Fresh Air Innovators Stage 3 STEM program

Fresh Air Innovators STEM program is designed for Stage 3 students, with a focus on air quality and bushfire management. It consists of 8 lessons of approximately 1 hour to be spread over a term. Each lesson empowers students with hands-on STEM activities and real-world skills. The program equips students with the means to tackle environmental challenges, build resilience and make a positive impact in their schools and communities.

Created in collaboration with environmental scientists, education specialists, teachers, Aboriginal and Torres Strait Islander knowledge holders and entrepreneurial professionals, this program combines scientific inquiry, cultural knowledge and innovative problem-solving.

View the website www.freshairinnovators.com.au for all resources outlined in this program.

Assessment overview

The program incorporates a variety of assessment strategies to support learning. Throughout the program, students use their learning journals to respond to formative assessment questions, with opportunities for self-assessment and teacher feedback on work samples and participation in discussions. Comprehensive teacher assessment and student self-assessment rubrics are provided for the final 2 lessons.

Outcomes - Current NSW syllabus (until 2027)	Outcomes - 2024 NSW syllabus (to be implemented by 2027)
Science and Technology ● ST3-1WS-S: Plans and conducts scientific investigations to answer questions, including fair testing. ● ST3-2DP-T: Plans and uses materials, tools, and equipment to develop solutions for a need or opportunity. ● ST3-3DP-T: Defines problems, and designs, modifies and follows algorithms to develop solutions. ● ST3-8PW-ST: Explains how energy can be transformed from one form to another. ● ST3-4LW-S: Examines how the environment affects the growth, survival and adaptation of living things. ● ST3-11LW: Describes some physical conditions of the environment and how these affect the growth and survival of living things.	**Science and technology** ● ST3-SCI-01: Uses evidence to explain how scientific knowledge can be used to develop sustainable practices. ● ST3-PQU-01: Poses questions to identify variables and conducts fair tests to gather data. ● ST3-DAT-01: Interprets data to support explanations and arguments. ● ST3-DDT-01: Uses design processes to create, evaluate and modify designed solutions. **HSIE**

Geography ● GE3-1: Describes the diverse features and characteristics of places and environments. ● GE3-2: Explains interactions and connections between people, places and environments. ● GE3-3: Compares and contrasts influences on the management of places and environments. **History** ● HT3-1: Describes and explains the significance of people, groups, places and events to the development of Australia. ● HT3-2: Describes and explains different experiences of people living in Australia over time. ● HT3-3: Identifies and describes change and continuity and describes the causes and effects of change on Australian society. **Mathematics (2022, current)** ● MAO-WM-01 Working mathematically: develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly. ● MA3-DATA-01: Constructs graphs using many-to-one scales ● MA3-DATA-02: Interprets data displays, including timelines and line graphs. **PDHPE** ● PD3-2: Investigates information, community resources and strategies to demonstrate resilience and seek help for themselves and others. ● PD3-7: Proposes and implements actions and protective strategies that promote health, safety, wellbeing and physically active spaces.	● HS3-ACH-01: Describes Aboriginal Knowledges and Practices that care for Country and the importance of Aboriginal Languages revival. ● HS3-GEO-01: Examines global citizenship and how people organise, protect and sustainably use the environment, using geographical information. **Mathematics (2022, current):** ● MAO-WM-01 Working mathematically: develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly. ● MA3-DATA-01: Constructs graphs using many-to-one scales. ● MA3-DATA-02: Interprets data displays, including timelines and line graphs. **PDHPE** ● PH3-IHW-01: Examines and explains factors that influence identity, health and wellbeing of individuals and groups. ● PH3-SMI-01: Evaluates and applies self-management and interpersonal skills in a range of contexts. ● PH3-CWT-01: Creates written texts to communicate understanding of health, safety and wellbeing.

Lesson 1 - Power up! Explore energy and renewable solutions				
In this lesson students explore energy transfer and transformation, including renewable and non-renewable sources. Through the Energy Transformers game, they tackle real-world challenges like reducing emissions and improving air quality. The lesson encourages students to think critically, generate higher-order questions, and contribute to the class question parking lot for further discussion.				
Outcomes (current)	**Outcomes (new)**	**Teaching and learning sequence**	**Assessment**	**Resources**
ST3-8PW-ST: Explains how energy is transformed from one form to another. GE3-3: Compares and contrasts influences on the management of places and environments. PD3-2: Investigates information, community resources and strategies to demonstrate resilience and seek help for	ST3-SCI-01: Uses evidence to explain how scientific knowledge can be used to develop sustainable practices. HS3-GEO-01: Examines global citizenship and how people organise, protect and sustainably use the environment, using geographical information. PH3-IHW-01: Examines and explains factors that influence identity, health	**Learning intention** We're learning how energy can be transferred and transformed. **Success criteria** • We understand that energy exists in different forms. • We understand that energy can be transferred (moved) or transformed (changed). • We can identify renewable and non-renewable energy sources. • We can describe the impact of using renewable and non-renewable energy sources on humans and the environment. Students are guided through slide presentation part 1: Introduction • Students think pair share about what objects relating to energy have in common • Students view a video clip on Dr. Nij who introduces the program Students are guided through slide presentation part 2: Types of energy • Students are introduced to how energy can be transferred and transformed, and how some energy is renewable and other energy is non-renewable	Question parking lot Assess students' contributions to the question parking lot in terms of their ability to think critically about energy sources and how these sources affect the environment. Observation / questioning Observe student engagement with the Energy Transformers game. Ask questions to check understanding during or after playing. These could include	Student devices with Energy Transformers app Question parking lot space in classroom Sticky notes for question parking lot; at least 3 per students (may need additional Blu Tack or sticky tape)

themselves and others.	and wellbeing of individuals and groups.	• As a class, students explore and classify types of energy Engage with Video 2: Dr Nij on ABC Education • Students view video to further explore renewable energy Students are guided through slide presentation part 3: Energy Transformers • Students are guided on how to play the Energy Transformers game and how this relates to learning about Energy. Students engage with Energy Transformers game on individual devices Students are guided through presentation part 4: Introduction to learning journal • Students are introduced to the learning journal • Students are provided with selection of questions to respond to, and an example WAGOLL • Students complete own entry in their journal	questions such as: What examples of renewable and non-renewable energy are there in the game? What challenge in the game have you found most interesting so far, and why? What's 1 thing you learned about reducing greenhouse emissions? Exit slip prompt Write down 1 thing you learned about renewable energy today. Learning journal	

Lesson 2 - The first scientists: Explore Aboriginal and Torres Strait Islander sustainable practices

In this lesson students explore Aboriginal and Torres Strait Islander Peoples' sustainable land management, focusing on cultural burning. They'll learn with DeadlyScience, compare fire types using a Venn diagram, and connect Aboriginal and Torres Strait Islander Peoples' knowledge to modern environmental challenges through videos and interactive activities.

Outcomes (current)	Outcomes (new)	Teaching and learning sequence	Assessment	Resources
ST3-4LW-S: Examines how	ST3-SCI-01: Uses evidence to	**Learning intention**	Assessment of work sample	Worksheet: First scientists

the environment affects the growth, survival, and adaptation of living things. ST3-11LW: Describes some physical conditions of the environment and how these affect the growth and survival of living things. GE3-2: Explains interactions and connections between people, places, and environments. GE3-3: Compares and contrasts influences on the management of places and environments. HT3-1: Describes and explains the significance of	explain how scientific knowledge can be used to develop sustainable practices. HS3-ACH-01: Describes Aboriginal Knowledges and Practices that care for Country and the importance of Aboriginal Languages revival. HS3-GEO-01: Examines global citizenship and how people organise, protect and sustainably use the environment, using geographical information. PH3-IHW-01: Examines and explains factors that influence	We're learning how Aboriginal and Torres Strait Islander Peoples' sustainable practices protect the environment. **Success criteria** ● We can describe Aboriginal and Torres Strait Islander Peoples' science practices. ● We can describe the difference between types of fires and how they affect the environment. Students are guided through slide presentation part 1: Introduction ● Students recap on last lesson ● Students are guided to explore the concept of Aboriginal and Torres Strait Islander Science ● Students are introduced to Corey Tutt from DeadlyScience and guided to think how they can relate to Aboriginal and Torres Strait Islander Science Engage with Video 1: Corey Tutt of DeadlyScience ● View a video of Corey Tutt, the inspirational STEM champion behind DeadlyScience Students complete worksheet: First scientists ● Students use their knowledge from earlier presentations and video to reflect on examples of Aboriginal and Torres Strait Islander Science Students are guided through slide presentation part 2: Fire: Friend or foe ● Students are guided to identify situations where fire may be considered a friend or foe ● Students explore the concept of bushfires, and are guided to identify if they are on bushfire prone land ● Students explore and discuss the effects of bushfires	Look at how accurately students categorise features of bushfires, controlled burns and cultural burns. Use this as an opportunity to check for misconceptions and provide clarification. Participation in discussions Observe student discussions and listen for their ability to explain cultural burning's benefits and how it differs from hazard reduction burning and bushfires. Exit slip Explain 1 way that cultural burning helps protect ecosystems. Or	Worksheet: Types of fires

people, groups, places, and events to the development of Australia. HT3-2: Describes and explains different experiences of people living in Australia over time.	identity, health and wellbeing of individuals and groups.	• Students engage with maps and information on the 2019-2020 Black Summer bushfires • Students are introduced to the concept of Hazard reduction burns • Students are introduced to Vince Scott from DeadlyScience Engage with Video 2: Cultural burns • Students learn about cultural burns with Vince Scott from DeadlyScience Students are guided through presentation part 3: Cultural burning and policy • Students are engaged in discussions about rules and policies Engage with Video 3: Joe Morrison explains cultural burning policy • Students learn from Joe Morrison from the Indigenous Land and Sea Corporation about cultural burning and how it fits into land management today. Students complete worksheet: Venn diagram: Types of fires • Students demonstrate their knowledge of the difference between bushfires, hazard reduction burns and cultural burning Learning journal • Students select and respond to learning journal questions to demonstrate their learning	describe 1 thing you learned about Aboriginal and Torres Strait Islander land management. Learning journal	

Lesson 3 - Know your backyard: Investigate natural hazards and local environmental management				
In this lesson students explore how natural hazard management adapts to climate change. They investigate local fire history using the SEED map database and examine climate impacts on bushfires, floods and droughts. Through the Mt Resilience game, they identify strategies for their community and consider systemic change, disaster resilience and sustainable land management.				
Outcomes	**Outcomes (new)**	**Teaching and learning sequence**	**Assessment**	**Resources**
ST3-4LW-S: Examines how the environment affects the growth, survival, and adaptation of living things. ST3-2DP-T: Plans and uses materials, tools, and equipment to develop solutions for a need or opportunity. GE3-1: Describes diverse features and characteristics of places and environments. GE3-2: Explains interactions and connections between people,	ST3-SCI-01: Uses evidence to explain how scientific knowledge can be used to develop sustainable practices. HS3-ACH-01: Describes Aboriginal Knowledges and Practices that care for Country and the importance of Aboriginal Languages revival. HS3-GEO-01: Examines global citizenship and how people organise, protect and sustainably	**Learning intention** We're learning to investigate our local environment and explore strategies to manage natural hazards sustainably. **Success criteria** • We can use digital tools to explore local fire history and environmental features. • We can identify and classify natural hazard management strategies in our community. • We can suggest improvements to existing strategies. Students are guided through slide presentation part 1: Introduction • Students are guided to consider their local landscapes and how they feel connected to it • Students recap on last lesson • Students discuss and identify what factors may cause changes in landscapes • Students are guided to explore examples of natural hazards Engage with Video 1: Connecting to country • Vince Scott from DeadlyScience explains the importance of connecting to Country	Discussion Engage students in class discussions about how Vince Scott connects to Country and how they connect to their own local environment. Observe their ability to articulate ideas and make connections. Assessment of worksheet Use the worksheet from the SEED map exploration to assess students' ability to record accurate observations and articulate questions about fire history and	Devices for SEED map online database and Mt Resilience game Worksheet: Local fire history Earphones (optional) for Mt Resilience game Padlet for class brainstorming; free platform, but you'll need to set up an account

places, and environments. GE3-4: Acquires, processes, and communicates geographical information using geographical tools for inquiry. HT3-2: Describes and explains different experiences of people living in Australia over time. HT3-5: Applies a variety of skills of historical inquiry and communication. MA3-DATA-02: Interprets data displays, including timelines and line graphs.	use the environment, using geographical information. PH3-IHW-01: Examines and explains factors that influence identity, health and wellbeing of individuals and groups. PH3-SMI-01 : Evaluates and applies self-management and interpersonal skills in a range of contexts. MA3-DATA-02: Interprets data displays, including timelines and line graphs.	Students are guided through slide presentation part 2: Exploring our local landscape ● Students are guided to reflect on how they can connect more to their local country ● Students are guided through how to use the SEED map database to explore the local fire history of their own local area Students complete worksheet: Venn diagram: Types of fires ● Students reflect and record their findings from the SEED map database Students are guided through presentation part 3: Weather, climate and resilience ● Students explore the difference between weather and climate and sort conditions into these categories ● Students are introduced to the concept of climate change Students explore the concept of disaster resilience Engage with Mt Resilience game ● Students independently play Mt Resilience game and are guided to reflect on management strategies used in their areas, including individual responsibilities, local, state and national ● Students are introduced to the idea of systemic change Students engage with video 2: Harkaway Primary Schools ● Students explore a case study of the Resilient Australia National School Award Learning journal ● Students select and respond to learning journal questions to demonstrate their learning	management strategies. Exit slip Explain 1 way our local landscape has changed over time and the impact of this change. Learning journal	

Lesson 4: Invisible invaders: Understanding and measuring air pollution				
In this lesson students explore air pollution sources, impacts, and monitoring. They investigate fine particulate matter (PM) known as PM2.5 and its effects on human health and the environment, and sort pollution sources. Using the Air Quality NSW website, they analyse real-time data and distinguish correlation from causation. Finally, students collect PM2.5 data around their school to identify pollution hotspots and possible sources.				
Outcomes	**Outcomes (new)**	**Teaching and learning sequence**	**Assessment**	**Resources**
ST3-1WS-S: Plans and conducts scientific investigations to answer questions, including fair testing. ST3-2DP-T: Plans and uses materials, tools, and equipment to develop solutions for a need or opportunity. ST3-4LW-S: Examines how the environment affects the growth, survival and adaptation of living things.	ST3-SCI-01: Uses evidence to explain how scientific knowledge can be used to develop sustainable practices. ST3-DAT-01: Interprets data to support explanations and arguments. HS3-GEO-01: Examines global citizenship and how people organise, protect and sustainably use the environment, using geographical information.	**Learning intention** We're learning about the impacts of pollution on humans and the environment. **Success criteria** • We can describe sources of pollution. • We can describe the impacts of pollution. • We can measure pollution in our environment. Students are guided through slide presentation part 1: Introduction • Students recap on last lesson • Students are guided to learn about pollutants through exploring diagrams, think, pair, share activities and filling the blanks • Students are introduced to the term 'particulate' and are guided to learn about the size and impact of these Students complete worksheet: Local sources of PM2.5 pollution • Students sort sources of PM2.5 pollution according to how likely they think they'll affect their local environment.	Assessment of data analysis worksheet Use the worksheet to assess how well students recorded and analysed PM2.5 data. Group discussions Discuss as a group why some areas of the school had higher or lower PM2.5 readings. Exit slips What is PM2.5 and why is it important for us to measure it? What was the most surprising result from your measurements today?	Charged air pollution monitors Access to outdoor areas Worksheet: Local sources of PM2.5 Worksheet: Measuring PM2.5

GE3-3: Compares and contrasts influences on the management of places and environments. MAO-WM-01: Working mathematically: develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly. MA3-DATA-01: Constructs graphs using many-to-one scales.	MAO-WM-01: Working mathematically: develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly. MA3-DATA-01: Constructs graphs using many-to-one scales. PH3-IHW-01: Examines and explains factors that influence identity, health	Students are guided through slide presentation part 2: Measuring PM2.5 ● Students are guided to explore the air quality NSW website to identify local patterns of PM2.5 ● Students explore the difference between correlation and causation and complete a sorting activity as a class ● Students are guided through calculating the health costs of pollution ● Students are taught how to use air pollution monitors and make predictions about PM2.5 levels around the school environment Students engage in worksheet: Measuring PM2.5 ● Students use air pollution monitors to collect PM2.5 data around the school environment ● Students are guided to analyse their data Learning journal ● Students select and respond to learning journal questions to demonstrate their learning	Learning journal	

PD3-7: Proposes and implements actions and protective strategies that promote health, safety, wellbeing and physically active spaces.	and wellbeing of individuals and groups.			
Lesson 5: Breathe easy: Monitor and reduce carbon dioxide in the classroom				
In this lesson students explore carbon dioxide (CO2) and its impact on human health and the environment. Using an air pollution monitor to measure CO2, they assess classroom levels and conduct an experiment to investigate its properties. They analyse data to understand how CO2 impacts indoor air quality.				
Outcomes	**Outcomes (new)**	**Teaching and learning sequence**	**Assessment**	**Resources**
ST3-1WS-S: Plans and conducts scientific investigations to answer questions, including fair testing. ST3-2DP-T: Plans and uses materials, tools, and equipment to develop solutions for a need or opportunity.	ST3-PQU-01: Poses questions to identify variables and conducts fair tests to gather data. ST3-DAT-01: Interprets data to support explanations and arguments. PH3-IHW-01: Examines and explains factors that influence	**Learning intention** We're learning how to monitor and manage CO2 levels and understand its impact on our health and environment. **Success criteria** • We can describe CO2 and how it affects the environment and human health. • We can use and interpret data from a digital CO2 monitor. • We can suggest actions to lower levels of CO2. Students are guided through slide presentation part 1: Introduction • Students recap on last lesson • Teachers drop 3 pre-prepared balloons (1 filled with CO2 from soda water bottle, 1 filled with exhaled air,	Experiment observation Observe students' ability to set up an experiment as a fair test. Ask prompt questions such as: 'What is the 1 thing you are changing?' (independent variable); 'What are you measuring? (dependent variable); and 'What are you keeping the same?	1 bottle of carbonated soft drink per group of 4-6 1 balloon pump per group of 4-6 3 balloons per group of 4-6 1 air pollution monitor per group of 4-6 1 or more small car-sized spaces per group of 4-6

ST3-11PW-ST: Explains how energy can be transformed from one form to another. PD3-7: Proposes and implements actions and protective strategies that promote health, safety, wellbeing. and physically active spaces. MAO-WM-01: Working mathematically: develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating	identity, health, and wellbeing of individuals and groups. PH3-SMI-01: Evaluates and applies self-management and interpersonal skills in a range of contexts. MAO-WM-01: Working mathematically: develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly.	1 filled with air from balloon pump) and guide students through questions in presentation ● Students are guided through the experiment set-up in groups, where they fill their own balloons like the demonstration ones, and repeat their own experiment ● Students are guided through the concept of fair testing and variables in their experiment ● Students are led through experiment discussion and encouraged to make real-world connections Students are guided through slide presentation part 2: CO2 in enclosed spaces ● Students engage in discussion on how CO2 can build up in enclosed spaces such as cars ● Students are guided how to set up a group-work experiment on how COS builds up in enclosed spaces, applying their knowledge of variables and fair testing Students engage in worksheet: CO2 in enclosed spaces ● Students use air pollution monitors and work in groups to conduct their experiment Students are guided through slide presentation part 3: CO2 in our classroom ● Students are introduced to the 'Birdie' CO2 monitor, discussing what is measures and what this means ● Students are guided to convert 'Birdie' into 'Kookie' using provided stickers ● Students use the 'letsair stimulator to estimate how classroom CO2 might change depending on various factors Learning journal	(controlled variables). Worksheet Assess students' ability to accurately record and interpret data. Exit slip What is 1 important thing you learned about CO2 and its impact on the environment or human health? Learning journal	Birdie CO2 monitor for the classroom Kookie stickers for Birdie CO2 monitor Worksheet: CO2 in enclosed spaces

their thinking and reasoning coherently and clearly. MA3-DATA-01: Constructs graphs using many-to-one scales. MA3-DATA-02: Interprets data displays, including line graphs.	MA3-DATA-01: Constructs graphs using many-to-one scales. MA3-DATA-02: Interprets data displays, including line graphs.	• Students select and respond to learning journal questions to demonstrate their learning		

Lesson 6: Filter heroes: Assemble and test HEPA filters to improve air quality				
In this lesson students investigate HEPA filters and their role in improving air quality. They construct a HEPA filter and conduct an experiment measuring PM2.5 levels before and after burning incense. Using air pollution monitors to measure PM2.5, they compare data with the HEPA filter on and off to test its effectiveness. The lesson promotes critical thinking and real-world application by exploring ways to improve indoor air quality.				
Outcomes	**Outcomes (new)**	**Teaching and learning sequence**	**Assessment**	**Resources**
ST3-1WS-S: Plans and conducts scientific investigations to answer questions, including fair testing.	ST3-SCI-01: Uses evidence to explain how scientific knowledge can be used to develop sustainable practices ST3-PQU-01: Poses questions	**Learning intention** We're learning how to monitor and clear our classroom of particulate matter. **Success criteria** • We can construct a HEPA filter and use it to improve air quality. • We can measure PM2.5 levels using air pollution monitors, interpret their data, and • evaluate the effectiveness of HEPA filters.	Experiment observation Observe students' ability to set up an experiment as a fair test. Ask prompt questions such as: 'What is the 1 thing you are changing?'	1 HEPA filter kit per group 1 magnifying glass per group 1 set of HEPA filter assembly instructions per group

ST3-2DP-T: Plans and uses materials, tools, and equipment to develop solutions for a need or opportunity. MAO-WM-01: Working mathematically: develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly. MA3-DATA-01: Constructs graphs using	to identify variables and conducts fair tests to gather data. ST3-DAT-01: Interprets data to support explanations and arguments. MAO-WM-01: Working mathematically: develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly.	Students are guided through slide presentation part 1: Introduction • Students are presented with a mystery object (a part of a HEPA filter) and asked to explore with a magnifying glass and suggest what it is, and what it might do • Students recap on last lesson • Students are guided to learn about what a HEPA filter is and how it works Students are guided through slide presentation part 2: Experiment: clearing the air • Students are reminded about PM2.5 and how to measure it • Students are guided to construct the HEPA filters in groups • Students are guided through setting up the HEPA filter experiment, about fair testing and variables • Students are taught how to record their data on their graph and discuss their results Students engage in worksheet: Clearing the air • Students conduct their experiment in groups, record and analyse their data Learning journal • Students select and respond to learning journal questions to demonstrate their learning	(independent variable); 'What are you measuring? (dependent variable); and 'What are you keeping the same? (controlled variables). Based on feedback from the previous lesson, students should be more confident in their responses. Worksheet / presenting findings Assess students' ability to accurately record and interpret data. Students could present their findings to the class. Students summarise the experiment in 1 sentence, including key terms like 'burning incense', 'PM2.5	1 incense stick per group 1 incense stick holder per group 1 air pollution monitor per group 2 long-handled oven lighters per group (one for use by teacher, one as back up) Cup or small container of water for each group to extinguish incense 1 timer or stop watch per group Have on hand a mask for each student if they would like to wear one 1 experiment worksheet for each student: Clearing the air

many-to-one scales. MA3-DATA-02: Interprets data displays, including line graphs. PD3-2: Investigates information, community resources and strategies to demonstrate resilience and seek help for themselves and others. PD3-7: Proposes and implements actions and protective strategies that promote health, safety, wellbeing and physically active spaces.	MA3-DATA-01: Constructs graphs using many-to-one scales. MA3-DATA-02: Interprets data displays, including timelines and line graphs PH3-IHW-01: Examines and explains factors that influence identity, health and wellbeing of individuals and groups.		levels' and 'HEPA filter'. Exit slip prompts What is 1 thing you learned about HEPA filters today? What questions do you still have about air quality or PM2.5? Learning journal	
Lesson 7: Fresh air action plan: Create a classroom environmental management plan				
In this lesson students design a classroom environmental management plan. They collaborate to monitor air quality and improve it by managing CO2 and PM2.5 levels. Using data and reasoning, they create a flowchart and assign roles for effective implementation of their				

plan. Groups present their plans, receive peer feedback, and refine their ideas, developing critical thinking and teamwork skills whilst creating healthier learning spaces.				
Outcomes	**Outcomes (new)**	**Teaching and learning sequence**	**Assessment**	**Resources**
ST3-2DP-T: Plans and uses materials, tools, and equipment to develop solutions for a need or opportunity. ST3-3DP-T: Defines problems, and designs, modifies and follows algorithms to develop solutions. GE3-3: Compares and contrasts influences on the management of places and environments. MAO-WM-01: Working mathematically: develops understanding and fluency in mathematics	ST3-SCI-01: Uses evidence to explain how scientific knowledge can be used to develop sustainable practices. ST3-DAT-01: Interprets data to support explanations and arguments. ST3-DDT-01: Uses design processes to create, evaluate and modify designed solutions. HS3-GEO-01: Examines global citizenship and how people organise, protect and sustainably use the environment, using	**Learning intention** We're learning to create a plan to sustainably manage air quality in our classroom. **Success criteria** • I can collect, analyse and interpret CO2 and PM2.5 data to identify air quality trends. • I can apply technology and engineering skills to develop solutions for air quality • management. • I can use mathematical reasoning to justify decisions and actions in the • environmental management plan. • I can work collaboratively to present a clear flowchart outlining responsibilities and • solutions. Students are guided through slide presentation part 1: Introduction • Students are reminded what management plans are, and introduced to environmental management plans • Students explore the key components of environmental management plans • Students are guided to a 'jigsaw' activity and allocated roles to start to brainstorm their own group classroom environmental management plans • Students are guided on how to create flow charts for their plan, using a medium of their choice (google drawings, Lucidchart, Powerpoint, Canva, Miro, or on paper)	Group presentations and peer feedback Assess how well each group explains their plan, including how they use data to justify when and why to use HEPA filters or adjust windows. Use the rubric to support assessment. Assess students' ability to provide constructive feedback using the '2 stars and a wish' framework. Observe how well groups incorporate feedback to revise and improve their plans. Student self-assessment Students use the self-assessment	Access to flowchart tools: This may include blank paper and markers, or digital tools such as Google Drawings, the Lucidchart add-on for Google Workspace, or student access to Canva or Miro Air pollution monitors HEPA filters Birdie classroom CO2 monitor Worksheet: Classroom environmental management plan: Planning sheet Worksheet: Classroom environmental

through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly. MA3-DATA-01: Constructs graphs using many-to-one scales. MA3-DATA-02: Interprets data displays, including line graphs. PD3-2: Investigates information, community resources and strategies to demonstrate	geographical information. MAO-WM-01: Working mathematically: develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly. MA3-DATA-01: Constructs graphs using many-to-one scales. MA3-DATA-02: Interprets data displays,	• Students are led through a WAGOLL example and familiarise themselves with a rubric before creating plans in groups • Students are supported to give feedback on other group's plans, and to make changes to their own plan • Students are supported to either amalgamate their plans into one for their classroom, or to vote on one to implement • Students consider ongoing monitoring of the selected plan Learning journal • Students select and respond to learning journal questions to demonstrate their learning	rubric to appraise their own work for their classroom environmental management plans. Teacher assessment Use the teacher rubric to assess students' final classroom environmental management plans. Learning journal	management plan jigsaw Classroom environmental management plan example Self-assessment rubric for Classroom environmental management plan Teacher rubric for Classroom environmental management plan Post-it notes for classroom environmental management plan feedback Recommendations for continuing the program

resilience and seek help for themselves and others. PD3-7: Proposes and implements actions and protective strategies that promote health, safety, wellbeing and physically active spaces.	including timelines and line graphs. PH3-IHW-01: Examines and explains factors that influence identity, health and wellbeing of individuals and groups. PH3-SMI-01: Evaluates and applies self-management and interpersonal skills in a range of contexts. PH3-CWT-01: Creates written texts to communicate understanding of health, safety and wellbeing.			
Lesson 8: Future innovators: designing entrepreneurial solutions for environmental challenges				
In lesson 8 students explore entrepreneurship as a tool for environmental change, guided by Megan Fisher from EnergyLab. They identify local transport issues, brainstorm solutions using 'blue sky thinking,' and develop ideas through storyboarding. Using peer feedback, they refine their innovations, fostering critical thinking and resilience. The lesson empowers students to drive systemic change in their communities.				

Outcomes	Outcomes (new)	Teaching and learning sequence	Assessment	Resources
ST3-2DP-T: Plans and uses materials, tools, and equipment to develop solutions for a need or opportunity. ST3-3DP-T: Defines problems, and designs, modifies and follows algorithms to develop solutions. GE3-2: Explains interactions and connections between people, places and environments. GE3-3: Compares and contrasts influences on the management of places and environments. PD3-2: Investigates	ST3-SCI-01: Uses evidence to explain how scientific knowledge can be used to develop sustainable practices. ST3-DDT-01: Uses design processes to create, evaluate and modify designed solutions. HS3-GEO-01: Examines global citizenship and how people organise, protect and sustainably use the environment, using geographical information. PH3-IHW-01: Examines and explains factors that influence identity, health	**Learning intention** We're learning to identify and solve real-world problems using entrepreneurial thinking and design processes to create innovative, sustainable solutions for the environment and society. **Success criteria** • I can identify and explain real-world transport and environmental problems and propose sustainable solutions. • I can use design processes to develop, evaluate and refine creative solutions collaboratively. • I can communicate my ideas effectively through writing and visuals, showing their impact on health, safety and the environment. Students are guided through slide presentation part 1: Introduction • Students are guided to consider why changes and technology are important • Students explore the pollution issues associated with transport • Students are introduced to how to think like entrepreneurs and introduced to 2 real life entrepreneurs: Saul Griffith and Megan Fisher Students engage with video 1: Saul Griffith • Students listen to Saul Griffith, as a case study of an entrepreneur Students engage with video 2: Megan Fisher, "Entrepreneurs identify opportunities'	Entrepreneurship rubric Use the entrepreneurship rubric to assess key components of this lesson. Peer feedback Use the rose, bud, thorn activity to assess how students give and respond to peer feedback. Ask: What did you learn from the feedback you received? How did you use feedback to improve your idea? Prototype observation (if doing) Observe students as they begin prototyping. Are they experimenting with different approaches? Are	Optional: Access to digital programs for storyboarding, eg, Canva or Google slides (can be done on paper) Storyboard template worksheet (optional) Rubric - student self-assessment Rubric - teacher assessment Optional: How to prototype guides (using tinkercad, cardboard, craft materials, Canva, Minecraft) Optional: Recycled materials, craft materials or access to digital programs to create entrepreneurial prototypes

information, community resources and strategies to demonstrate resilience and seek help for themselves and others. PD3-7: Proposes and implements actions and protective strategies that promote health, safety, wellbeing and physically active spaces.	and wellbeing of individuals and groups. PH3-SMI-01: Evaluates and applies self-management and interpersonal skills in a range of contexts. PH3-CWT-01: Creates written texts to communicate understanding of health, safety and wellbeing.	• Students are guided to think like entrepreneurs and identify opportunities for transportation solutions in their local area Students complete storyboard template • Guided by Megan, students complete a storyboard template demonstrating a solution for a transportation problem in their local area Students engage with video 3: Megan Fisher, 'Turning ideas into reality' • Students are guided to give and seek feedback to improve their ideas • Students explore how to turn their ideas into reality Optional: Students are guided through slide presentation part 2: Prototyping • Students have the option of building prototypes of their ideas through a variety of media, including Tinkercad, cardboard, craft materials, Canva, Minecraft and can use the downloadable guides for step-by-step support Optional: Competition • Students may choose to enter the prototypes or storyboards to the Fresh Air Innovators competition. See the competition tab of the website for complete guidelines. Learning journal • Students select and respond to learning journal questions to demonstrate their learning	they iterating based on feedback or challenges? Learning journal	

Fresh Air Innovators resources

If a funded position in the Fresh Air Innovators program is not available, you can still participate by accessing the online resources and purchasing your own hardware and experiment equipment. In addition to the listed materials, students will need access to devices (tablets, computers, or laptops) to engage with online resources. This document serves as a guide for purchasing the recommended resources for each lesson. For advice on recommended retailers, feel free to contact us via the 'contact us' tab in the website.

Lesson	Resource	Recommended quantity	Notes
Lesson 1	Learning journal	1 per student	Any lined workbook
	Post it notes	At least 3 per student	You may need additional blu-tac or sticky tape
Lesson 4	Air pollution monitors	5 for class, to use in groups	We use AirFanta G2 Air Quality Monitors to measure both PM2.5 and CO2
Lesson 5	Carbonated soft drinks (1.1L bottles, ideally soda water)	1 per group	Recommended group size of 4-6 students per group
	Balloon pumps	1 per group	
	Balloons	3 per group, some spare	
	Air pollution monitors (as per lesson 4)	1 per group	
	Birdie CO2 monitors	1 for classroom	See birdie.design for more information
	Birdie 'Kookie' sticker	1 per classroom	Contact us for availability
Lesson 6	HEPA filter set	1 per group	We use AirFanta 3Pro
	Incense sticks	1 per group	
	Incense holder	1 per group	
	Air pollution monitors (as per lesson 4&5)	1 per group	
	Long handled oven lighters	2 for class	Teacher to use one, keep one spare
	Timer / stop watches	1 per group	
	Face masks	1 per student if they would like to wear them	
Lesson 7	Air pollution monitors, HEPA filters, Birdie CO2 monitors	As per previous lessons	
	Post it notes	Approx. 3 per group	
Lesson 8	Prototype materials (optional)	Enough for each student to construct a prototype using a material of their choice (optional)	Materials may include cardboard, recycled materials, craft materials or access to digital programs to create entrepreneur prototypes (optional)