

Section 5 – Resources

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5.1 Thinking and teaching strategies

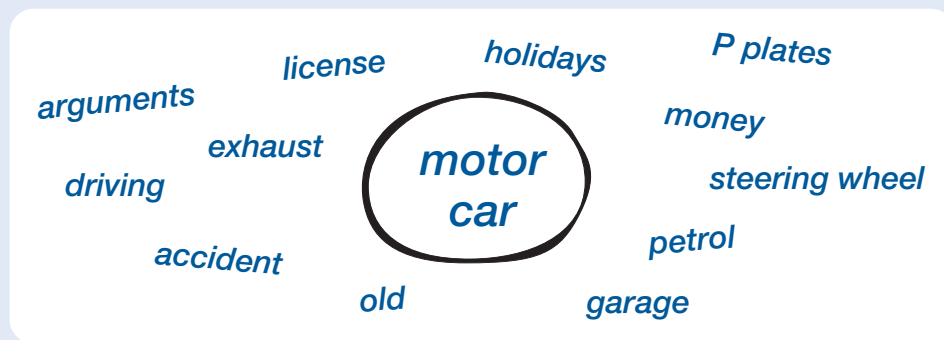


Brainstorm

A brainstorm activity can be conducted by an individual, a small group or a whole class. It is a list of all the thoughts, ideas and concepts and is the first recording of knowledge about a topic.

No suggestions are wrong – they are all recorded, without discussion, on whiteboard, butcher's paper or using a graphic organiser program. Leaving a brainstorm on display for a few days allows students to add their ideas when they think of them.

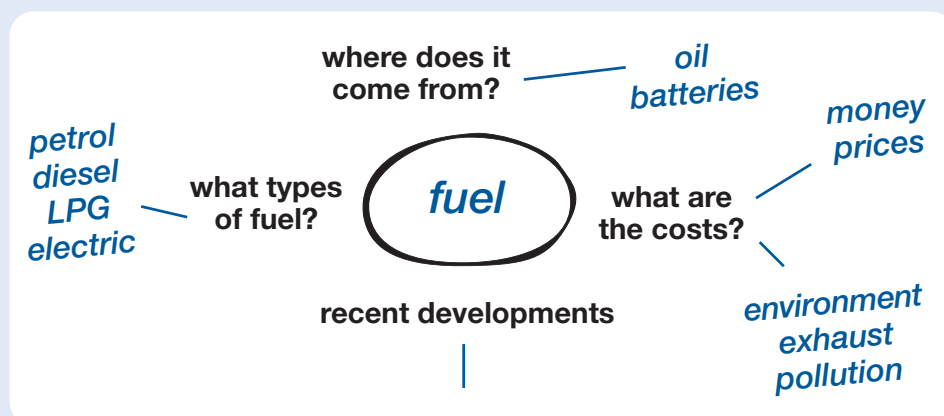
A second stage to a brainstorm is the identification of subheadings and sorting the ideas accordingly.



Concept map

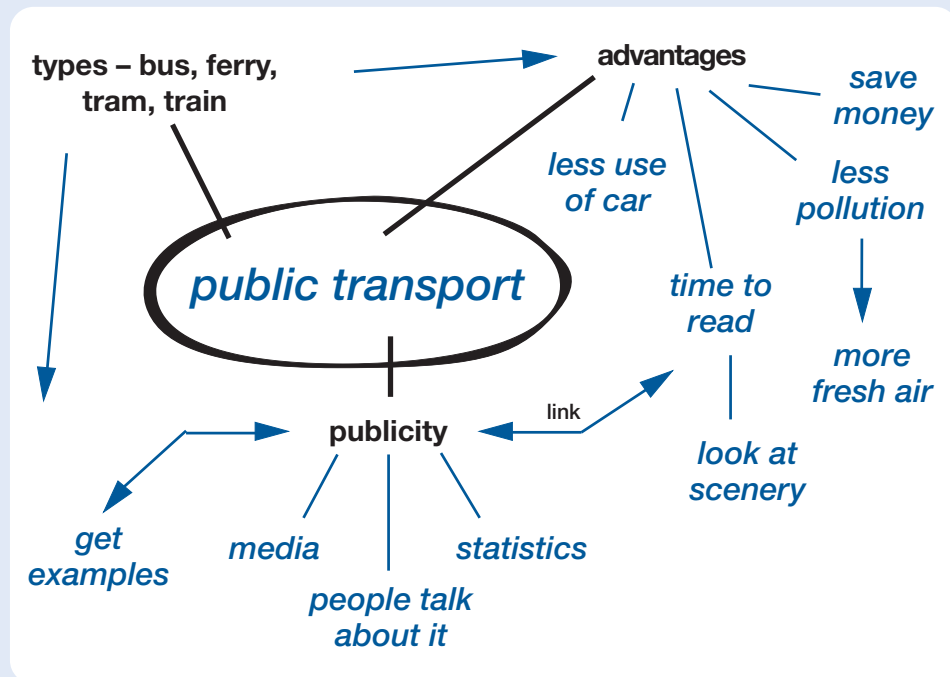
A concept mapping activity can further develop one of the headings relating to the topic.

It explores related concepts and is planned under relevant question starters – how, when, where, why, who, what.



**Mind map**

Mind mapping represents the links between concepts and establishes common grounds. A mind map is an excellent way of planning a report, persuasive argument, discussion or debate. It allows for relevant details and references to be added and is, potentially, a rough draft.

**Plus. Minus. Interesting**

The PMI activity is a visual representation that organises thinking into positive and negative aspects and the implications of both on an idea. It is best organised in columns and can be used in developing an argument or debate or making decisions.

More information about thinking tools can be located at:



<http://www.demon.co.uk/mindtool/pmi.html>
<http://www.forum.learningspace.com.au>

Question matrix

The question matrix encourages application of the question starters – how, when, where, why, who and what – in a variety of contexts. Use of this strategy encourages higher level thinking as students realise the potential of asking specific questions.

The question matrix can be accessed at:



<http://www.lincoln.school.nz/interlinc/presentations/webquest/question%20matrix.pdf>



Debate

Debates take a bit of organisation but are a lot of fun. Students learn to respect the rights of others to have different, valid points of view. In planning a debate, start small – with directed discussion and development of one aspect of each side of a topic.

A standard debate process is:

Students form 2 teams of 3 speakers. One team is the affirmative and the other, the negative.

The teams are each given the topic and allowed a certain time to plan their arguments. A leader of each team is chosen.

In the debate, speaking order is

- leader of the affirmative team (3 minutes)
- leader of the negative team (3 minutes)
- 2nd speaker affirmative (3 minutes)
- 2nd speaker negative (3 minutes)
- 3rd speaker affirmative (3 minutes)
- 3rd speaker negative (3 minutes)

Then it is usual to take a short break, for the leaders to plan their final speeches.

The leader of the negative concludes their argument and rebuttal (1 minute) followed by the leader of the affirmative team (1 minute).

Following a debate, students can discuss points raised. In formal debates, an adjudicator judges the whole debate and announces the winning team.



Thinkers keys



<http://www.lea.co.nz/citest/ciinpractice/tools/thinkerskeys.htm>

This resource explores many directions of divergent thinking.

Interviewing

Interviewing people is an excellent way of obtaining first hand information about a subject by asking relevant questions of a person who has experience and knowledge of the subject being studied.

The key to successful interviewing is to be VERY WELL PREPARED

YOU WILL NEED:

- **An interviewer** – the person conducting the interview and asking the questions
- **An interviewee** – the person being interviewed and answering the questions
- **A method of recording the interview** – this can be either by a scribe who writes the answers as the interview takes place OR by using a cassette recorder or video camera to record the interview. It is a good idea to transcribe the taped interview as soon as possible after it is done.

STEP 1 – Groundwork

- Decide what you need to know – make a plan of the development of your unit of study, work out what you need to know and plan your questions accordingly.
- Decide who is the best person to interview – someone who knows a lot about the subject and is keen to talk about it.

STEP 2 – Preliminary Contact

- Write, telephone or visit the person you wish to interview.
- Introduce yourself, explain who you are, what you want to find out and why you need to know. Ask the person if they would agree to being interviewed. Give a brief explanation of how you will conduct the interview, who will be present and how long you expect it to take. Ask if the interviewee would mind being taped or videoed.
- If the person agrees, make an appointment time for doing the interview. Arrange WHEN and WHERE – try to hold the interview in a place which is comfortable and will have no distractions or interruptions.

STEP 3 – Preparation

- Choose the questions. They must be logical and on the topic. Try to make them lead on from one another so that you can develop the ideas or information that the interviewee is telling you about.
- AVOID questions that can be answered with YES or NO – they waste your time, frustrate the person you are interviewing and don't really tell you anything.

AT THIS STAGE IT IS VERY IMPORTANT THAT YOU PRACTISE INTERVIEWING – ASK YOUR PARENTS / TEACHERS / FRIENDS TO HELP. ALSO PRACTISE SCRIBING AND CASSETTE OR VIDEO RECORDING.

STEP 4 – The Interview**Be**

- On time
- Tidy and well presented
- Well organised
- Polite
- A good listener
- Prepared for ANYTHING!

When the interview has finished, ask the interviewee if it would be all right if you contacted them again – for further explanations, clarification or maybe more questions.

If the interviewee has books / photos / papers for you to use or borrow, you must be honest with yourself. If you aren't very good at keeping track of your own possessions – **DON'T BORROW FROM ANYONE ELSE.**

If you do use the materials offered, make sure you return them as soon as possible – and always within a week.

STEP 5 – Finalisation

- When you have finished the whole interview process, including contacting the person again if necessary, it is essential that you make an effort to thank them.
- Write a note or call to see them – mention how the interview helped and if possible (and if you want to!) tell the person the assessment and comments you received for your work.
- You could even show your final copy so that the interviewee knows how you used their information.
- Depending on the circumstances a small gift may even be appropriate – judge this on how you would feel if you were the person being interviewed.

REMEMBER to add the details of your interview to your bibliography. It is a great idea to acknowledge an interview as a source of information.

BIBLIOGRAPHIC FORM For example:

Name of interviewee	Date	Title of interview	Place
<i>Sherie Smith</i>	<i>1 July 2003</i>	<i>How did you travel to school today?</i>	<i>Name of school</i>

5.2 Development of the motor car and bicycle

1490 Leonardo da Vinci sketched prototype design of the modern bicycle – there is no proof that it was ever built, and some people think it is a hoax, see for example http://users.aol.com/PryorDodge/Leonardo_da_Vinci.html.



Leonardo da Vinci
Sketch – 1490

1770 Nicholas Cugnot built a steam tractor that moved at walking pace.

1790 The forerunner of the bicycle, the Celerifere, was made by Count Mede de Sivrac in France. It had a wooden frame and wheels and was propelled like a scooter with no steering mechanism.

1810 Scotsman John McAdam introduced a road surfacing method – tarmacadam.



Hobby-horse

1817 German, Karl von Drais developed a bicycle which could be steered. Commonly known as the 'hobby horse', it had a padded seat and armrest.

1834 First electric vehicle was built by Thomas Davenport in the USA.

1835 The first known electric car was a small model built by Professor Stratingh in the Dutch town of Gröninge.

1839 Kirkpatrick MacMillan built the first bicycle with pedals to drive the rear wheels.

1847 Moses Farmer built the first two passenger electric vehicle.

1860 In France, Pierre and Ernest Michaux moved the pedals and cranks to the larger front wheel axle and the Velocifere (or Velocipede) was produced. Jean-Joseph Lenoir invented a two stroke internal combustion engine that ran on coal gas.



Velocipede

1865 An electric vehicle was not considered a viable option until Frenchman, Gaston Plante, invented the storage battery.

1867 A Velocipede was built in Goulburn, New South Wales, by W A George.



Ordinary

1870 The 'Ordinary' bicycle or 'penny farthing' was produced. This bicycle, with its large front wheel and smaller rear wheel gave increased speed and a more comfortable ride for the cyclist.

1875 The first 'Ordinary' bicycle was imported into Australia.

1876 The first four stroke internal combustion engine was invented by Nikolaus Otto in Germany.

1877 In America, Albert Pope, the 'father of the bicycle industry' built the Columbia, a modern style bicycle.

1881 Frenchman Camille Faure improved the capacity and power of the storage battery.

1885 The first commercially successful 'Safety' bicycle design, with wheels of equal size, was built by John Starley in England. This bicycle had a chain drive to the rear wheel and an adjustable saddle. The third version of this bicycle, the Starley Rover, was produced in 1888 and provided the general shape of bicycle frames for the next 60 years.



Safety bicycle

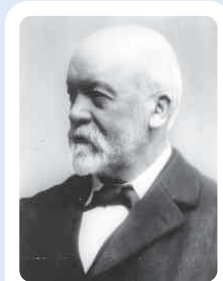


Benz

1885 Carl Benz in Germany, developed the first car with an internal combustion engine. It was a 3-wheeled vehicle, capable of travelling at 1/2 hp. Gottlieb Daimler fitted an internal combustion engine to a wooden frame to create the first motorised cycle.

1886 Daimler developed a 4-wheeled 1 1/2 hp vehicle in Germany. It had a 1.1 kw petrol driven vertical internal combustion engine.

Ransom E. Olds built his 3-wheeled steam car.



Daimler



Dunlop

1888 The first patent for pneumatic bicycle tyres was issued in Britain to a Scot, John Boyd Dunlop. Until this time, bicycle wheels were made of wood or metal and had no tyres.

1889 Gottlieb Daimler and Wilhelm Maybach combined the gasoline engine, gearbox and steering mechanism in a horse carriage frame – the 'horseless carriage'.

1890 The Humber bicycle was produced. Most bicycles produced since this time have been based on this design.

1890 Daimler Motor Company was founded.

1893 Frank and Charles Duryea made the first successful gasoline powered automobile in the USA.

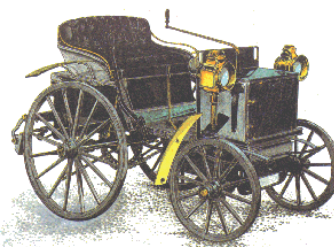
1894 The Panhard was the first car to be fitted with the engine at the front.

1895 In France, the Michelin Brothers improved on Dunlop's tyre by making a beaded edge, suitable for motor vehicles.

The Panhard-Levassor was the first car with an enclosed body. F W Lancaster built the first English car.

Herbert Austin, in England, built the first Wolseley.

75 cars entered United States of America's first automobile race but only 2 finished, the Benz and the Duryea.



Panhard-Levassor

1896 In England, the Locomotive Act (commonly known as the Red Flag Act) was abandoned and motor vehicles were allowed to travel at a maximum speed of 12 mph without pilots or red flags in front. The first Daimler was made at Coventry, England. First road fatality was at Crystal Palace, London, England: “Mrs Bridgett Driscoll run down by a car going at a tremendous pace like a fire engine – as fast as a good horse could gallop. The driver said he had rung his bell and shouted and that his car which had a maximum speed of 8 mph was doing 4 mph at the fatal moment.”



Ford's Quadricycle

Henry Ford built a motor car with 2 horizontal cylinders and a 2-speed gear, called the Quadricycle. Graft and Smith of Australia built the first front wheel drive petrol car.

Louis Renault, in France, built a car with a differential gear incorporated in the back axle, where, for practical purposes, it has remained ever since.

1897 H J Lawson introduced a Daimler motor omnibus to the streets of London. This was a 17-seater which operated in the Marble Arch – Notting Hill Gate district.

1898 The Coaster brake was fitted on bicycles. Many accessories became available and the bicycle was widely used for military, sport and general transport purposes.

1899 Henry Ford founded the Detroit Automobile Company. This venture failed and it was not until he developed a successful racing car with 4 cylinders and a top speed of 80 mph that he received financial backing.

1901 Electric taxi cabs appeared in New York.

1903 The Ford Motor Company Limited was founded. Driver's licences became compulsory in England. The legal speed limit in England was raised from 12 to 20 mph.



Model T-Ford

1904 Henry Royce undertook to make a vehicle that would become the ‘best car in the world’. He set exacting standards of workmanship. His vehicle was taken up by two partners in a motor vehicle agency firm, C S Rolls and Claude Johnson. Automatic car transmission was invented in the USA.



Silver Ghost

1908 The Rolls Royce company was founded with the introduction of the 40/50 hp Silver Ghost. The first Model T Ford appeared.

1911 Henry Ford introduced the first moving assembly line and mass production of the automobile began in earnest at 1,000 cars a day.

1914 Mass production of the bicycle meant that it became a cheap and practical form of personal transport.

1919 A Packard car established a world speed record in Florida, USA, doing 150 mph.

1926 The Daimler and Benz Motor Companies merged to form Mercedes-Benz.

1931 General Motors Australia (1926) and Holden's Motor Body Builders (1917) merged to form General Motors Holden.

1948 The first Holden production car rolled off the line at General Motors Holden's plant at Fisherman's Bend, Victoria – the Holden legend was born.



Holden FJ



Falcon XK

1960 Ford Australia released the XK Falcon. <http://www.automuseum.com/forddate.html>

1970s Development of BMX and mountain bikes gave the bicycle industry a huge boost.

1989 'Bike helmet' legislation. Australia passed the world's first first compelling cyclists to wear helmets.

1990s Regulations requiring an approach to "zero emissions" from vehicles increased interest in new battery technology. Battery systems that offered higher energy density became the subject of joint research by federal and auto industry scientists. Solar cars were first built by universities and manufacturers. The sun energy collector areas proved to be too large for consumer cars, however that is changing. Development continues on solar cell design and car power.

<http://www.sunwindsolar.com>

1997 In Japan, Toyota releases the Prius, the world's first mass-produced, electric/petrol hybrid vehicle.

<http://pressroom.toyota.com/mediakit/toyota/#Prius>

<http://www.toyotaavenue.com.au>

For more information about the history of the motor car

<http://inventors.about.com/library/weekly/aacarssteama.htm>

Bike history

<http://inventors.about.com/library/inventors/blbicycle.htm?terms=history+bicycle>



Toyota Prius 2000

5.3 Text types

In recording or presenting ideas and information, students can use any one of a number of text types to communicate their learning. Text types can be LITERARY or FACTUAL and each type has a specific purpose.

- The Literary text types are Drama, Narrative and Poetry.
- The Factual text types are Description, Discussion, Explanation, Exposition, Narrative (including auto/biography), Procedure, Procedural Recount, Recount, Report and Response/Review.

A Letter can be any one of a number of these text types but has a specific form.

Text type	Purpose	Structure	Language
Description	<ul style="list-style-type: none"> • to focus attention on the characteristic features of a particular thing • can be imaginative or objective • can be about a person, place or thing • can set the scene in an auto/biography or history text • often part of a literary text – drama or narrative 	<ul style="list-style-type: none"> • introductory paragraph about the subject • series of paragraphs describing different aspects of the subject • concluding paragraph 	<ul style="list-style-type: none"> • verbs in present tense • adjectives to describe the features of the thing being described
Discussion	<ul style="list-style-type: none"> • to present information about more than one side of an issue – the for and against aspects, or perspectives, of an issue, • to form opinions and give reasons for them • to make informed decisions about an issue and make recommendations based on evidence • debate, interview, newspapers articles, essay 	<ul style="list-style-type: none"> • opening statement presenting the issue • arguments for and supporting evidence • arguments against and supporting evidence • concluding recommendation, summary and conclusion • (alternatively, argument/counter argument a point at a time) 	<ul style="list-style-type: none"> • words that compare or contrast • words related to the topic

Text type	Purpose	Structure	Language
Explanation	<ul style="list-style-type: none"> to explain why things are as they are, or how things work to tell how things occur and gives reasons to explain why things are alike or different, or how to solve a problem 	<ul style="list-style-type: none"> general introductory statement paragraphs explaining how and why, a series of logical steps in chronological order concluding statement 	<ul style="list-style-type: none"> simple present tense
Exposition	<ul style="list-style-type: none"> to argue a case for or against a particular position or point of view to advance or justify an argument advertisements, editorials, arguments, legal defence 	<ul style="list-style-type: none"> point of view is stated justifications of arguments presented in logical order sum up argument and reiterate point of view 	<ul style="list-style-type: none"> simple present tense use dot points and elaborate words to express attitude and feelings nouns and verbs to convey emotion
Narrative	<ul style="list-style-type: none"> to tell a story to retell a series of events in the order they happened can entertain or instruct can have an unexpected outcome can be literary or factual can include description 	<ul style="list-style-type: none"> background information about who, where, when complication which begins the sequence of events series of events – maybe in chronological order or as retrospective ‘glimpses’ in a current framework resolution personal comment or moral to the story 	<ul style="list-style-type: none"> extensive use of nouns, adjectives, verbs and adverbs to develop the story
Procedure	<ul style="list-style-type: none"> to tell how to do something through a series of steps or actions a recipe, an itinerary 	<ul style="list-style-type: none"> opening statement of aim list materials required in order of use process steps in procedural order often illustrated with diagrams/ photos 	<ul style="list-style-type: none"> commanding words technical and time words adverbs to describe the things being done precise language

Text type	Purpose	Structure	Language
Procedural recount	<ul style="list-style-type: none"> to tell the steps taken to achieve a goal to tell how something was achieved science experiment, how something was made, a journey 	<ul style="list-style-type: none"> title or introductory statement of the end result list of the materials used to complete the procedure a sequence of steps taken, may be numbered 	<ul style="list-style-type: none"> verbs past tense numbers may be used in the sequence
Recount	<ul style="list-style-type: none"> to retell events and incidents in the order in which they occurred to reconstruct past experiences letters, newspaper reports, television interviews, conversation 	<ul style="list-style-type: none"> set the scene – who, what, where, when recount events as they occurred closing statement 	<ul style="list-style-type: none"> past tense chronological order often in the first person individual or group participants, eg I, we
Report	<ul style="list-style-type: none"> to present factual information about a class of things or describe the way things are to classify, then describe, characteristics lecture, research assignment 	<ul style="list-style-type: none"> opening definition – general classification series of paragraphs which entail a detailed description of qualities, function, uses, applications of the subject concluding statement or summary 	<ul style="list-style-type: none"> timeless present tense technical words no chronology can use dot points for and within each section
Response/Review	<ul style="list-style-type: none"> to summarise, analyse and respond to an artistic work, literary text can be a personal response or a general view 	<ul style="list-style-type: none"> paragraph to introduce the text or work being responded to a description of the features an opinion and reasons for them 	<ul style="list-style-type: none"> present tense descriptive words

5.4 Inclusion of Information and Communication Technologies (ICTs)*

Information Process	Activity Strategy	ICT option	Where can I find out more?
Define	<ul style="list-style-type: none"> brainstorm/mind mapping 	<ul style="list-style-type: none"> use a graphic organiser eg. Inspiration™ – have the program set up on class computer or via multimedia projector for all students' contributions 	<ul style="list-style-type: none"> http://www.inspiration.com http://www.graphic.org http://www.oswego.org/staff/cchamber/inspire/
	<ul style="list-style-type: none"> ideas forum 	<ul style="list-style-type: none"> EdNA forum/chat email within class 	<ul style="list-style-type: none"> http://www.edna.edu.au/messaging/index.html
	<ul style="list-style-type: none"> 'sage on the stage' 	<ul style="list-style-type: none"> use Powerpoint, HyperStudio program as prop to teaching multimedia projector – link with video player and computer 	
	<ul style="list-style-type: none"> assignment sheet 	<ul style="list-style-type: none"> 'build' it with students – start with topic, SACSA Strands Key Ideas and anticipated Learning Outcomes, build in ideas for research, activities, presentation, assessment – use Inspiration with multimedia projector (class ownership of work) 	<ul style="list-style-type: none"> http://mypage.direct.ca/g/grewal/
	<ul style="list-style-type: none"> lesson planning 	<ul style="list-style-type: none"> Inspiration 7 (File > Open Template > Planning) 	

* From an idea of Doug Johnson, Director of Media and Technology, Mankato Public Schools, MN.

Information Process	Activity Strategy	ICT option	Where can I find out more?
Locate	<ul style="list-style-type: none"> resource search 	<ul style="list-style-type: none"> online library catalogue keyword search: Internet bookmark recommended sites on intranet/students bookmark sites as part of their learning NB also delete bookmarks at end of unit online encyclopaedia eg World Book Online (subscription may be necessary), Encarta online newspaper and magazine database eg Electric Library (subscription may be necessary) video CD ROM 	<ul style="list-style-type: none"> ask a librarian search strategies
	<ul style="list-style-type: none"> discussion 	<ul style="list-style-type: none"> class forum 	<ul style="list-style-type: none"> http://www.edna.edu.au/messaging/index.html
	<ul style="list-style-type: none"> excursion 	<ul style="list-style-type: none"> video record the excursion for reference 	
Select	<ul style="list-style-type: none"> interview 	<ul style="list-style-type: none"> noting/editing video or audio recording 	<ul style="list-style-type: none"> Panasonic video 'Filming Techniques'
	<ul style="list-style-type: none"> comparative data 	<ul style="list-style-type: none"> create a table eg Word 	
Organise	<ul style="list-style-type: none"> collate survey findings 	<ul style="list-style-type: none"> spreadsheet eg Excel 	<ul style="list-style-type: none"> http://curriculum.mn.catholic.edu.au/resources/toolsoftrade.htm#graphic
	<ul style="list-style-type: none"> create a flow chart 	<ul style="list-style-type: none"> use a graphic organiser eg Inspiration™ 	<ul style="list-style-type: none"> http://www.inspiration.com/theory.html

Information Process	Activity Strategy	ICT option	Where can I find out more?
Present	<ul style="list-style-type: none"> oral presentation 	<ul style="list-style-type: none"> visual aids eg video, PowerPoint, music as background, overhead transparencies 	<ul style="list-style-type: none"> http://www.oootraining.com/main/powerpoint.html Panasonic video 'Filming Techniques'
	<ul style="list-style-type: none"> role play, play, skit, debate 	<ul style="list-style-type: none"> video the presentation 	
	<ul style="list-style-type: none"> drawings to illustrate 	<ul style="list-style-type: none"> use drawing or paint software eg Kid Pix digital photos imported or printed 	
	<ul style="list-style-type: none"> written presentation 	<ul style="list-style-type: none"> word processing software, eg Word, Publisher 	<ul style="list-style-type: none"> http://www.nailitnow.com.au/
	<ul style="list-style-type: none"> labelled diagram 	<ul style="list-style-type: none"> Inspiration, Kid Pix 	
	<ul style="list-style-type: none"> book reports 		
	<ul style="list-style-type: none"> pamphlet 	<ul style="list-style-type: none"> Create class database eg Access 	
	<ul style="list-style-type: none"> Maths data 	<ul style="list-style-type: none"> publishing software eg Publisher spreadsheet eg Excel 	<ul style="list-style-type: none"> http://mac.ozbytes.net.au
	<ul style="list-style-type: none"> timeline 	<ul style="list-style-type: none"> use timeline software eg Timeliner OR create a table in Word and sort numerically 	
	<ul style="list-style-type: none"> statistics 	<ul style="list-style-type: none"> graph using Excel/Powerpoint 	
Evaluate		<ul style="list-style-type: none"> DECS Planning and assessment (SACSA) software – achieverSA™ 	<ul style="list-style-type: none"> http://www.sacsa.sa.edu.au/ATT/{AF1782D9-9A75-4591-B4BA-9A983D82EA1B}/Module9.ppt
		<ul style="list-style-type: none"> Assessment table aka grid, chart, rubric 	<ul style="list-style-type: none"> http://www.middleweb.com/rubricsHG.html http://www.odyssey.on.ca/~elaine.coxon/rubrics.htm http://school.discovery.com/schrockguide/assess.html

5.5 Glossary

Active transport is a developing strategy which encourages people to increase physical activity as a means of transport

Air pollution*

Air toxics

There are many of these, most of which come from cars and other sources such as cigarette smoke and fuel vapour.

These have serious effects ranging from reduced consciousness and irritation of the respiratory system to increased levels of cancers.

Carbon monoxide

Carbon monoxide which is colourless, odourless and very toxic, comes from incomplete burning, industrial processes and biological decay.

Motor vehicles contribute 80 per cent of the carbon monoxide, other sources contribute 18 per cent, while industry accounts for only two per cent. Other sources include our homes, gardens, schools, shops and service stations.

One of the most significant individual sources of carbon monoxide is cigarette smoke. Scientific research indicates that smokers, and passive smokers (people who breathe air that contains smoke), are exposed to four times more carbon monoxide than people in a smoke-free environment.

Low levels of carbon monoxide can reduce our ability to exercise. Greater levels reduce our ability to concentrate and cause headaches. Very high levels can be fatal.

The health threat of carbon monoxide is greatest for people who suffer from heart disease. There is a correlation between carbon monoxide levels and hospital admissions of elderly people with heart failure.

Haze and fine particles

Haze occurs when many tiny particles from wood smoke and vehicles make our skies brown. Haze occurs mostly on cold, calm winter mornings.

The largest source of haze forming particles in winter is smoke from domestic wood heaters. In autumn and spring particles come from burning off. Exhaust fumes, especially from diesel engines, also contribute to haze.

When we breathe in particles, the larger ones are trapped by the fine hairs inside our noses and windpipes. We get rid of these when we blow our noses or cough. However, the smaller particles can travel deep into our lungs and have serious impacts on our health.

Fine particles are known to worsen the effects of bronchitis, emphysema and asthma. There is also evidence that they cause premature deaths. The main group at risk are those who have chronic respiratory problems. We should also be aware that particles may contain chemicals which can damage our lungs or cause cancer.

* From *Who cares about our air? A workbook on air pollution for Primary Schools. 2002. Department of Environmental Protection (WA). Perth. pp. 82–83.*

When particles settle they add a fine film of 'dirt' to the natural and physical environment.

Odours

Odour causes a great deal of concern for many people. Generally odours are annoying. In rare cases, the compound causing the odour may be poisonous and lead to illness in people.

Most odour complaints are related to industries which deal with animals or animal by-products. Examples include poultry farms, piggeries, cattle feedlots and tanneries.

Oxides of nitrogen

The most common of these are nitric oxide and nitrogen dioxide. These help form photochemical smog and also have significant impacts on health.

The largest man-made source of nitrogen oxides is the combustion of fossil fuels.

Motor vehicles contribute some 50 percent of these emissions and industry contributes about 44 per cent.

Photochemical smog

Photochemical smog, which is often invisible to the naked eye, is characterised by high concentrations of ground level ozone. This tends to happen in late spring, during summer and early in autumn when there is lots of sunlight and high temperatures.

Motor vehicles are the major contributor of NO_x pollution, which can lead to photochemical smog. Industry and other sources also make significant contributions to NO_x and HC levels.

Ozone affects the healthy and fit as well as susceptible members of the population such as the elderly, the young and those with respiratory problems.

The effects of ozone include eye, nose and throat irritations, damage to our respiratory tracts, chest tightness and wheezing. There is also evidence that ozone can increase our sensitivity to allergens, trigger asthma attacks and increase our susceptibility to infection.

Ozone can also damage plants and reduce their ability to photosynthesise as well as damage materials such as plastics, rubber, concrete, stone, cloth, dyes and paintwork.

AirWatch is a national initiative that aims to develop environmental awareness in students, specifically about air pollution. Through the AirWatch program, students from around Australia learn about their local air and how to help keep it clean. Students learn to monitor the air, enter their results, view other students' results from around Australia and add their own project work and comments for others to see. For more information, visit the AirWatch web site at:



www.airwatch.gov.au/default.asp

Alternative fuels – Many people would argue that with oil supplies quickly being used up, we should be looking at alternative fuels for vehicles. One way that this can work is by using the EV (electric vehicle) car. However, there are other alternative fuels. Options are shown below.

Biodiesel

A fuel for diesel engines, derived from plant oils (e.g. Canola) or animal fats. TME (see below) is an example of biodiesel fuel. Biodiesel is much safer to handle and significantly reduces exhaust emissions from diesel vehicles when mixed with normal diesel fuel, or as a fuel in its own right.

CNG

Compressed natural gas – natural gas is compressed and remains gaseous. Vehicle range is less than for petrol but the cost is lower.

It is often used by bus fleet owners.

Electricity

Electricity has long been used to power trains, trams and trolley-buses. Battery-powered electric cars have a very long history, but have a limited range.

Ethanol

Produced from renewable bio-mass energy sources. Readily made from sugar or from other crops with greater effort. Vehicles can be modified to operate on a mix of ethanol/petrol or straight ethanol. Inconsistent supply is a major problem at the moment. Higher fuel consumption than petrol – a litre of ethanol has around 70% of the energy of a litre of petrol. Petrol vehicles can operate on up to 10% ethanol without modification, or be modified to operate on up to 100% ethanol.

Hybrid vehicles

A hybrid petrol-electric vehicle uses conventional petrol fuel, but is more economical because it uses a smaller engine and converts some of its energy to electric power for acceleration. Hybrid diesel-electric cars, currently being developed, may be even more economical. Hybrid diesel-electric trains have been used for many years.

Electric power can be utilised successfully for commuting and recent developments in hybrid petrol-electric technologies indicate that hybrid vehicles are becoming increasingly viable.

Hydrogen

The use of hydrogen is not practical at present because of the difficulty of storing and carrying hydrogen.

Like electricity, hydrogen must be produced from another energy source. It can be converted to electricity in a fuel cell. Hydrogen cars and buses are being trialled in Europe and the USA. Hydrogen cars are very expensive, and are expected to remain expensive for at least another decade.

LNG

Liquefied natural gas, which is refrigerated and stored at -160 degrees celsius. Offers similar vehicle range to petrol or diesel, but there are currently very few refuelling stations.

LPG

Liquefied petroleum gas – the fraction of natural gas that liquifies when compressed and is separated out at the wellhead. Also produced as a by-product of petroleum refining. It is used extensively by taxis and fleets.

Methanol

This is currently being tested on cars and buses. It has the advantage of causing less pollution but it evaporates quickly and can be intolerant of water.

Solar

Potential for solar power has been shown in long-distance trials. Problems exist with fuel supply and storage to allow a wide range of applications.

TME

Tallow methyl ester is produced from animal fat. It can be mixed with diesel fuel and could extend the supply of diesel.

BikeEd is a national bicycle education program provided by Transport SA and local government for primary school students aged 9–13 years. Similar programs may operate in other states of Australia. The program encourages community and parental involvement and the development of personal safety, cognitive and physical skills specific to cycling. For more information, visit the web site at:

www

www.transport.sa.gov.au/educational/schools/bike_ed/index.asp

CARisma is an online teacher resource related to the status of the car in our society, with a focus on Internet and critical literacies. Students can work their way through a series of 15 Investigations, with access to online resources, and learn about:

- how the car has become such a focal point in our culture
- its impact – culturally and environmentally
- what alternative transport modes to the car can be used

Schools who complete all or part of the CARisma Investigations are encouraged to upload their results for publishing on Transport SA's web site.

www

<http://www.transport.sa.gov.au/environment/travelsmartsa/index.asp>

Car pooling (ride sharing) means that people plan their car travel and use a single vehicle for multiple passengers travelling in the same direction.

El Nino is characterised by unusually warm ocean temperatures in the equatorial Pacific, along the coasts of Ecuador and northern Peru. This occurs towards the end of the year, giving rise to the reference to “El Nino”, the Christmas Child. Every two to seven years, the warming is stronger and often brings rain to these arid countries.

The El Nino effect refers to these warmer episodes of the phenomenon.

Greenhouse*

- **Climate Change:** describes the full extent of the implications of the greenhouse effect. Whilst the average temperature of the Earth may increase, it is the changes in the Earth's climate systems that will be most dramatic. Extreme weather events such as droughts, floods, cyclones and frosts may affect areas previously unaffected or strike with increased frequency. Rising sea levels may affect rainfall patterns, soil erosion and local ecosystems.
- **Energy Efficiency:** one way of reducing greenhouse gas emissions. By cutting down on the energy our society needs to grow and develop, we can reduce the amount of greenhouse gas emissions. Simple steps like replacing older incandescent bulbs with new compact fluorescent lights can save 75% of your lighting energy needs.
- **Fossil Fuels:** the minerals which human society require to generate most of our energy needs. Coal, oil (which is used to produce petroleum), natural gas, methane and diesel are all examples of fossil fuels. Fossil fuels consist of a long chemical structure that contains carbon. When oxidised with oxygen (burnt), carbon dioxide (CO₂) is given off as a waste gas. CO₂ is a chief greenhouse gas. Fossil fuels are most commonly used to generate electricity and power motor vehicles.
- **Fugitive Emissions:** caused by the escape of gases or liquids from confined vessels or pipes. For instance, methane, which is a greenhouse gas, is produced in landfills by decomposing vegetable matter and can be released into the atmosphere over time.
- **Global Warming:** is the term given to the major consequence of the greenhouse effect. Scientists have long predicted and recently measured notable increases in the world's temperature. Average global temperatures have increased 0.7°C since the 1900's and the ten warmest years on record have all occurred since 1983 with seven of them since 1990.

While the term 'global warming' does go some way to describe the impacts of the greenhouse effect, climate change is a more accurate term.

- **Global Warming Potential:** all greenhouse gases contribute to the 'trapping' of infrared radiation, hence heat, in the lower atmosphere. Due to the relative sizes of the GHG molecules, some trap more than other. Methane for instance has ten times the Global Warming Potential (GWP) of carbon dioxide. Carbon dioxide is used to compare the gases.
- **Greenhouse Effect:** the common term given to the phenomenon whereby certain gases (eg carbon dioxide, methane) build up in the lower atmosphere and prevent heat from the Sun's rays from escaping into space. Scientists fear that increasing concentrations of greenhouse gases may increase the average global temperature and lead to changes in the Earth's climate and weather patterns.

Kyoto Protocol is an international treaty designed to limit global greenhouse gas emissions. At a summit held in 1997, the nations joining the treaty agreed to reduce their greenhouse gas emissions by the year 2012. While different countries have committed to varying levels of reduction, average emission cuts by the Kyoto Protocol are calculated to be about 5.2%.

* Courtesy of the NSW Government's Sustainable Energy Development Authority – SEDA. <http://www.seda.nsw.gov.au>

La Nina episodes are characterised by unusually cold ocean surface temperatures in the equatorial Pacific, caused by lower than normal pressure over Indonesia and northern Australia and higher than normal pressure over the eastern tropical Pacific. An effect over the central and eastern equatorial Pacific is that of strong easterly winds.

Road Ready is the primary school curriculum resource of Transport SA's Safe Routes to School program. Road Ready concentrates on the three specific aspects of road safety – passenger safety, pedestrian safety and crossing procedures.

Safe Routes to School is an initiative of Transport SA, where councils, primary schools and Transport SA work together to address safety concerns around school via engineering treatments and a program of road safety education.

Smogbusters Day of Change is a competition run in conjunction with the Environment Protection Authority through Air Watch. Students reduce their car trips to and from school for one day, by using alternatives like walking, cycling, car pooling or public transport.

www

http://www.transadelaide.com.au/community/rail_edu_unit.htm

Travel Behaviour Change (TBC) tools are strategies that encourage people to voluntarily reduce their car use by thinking about how and why they use cars and the benefits of choosing alternative, more sustainable modes of transport. Travel Diaries and the Walking School Bus are examples of Travel Behaviour Change tools.

Travel blending means that people use a combination of travel options to reach a destination. For example, they may choose to walk to the ferry terminal, travel on the ferry and then catch a bus to their destination.

Travel Diaries are an optional Travel Behaviour Change tool for students participating in the TravelSmart program. The Diaries encourage students and their families to become aware of their travel habits, the modes of transport they use and the greenhouse gas emissions their vehicles discharge over the course of a week. Families become aware of ways to reduce their car use by making small, sustainable changes and smarter travel choices, which lead to increased physical activity and fitness levels.

Travel Options are modes of transport that can be used other than the car.

Trip Chaining involves planning ahead and using one journey to achieve a number of objectives. For example, the drive home from work may include stopping at the supermarket and taking the videos back before picking up the children from school.

Voluntary taxi is a neighbourhood strategy in which people participate in a roster system to collect and transport a car load of people to a set destination.

Walk Safely to School Day is an international road safety awareness raising campaign, being trialled in schools in conjunction with the Pedestrian Council of Australia. The aim of the day is to encourage parents and caregivers to walk to school with their children and, when crossing the road, hold the hand of any child under the age of 10.

Walking School Bus (WSB) consists of two parent volunteers walking a small group of students to school along a designated route, with set pick-ups for the children along the way. The WSB is very popular both interstate and overseas and is a way of reducing car congestion around schools while increasing the physical activity of students.

5.6 Additional resources

Picture Books

- Allen, P. **Watch me.** A little bit of cycling madness from Pamela Allen – and an accident.
- Awdry, Rev. W. **Thomas the Tank Engine.** (several titles). Australian Broadcasting Corporation, Sydney.
- Bates, D. **Big Bad Bruce.** Good story line, shows that bikers are just like other people.
- Blake, Q. 1987. **Mrs Armitage on Wheels.** Random House. London. Mrs Armitage and Breakspear the dog need a fabulous vehicle to get them where they need to go – excellent ideas for discussion and a good ending.
- Bodsworth, N. 1989. **A nice walk in the jungle.** Puffin. Ringwood, Victoria. More things to discover on a walk.
- Bond, D. 1993. **The granny who wasn't like other grannies.** Scholastic. London. Granny tries the ghost train, bus, motorbike, skates – she'll get there any way she can.
- Braithwaite, A. **Angry Albert.** Tie in with getting angry about the way others use the road. Ways to sort out anger.
- Browne, A. 1977. **A walk in the park.** Macmillan, London. All sorts of special things to do and discover, on a walk.
- Dann, P. **The Wheels on the Bus.** Words and music of a favourite.
- Fox, M. 1983. **Possum Magic.** Omnibus. Adelaide, SA. Adventures with Grandma Poss, around Australia on a bike.
- Gretz, S. **Teddybears get their skates on.** Seven teddy bears and Fred the dog go skating in the fun park. 1999. Black. London.
- Gretz, S. 1987. **Teddybears take the train.** Scholastic. Gosford, NSW. Being good passengers on the train – the seven teddy bears and Fred the dog, again.
- Gordon, G. 1993. **Skateboarders.** Scholastic, Gosford, NSW. Griselda Gravel can't beat the kids skating in the park, so she joins them!
- Paterson, A.B. 1976. **Mulga Bill's Bicycle.** Collins, Sydney. Niland illustrations bring this early Australian poem to life.
- Wild, M. **Mr Nick's Knitting.** Travelling on the buses with Mr Nick.
- Zelinsky, P. **The Wheels on the Bus.** Another version of the all time favourite.

Songs

From ABC Song Books

Title	Year	Song number
Transport options		
BMX Rider	1988	42
Free Wheeling	1982	21
The great race	1983	27
My bike	1982	14
Pushbike song	1985	42
You can't roller skate in a buffalo herd	1982	27
Sakaraka the bomb	1988	14
The station wagon	1990	7
Hit the road, Jack	1986	39
Wheels keep turning	1989	9
Environment		
Leave them a flower	1986	47
Look after the trees	1992	24
There's a gum tree	1991	8
The third planet from the sun	1990	40
What have they done to the rain?	1984	44
Morning has broken	1985	18
The music of this land	1990	39
The world	1986	51

Teacher Reference

Achieving Excellence: Units of Work for Levels P – 8 / Travel. 1991.
Directorate of School Education, Victoria.

Anderson, M. & Anderson, K. 1997. **Text Types in English 1 (2,3).**
Macmillan Education Australia. South Yarra, Victoria.

Cook, S. 1993. **Environmental Impact: linking environmental studies with everyday life.** Incentive Publications, Tennessee.

Cooke, D. 1993. **The Air We Breathe.** Collins Dove, Melbourne.

De Bono, E. 1991. **Six Thinking Hats for Schools.** Perfection Learning, USA.

Flynn, Pat. 2001. **Alex Jackson: Grommet.** University of Queensland Press, St Lucia.

Healey, K. 1995. **Energy Resources: Issues for the Nineties.** Vol. 32.
Spinney Press. Balmain, NSW.

I Spy Technology: Practical Ideas for Gender Equity in Primary Technology Studies. 1993. Directorate of School Education, Melbourne.

Nicol, S. 2003. **Rebel on Wheels.** Royal Automobile Association, Adelaide, SA.

Ollie Saves the Planet (CD ROM) 2003. www.olliesworld.com

Safe Track Student Pack. TransAdelaide & SA Police, Adelaide.

Saving Hieronymus: an educational kit for school students on saving energy and the greenhouse effect. (ages 9-11). (kit) 1992. Commonwealth Department of Primary Industries and Energy.

Smith, P. 1992. **Transport: Science, Technology and Science Themes for Early Childhood.** Lego Dacta.

Stops in Time – History of public transport in South Australia. (picture kit). Media Motion, Adelaide, 2003. (Available Adelaide Metro \$33).

Sustainable Energy Development Authority (NSW). <http://www.seda.nsw.gov.au>

The Big Kit of Technology. 1992. Telecom Australia.

The GLOBE Programme – International Environmental Education Project.
www.globe.org.uk

Who cares about our air? – A workbook on Air Pollution for Primary Schools. 2002. Department of Environmental Protection (WA), Perth. (Available: Air Watch, Project Manager, Department of Environment, Level 2, 123 Adelaide Terrace, East Perth WA 6004).

Wood, B. & Jorgensen, G. 1996. **Spotlight on Multiple Intelligences (for teachers and children too).** Heads Together Press. Dalby, Queensland.

Videos

Beyond 2000: Climate in Crisis (video) 1989. Beyond International, Sydney

Beyond 2000: Atmosphere (video) 1988. Beyond International, Sydney.

BusZone: the computer video game. (video) 1995. NSW Dept of Transport and Roads, Sydney.

Doing the Bus Stop. (video) VicRoads, Melbourne.

The Safest Way: safe travel to and from school. A Guide for Parents and Carers. (video) 1995. NSW Dept of Transport and Roads, Sydney.

Suzuki, D. **The Nature of Things.** Martin & Rosenthal Education & Canadian Broadcasting Corporation.

Websites

All sites have been checked in a SINA environment and were active as of July 2003.

10,000 Steps

<http://www.10000steps.cqu.edu.au/>

Active for Life Victoria

<http://www.dhs.vic.gov.au/phd/activeforlife/programs.htm>

Active program

<http://www.ausport.gov.au/fulltext/2003/ascmedia/20030326.asp>

Active8

<http://www.active8.on.net/index.html>

Air Watch

www.airwatch.gov.au/default.asp

AirWatch

http://www.epa.nsw.gov.au/air/airwatch/actgu_airpollutants.pdf

Aussie School House: Reviews – Alex Jackson: Grommet

http://www.teachers.ash.org.au/ozreading/yara/senior_reviews/alex_jackson.htm

Australian Bureau of Statistics

www.abs.gov.au/port/Vehicle_ownership_TERM_2001.doc.pdf

Australian Greenhouse Office

<http://www.greenhouse.gov.au/education/factsheets/what.html>

<http://www.greenhouse.gov.au/international/kyoto/index.html>

<http://www.greenhouse.gov.au/pubs/gwci/transport.html>

<http://www.greenhouse.gov.au/fuelguide/index.html>

Australian Heart Foundation

http://www.heartfoundation.com.au/heart/index_fr.html

Australian Pedestrian Charter

<http://www.walk.com.au/pedestriancouncil/page.asp?PageID=107>

Autoshare – Canada

<http://www.autoshare.com/>

Bay to Birdwood

<http://www.baytobirdwood.com.au/events.html>

Bike, Bus or Pool

www.b-bop.org

Bike Ed

http://www.greenweb.com.au/kidsafe/html/bp_bike_ed_campaign.html

Birdwood Motor Museum

<http://www.visitadelaidehills.com.au/motormuseum/>

Catholic Schools Office – NSW

<http://curriculum.mn.catholic.edu.au/resources/toolsoftrade.htm#graphic>

CERES Network for Change

www.ceres.org

Copyright Council of Australia

www.copyright.org.au

CSIRO

<http://www.dar.csiro.au/information/greenhouse.html>

Department for Planning and Infrastructure – Western Australia’s

www.dpi.wa.gov.au

Department of the Premier and Cabinet – WA

<http://www.sustainability.dpc.wa.gov.au/CaseStudies/pedestrianinitiatives/pedestrianinitiatives.htm>

Dialogue for Kids

<http://www.idahoptv.org/dialogue4kids/season4/blood/links.html>

discoveryschool.com

<http://school.discovery.com/schrockguide/assess.html>

Earth Science

<http://earthsci.org/weather/airpolute/airplou.html>

Ecological Footprint

<http://www.earthday.net/footprint/index.asp>

Education Network Australia

<http://www.edna.edu.au/messaging/index.html>

Electric Vehicles Association

<http://www.aeva.asn.au/>

Environment and Heritage – SA

www.environment.sa.gov.au/reporting

Environment Protection Authority – NSW

<http://www.epa.nsw.gov.au/air/activeforair/index.htm>

Environment Protection Authority – Victoria

www.epa.vic.gov.au/GreenhouseCalculator

European Environment Agency

http://themes.eea.eu.int/Sectors_and_activities/transport/indicators/spatial/trans

Exploring Middle School Reform

<http://www.middleweb.com/rubricsHG.html>

Geebung State School – Qld

<http://www.geebungss.qld.edu.au/assessment.htm>

Google

www.google.com

Greater Vancouver Regional District – Sustainable Region Initiative

<http://www.gvrd.bc.ca/sustainability>

History of the Automobile

<http://inventors.about.com/library/weekly/aacarssteama.htm>

History of the Bicycle

<http://gate.cruzio.com/~rbedard/bike/history/bikehist.html>

History Trust of South Australia

<http://www.history.sa.gov.au>

Inspiration

<http://www.inspiration.com>

International Walk to School

<http://www.iwalktoschool.org/>

Jacobs Creek Tour Down Under

<http://www.tourdownunder.com.au/>

Kurwongbah State School – Qld

<http://www.kurwongbss.qld.edu.au/thinking/thinkkeys.htm>

Landcare Australia

<http://www.landcareaustralia.com.au/>

LEA – NZ

<http://www.lea.co.nz/citest/ciinpractice/tools/thinkerskeys.htm>

Lincoln High School – NZ

<http://www.lincoln.school.nz/interlinc/presentations/webquest/question%20matrix.pdf>

<http://www.lincoln.school.nz/interlinc/presentations/webquest/question%20matrix.pdf>

Map Your Mind

www.mapyourmind.com/howto.htm

Mind Tools

<http://www.mindtools.com/>

Ollie Saves the Planet

www.olliesworld.com

One On One Computer Training

<http://www.oootraining.com/main/powerpoint.html>

Origin Energy – SA

http://www.originenergy.com.au/environment/subnav_section.php?pageid=271

Oswego City School District – New York

<http://www.oswego.org/staff/cchamber/inspire/>

Pedestrians – US TV program site

<http://www.pedestrians.org/>

People's Car Cooperative Incorporated

<http://www.peoplescar.org/pages/history.html>

Riverina Environmental Education Centre

<http://www.reec.nsw.edu.au/2002/enviro/text/wedgw.pdf>

Science Centre

<http://www.sciencentre.qld.gov.au/sciencentre/exhibits/permanent/gases/gases1.htm>

Sun Wind Solar

www.sunwindsolar.com

Sustainable Living Project – University of NSW

http://www.sustainableliving.com.au/what_is_SLP/

Tampa Bay

www.tampabayonline.net/bguard/home.htm

The GLOBE Programme – International Environmental Education Project

www.globe.org.uk/schools

The Staff Room – Canada

<http://www.odyssey.on.ca/~elaine.coxon/rubrics.htm>

Toyota Prius

<http://www.toyotaavenue.com.au/ToyotaAvenue/SiteDetail/Article/1,2315,69-54-1693,00.html>

Toyota Prius

<http://pressroom.toyota.com/mediakit/toyota/#Prius>

Toyota Prius

<http://prius.toyota.com.au/Prius/HomePage/0,,,00.html>

Trans Adelaide

http://www.transadelaide.com.au/community/rail_edu_unit.htm

Transport SA

<http://www.transport.sa.gov.au/environment/travelsmartsa/index.asp>

Tucows – OzBytes

<http://mac.ozbytes.net.au>

Twin Cities Green Guide – Minnesota

<http://www.thegreenguide.org>

United Nations – Kyoto Protocol

<http://unfccc.int/resource/convkp.html>

Walking for Health

<http://www.walkinginfo.org/>

Wetmore, John Z. – Reducing Student Pedestrian Perils.

<http://www.pedestrians.org/articles/riskmanagement.html>

WorkCover Corporation ‘Do you use protection?’

<http://www.workcover.com/ftp/documents/schProtectionWork2003.pdf>

World Solar Cycling Challenge

<http://www.bikesa.asn.au/Events/wsc.html>

Write Design Online

<http://www.writedesignonline.com/organizers/index.html>

Resources

Who Cares about our air? – a workbook on Air Pollution for Primary Schools is an Air Watch resource available from:

- Air Watch
Project Manager
Department of Environment
Level 2, 123 Adelaide Terrace
East Perth WA 6004