE

Students will understand the science and impact of greenhouse gas emissions from transport, evaluate travel choices through sustainability and data analysis, and apply strategies to reduce their personal and community carbon footprint.

## SUCCESS CRITERIA

- I can explain the role of active travel in reducing greenhouse gas emissions.
- I can analyse emissions data and use it to evaluate travel choices.
- I can suggest and justify ways to reduce my carbon footprint through sustainable transport.

## TEACHING CONSIDERATIONS

- Scaffold sustainability concepts with visual examples.
- Acknowledge transport limitations in rural or low-infrastructure communities.
- Encourage respect for diverse environmental beliefs and experiences.
- Allow students to critically analyse information without pressure to change personal family routines.

**Extend**

- Research your local area's public transport network and propose improvements.
- Create a school Active Travel Week challenge.
- Design a class awareness campaign: "Reduce Your Travel Footprint".

**Enable**

- Offer structured sentence starters for pledge writing.
- Simplify game card scenarios for students with numeracy challenges.
- Allow peer support or teacher-guided group for worksheet tasks.
- Provide printed map alternatives for students without device access.

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## ASSESSMENT

- Observe group discussion and data calculations.
- Check worksheet accuracy and evidence of understanding.
- Review pledges for feasibility, relevance, and alignment with learning.
- Use exit ticket question: "One travel change I could make this month is...".

## LEARNING CONTINUUM

**Focus:** Exploring the environmental impacts of transport, evaluating data on emissions and applying sustainable, community-focused travel solutions through analysis, problem-solving and personal responsibility.

| Learning Continuum | Phase 1 | Phase 2 | Phase 3 |
|---|---|---|---|
| **Students explore the role of transport in environmental sustainability and climate change. They engage in scientific thinking and data analysis to evaluate their own travel choices and propose actionable, inclusive solutions.** | Student can describe active travel and show basic awareness that motorised transport impacts the environment. Ideas are mostly personal and general. | Student uses data or examples to explain how transport contributes to climate change and can describe strategies to reduce their impact. | Student critically analyses emissions data, connects travel behaviours to broader environmental systems, and justifies inclusive, community-oriented solutions. |

## ASSESSMENT RUBRIC

| Organising Element | Action | Insufficient Evidence | Quality Criteria | | |
|---|---|---|---|---|---|
| **Understanding of environmental impact** | 1. Explain how transport contributes to climate change | 1.0 No response or unrelated idea | 1.1 States that transport causes pollution or environmental damage without elaboration | 1.2 Explains the link between transport and carbon emissions using accurate terms or examples | 1.3 Justifies how different transport types affect greenhouse gases and links to broader climate science concepts |
| **Data interpretation and analysis** | 2. Use emissions data to evaluate travel choices | 2.0 No attempt or incorrect use | 2.1 Uses a simple example or makes a partial comparison between travel modes | 2.2 Accurately calculates and interprets data to compare travel options | 2.3 Analyses trends, justifies choices using calculations, and identifies patterns or anomalies |

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## ASSESSMENT RUBRIC (Cont'd)

| Organising Element | Action | Insufficient Evidence | Quality Criteria | | |
|---|---|---|---|---|---|
| **Sustainability awareness** | 3. Identify ways to reduce carbon footprint through travel | 3.0 No suggestion or unclear idea | 3.1 Suggests a basic strategy (e.g., "walk more") without explanation | 3.2 Proposes a realistic action and explains how it reduces emissions | 3.3 Proposes creative or community-level solutions and explains broader sustainability impacts (e.g., liveability, future generations) |
| **Critical thinking and connection-making** | 4. Connect environmental, social and personal reasons for change | 4.0 No connection made | 4.1 Lists separate reasons without linking them | 4.2 Makes connections between environmental benefits and personal or community actions | 4.3 Clearly explains how actions have multi-layered impacts across systems (e.g., health, equity, environment) |

## Structure of lesson:

**1** **LESSON PHASE:** Introduction (Hook) **TIMING:** 10 mins

**Brainstorm** the following series of questions:

1. *What do you think it means when First Nations people say "Country" is part of who they are?*
2. *Why do you think caring for Country has always been so important to Aboriginal people?*
3. *What do you think "Healthy Country, Healthy People" mean and how does that idea apply to all of us today?*

**Summarise** the importance of everyone looking after country:

*For Aboriginal people in Victoria, Country is much more than land. It includes the rivers, mountains, animals, plants, skies, and even the stories, songs and spirits connected to it. Aboriginal people have a deep spiritual and cultural connection to Country — it's part of who they are.*

*The phrase **"Healthy Country, Healthy People"** means that when the land is cared for and respected, the people stay strong and well too. Aboriginal people have looked after Country for tens of thousands of years, using traditional knowledge passed down through generations.*

*Respecting Country means listening, learning, and recognising that Aboriginal people are the original custodians. It's about working together to protect and care for the environment and the culture that belongs to it.*

**Show** Connection to Country - Parks Victoria video

**Ask**: How might our everyday travel choices affect the health of Country?

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## DIFFERENTIATION STRATEGIES

**Enable**

- **Simplified Vocabulary**: Provide a printed glossary with icons and simplified definitions for key terms (e.g., "carbon footprint" = "the pollution we make when we travel").
- **Visual Check-ins for Understanding**: Use thumbs up/down and matching activities with images and terms to assess understanding of vocabulary and key ideas in the video.

**Extend**

- **Note-Taking & Peer Teaching**: Students jot down known climate terms and teach one to a peer after the video.
- **Vocabulary Expansion Task**: Students add an additional sustainability term (e.g., "mitigation") to the vocab list and explain it to their group with a quick sketch or example.

## 2 LESSON PHASE: Explicit Teaching & Modelled Learning

**TIMING:** 20 mins

**Show** Agriculture Victoria - Victoria's Climate 101 video

**Show** Zero Emissions - What does that mean? - BTN video

**Pause** the video regularly and check for understanding of key terms (Use thumbs up/down for definitions, match words to meanings on board)

- **Active travel** – walking, bike riding, or scooting instead of using motorised transport.
- **Sustainability** – meeting our needs without harming future generations.
- **Carbon emissions** – carbon dioxide released by vehicles and industry.
- **Greenhouse gases** – gases that trap heat in the Earth's atmosphere.
- **Climate change** – long-term shifts in temperatures and weather patterns.
- **Carbon footprint** – the total amount of greenhouse gases we produce.
- **Net Zero** - balancing the greenhouse gases released with an equal amount removed from the atmosphere.

**Prompt discussion**: What did you already know? What was new or surprising?

**Check** understanding of key ideas:

- What causes the Earth to heat up?
- What does 'Net Zero' emissions mean?

**Explain** Low Emission Dash Game rules provided.

**Set-up and materials:**

- Low Emission Dash Game Travel Action Cards – e.g., walk, bike ride, bus, train, car solo, carpool, e-scooter, skateboard, tram. One set per group. Each set is a different colour.
- Emissions Cones or Zones: 4 coloured cones or signs labelled with emission levels:
  - Very Low
  - Low
  - Medium
  - High

**Debrief after the game:**

- Which mode surprised you most?
- What does this tell us about the way we usually travel?
- Lead into explicit teaching phase with unpacking the science behind the numbers.

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**Display or share** infographic in Travel Emissions Comparison Worksheet

**Explain** the measurement used on the infographic - grams of $CO_2$ per person km metric.

*As we now know, not all types of transport make the same amount of $CO_2$. One way to measure this is by looking at how much $CO_2$ is made for* ***each person for every kilometre they travel.*** *That's called* ***grams of $CO_2$ per person kilometre (g $CO_2$/person km).***

**Discuss**: *What is the biggest contributor to transport emissions? Why does car use rank so high?*

**Teacher models** using a formula:

Emissions (g $CO_2$) = Distance (km) × g $CO_2$ per person km
Examples:

- 5 km dual occupancy car trip = 5km × 121.9g $CO_2$ per person km = 609.5g $CO_2$
- 5 km bus trip = 5km × 22g $CO_2$ per person km = 110g $CO_2$

**Discuss**: *What's the real-world impact of this data?*

## DIFFERENTIATION STRATEGIES

**Enable**

- **Pre-Highlighted Data Sheets**: Provide a version of the "Australia's Transport Emissions" infographic with key numbers and terms already circled or colour-coded.
- **Supported Group Participation**: Assign students to a group with a peer coach or teacher aide to help with decision-making and understanding of the travel card activity.

**Extend**

- **Prediction Challenge**: Before revealing answers, ask students to predict emission zones for each transport type and justify their decisions with logic and prior knowledge.
- **Visual Reasoning Activity**: Students create a diagram showing the connection between fuel type, transport mode, and emissions, then present it briefly to a small group.

## 3 LESSON PHASE: Guided Practice

**TIMING:** 10 mins

**Play** the Carbon Crunch: The Travel Challenge Game

**Read** the rules and print the cards provided.

**Provide** each group with:

- A deck of Carbon Crunch Scenario Cards (provided)
- A Weekly Emissions Record Sheet or spreadsheet
- Access to carbon emission values per km for transport modes and Australia's Transport Emissions infographic.

**Students** work in small groups with pre-prepared cards that give a scenario.

**Use** calculators or spreadsheet to complete challenges.

**Groups** compete to find the most eco-friendly travel pattern.

**Share** most surprising results with class.

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## DIFFERENTIATION STRATEGIES

**Enable**

- **Worked Example Scaffold**: Start with a full class walkthrough of one Carbon Crunch scenario using visuals and verbal thinking aloud.
- **Tangible Visual Supports**: Allow use of coloured counters, bar graphs, or simplified templates to help compare total emissions instead of relying only on calculations.

**Extend**

- **Complex Scenario Variation**: Provide extra challenge cards that include combinations of transport types, distance changes, or interruptions (e.g., "Bus strike on Fridays" or "Cancelations due to extreme heat").
- **Create-a-Challenge Activity**: Ask students to invent their own realistic travel scenario card and swap with another group to calculate emissions.

## 4 LESSON PHASE: Independent Application

**TIMING:** 10 mins

**Students** calculate the emissions of their own weekly travel

- Use Google Maps or printed maps to find travel distances.
- Identify potential areas where emissions could be reduced.

**Extension** for fast finishers: Compare current habits with an improved week of travel and calculate emissions savings.

## DIFFERENTIATION STRATEGIES

**Enable**

- **Travel Calculator Template**: Supply a table or graphic organiser with sample numbers filled in (e.g., "If you travel 3 km each day…").
- **Peer-Assisted Learning**: Pair with a peer tutor to help measure travel distance using Google Maps or a printed map with scale.

**Extend**

- **Compare & Reflect Analysis**: Students create two versions of their weekly travel (current and improved) and graph the carbon savings visually.
- **Class-Level Projection**: Ask students to estimate emissions if their whole class or street adopted a new travel habit, using multiplication and averaging.

## 5 LESSON PHASE: Review / Reflection

**TIMING:** 10 mins

**Whole-Class Reflection Circle**

**Gather** students in a circle to reflect on the key ideas from the lesson.

Use the following **discussion prompts** to guide thinking and spark conversation:

- *What could happen if everyone in our community made small changes to how they travel?*
- *What's one new idea you learned today that might change the way you choose to travel?*

**Personal Pledge Activity:**

Ask students to write an **Active Travel Pledge** — a personal goal or action they will take to make their daily travel safer, more active, or more sustainable.

**Inspiring Broader Thinking** and pose this guiding question:

- *What can we do as young people to be climate leaders?*

**Encourage** students to think about small, individual actions that can lead to bigger change in their families, schools, and communities.

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**Video Stimulus:**

Play the *BTN* video: Teens File Class Action Lawsuit Against the Government - BTN

Use the video to **spark discussion** on how young people can take initiative and be powerful voices for environmental and community change.

## DIFFERENTIATION STRATEGIES

**Enable**

- **Pledge Sentence Starters**: Provide scaffolds like "One small change I can make is..." or "I could try walking to school on ____ days."
- **Flexible Expression Options**: Allow students to record a verbal pledge using a class iPad or share it in a small group discussion if writing is a challenge.

**Extend**

- **Community Action Extension**: Students include a step to influence or involve others (e.g., "I'll ask my friends to walk home with me on Fridays").
- **Persuasive Writing Mini-Task**: Students write a short persuasive statement or poster idea: "Why we should have a No-Car Day at school," using data from earlier activities.