

Sustainable Living Practices

Learning from the past to work towards a more sustainable future

Overview

This unit invites **middle school students** to **investigate living practices** during the first half of the 20th century from the point of view of sustainability. This is studied in the context of significant global events in the form of the economic boom of the post World War I period, the economic depression of the 1930s as well as the austerity of the war years of the 1940s.

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."
(WCED, 1987, Brundtland Report)

There are three **primary objectives in sustainable home living**:

- Lifestyle and health improvement
- Cost effectiveness
- Environmental friendliness

Taking the *think globally but act locally* approach, sustainability issues can be explored at the home level.

The objects typically used in homes of the early 20th century are first analysed then **evaluated for their level of sustainability**. Students are then asked to consider current practices or objects that have replaced the earlier methods and compare the levels of sustainability. Finally, students are asked to suggest either improvements or alternatives to these practices that could better meet sustainability objectives in the future.

Curriculum fit

This unit has **curriculum links** to the SOSE Technology and Mathematics **KLA** syllabuses as indicated in the **Appendix 1**. Relevant **Essential Learnings** are also referenced in the Appendix 1.

Schools may choose to use the materials as either a SOSE or Technology unit or as a combined unit depending on the fit with the school program and organisation.

Issues of sustainable living in the home:

- Energy use
 - Energy sources
 - Air quality
 - Passive vs. active climate control
- Water use
 - Essential
 - Non-essential
 - Water quality and reuse
 - Water saving strategies
- Materials use
 - Resource recovery (recycling)
 - Repurposing
 - Reusing
 - Renewable resources
- Environmental impact
 - Degradation
 - Biodiversity



Resources:

Objects from the *Sustainable Living* kit which can be borrowed from Queensland Museum Loans.

(07) 3406 8344 or
loans@qm.qld.gov.au

Engage

Introductory class discussion:

- Current issues of environmental impacts (global warming) and resource use (energy and water) by humans should be raised.
- [Stories](#) are told from the Depression focusing on domestic practices. (QM: Living in the early 20th Century PDF)
- Links should be made between the economic demands of the time with the use of resources.

Key questions addressed by this unit:

- *Do early 20th century devices meet current needs for sustainability?*
- *Do current devices that perform similar functions meet sustainability requirements?*
- *Do current devices better meet sustainability requirements than similar early 20th century devices?*
- *What can we learn from earlier devices to improve the design and construction of modern devices?*
- *Can we design and build our own device to better meet modern sustainability requirements?*

Exploration

Part A: How sustainable were past living practices?

Activity One – Every object tells a story

What can you find out about an object by looking closely?

Object Analysis – Looking closely at an object

1. Working as an individual or in small groups, students perform **object analysis** on one object from **each category** of living practices (Energy Water Materials Environment).
2. Students require one Sheet #1 for each object. (Sheet #1: Object analysis)

Explanation

Activity Two- Learning from the past

How sustainable is the practice of using your object in the past?

What can we learn from past practices?

Sustainability analysis

1. Students select an object to study in more detail from the point of view of sustainable practices in the home.

Sheet #2: Sustainability analysis
2. Students identify the positives and negatives of each practice for each of the sustainable living objectives. Then decide on how sustainable the practice is.
3. Students conduct further research on the comparison between today's practices and yesterday's from the point of view of sustainability.
4. Students suggest some ways that current practices might be able to adopt some ideas from earlier practices to better achieve sustainability.



Petrol iron

How sustainable was the use of this object?

Student activity icons



Think and discuss



Write down



Use computer

Part B: Sustainable home water use

How well do we manage our water compared with days long ago?

What can we learn from the water usage practices of the past?

Can learning from the past help us in the future?

Activity Overview – What students will do

In this activity students are to firstly **estimate some data** on water usage during a typical day in the early 20th Century. To do this they will use information about past domestic practices as well as a water use table for various domestic activities.

In the second part of the activity students will **make predictions** about how water usage might have changed between now and many years ago.

Thirdly, they will **perform a water audit** for modern home living. Students will **compare this data** with the early day's data as well as their predictions to find similarities and differences.

Finally, students will **make some conclusions** about what they have learned about water usage in the home. They may have learned some more sustainable ways to manage water.

Early day's data – How much water was used in the early days?

Students imagine they are living in a home in the early part of the 20th century.

They perform a water audit for their daily activities.

Use the **water usage fact sheet** to guide decision making. The fact sheet provides important background information about life in the past as well as a data usage table to help calculate weekly water usage.

Some of the listed activities may not have occurred.

Making predictions – What do you think?

Students use the data table they have just completed and their knowledge of modern living to make predictions about how water usage in the early days compares with today.

Place a ✓ in the appropriate box opposite each activity to indicate what they think would occur as in the following table.

Not occur: This activity would **not have occurred** in the early part of the 20th Century.

Use less: This activity would **use less water** in the early 20th Century compared with today.

Use more: This activity would **use more water** in the early 20th Century compared with today.

The following section on justifying decisions would be optional dependent on age and abilities of students.

Justify decisions – Why do you think this?

- Students compare their predictions with another student or group.
 - If they disagree with any predictions they try to convince the others to take their point of view.
 - If they change their mind, they change their predictions.
- If they couldn't agree with another person or group, they research the topic more to help settle the disagreement. They use the internet to investigate further but are mindful to use good quality sources of information.

Today's data – How much water is used today?

Students consider living in a home in modern times.

They perform a water audit for their daily activities.

They use the water usage fact sheet to guide decision-making.

Some of the listed activities may not occur.

Resource link

The water use activity links closely to the Waterwise Queensland's *Water: Learn it for life!* Unit 1 for Years 6 and 7.

Lesson 2: Saving water at home

Email: waterwise@derm.qld.gov.au

Web: www.derm.qld.gov.au/waterwise/education

Collation of data – Organising data for easy viewing

1. Design a spreadsheet to enter data into tables.
2. Use the spreadsheet functions to calculate the **totals** including the **total use** column.
3. Apply the *Chart Wizard* to display the data graphically. A graph will be created for each table of data.
 - a. Select data to display
 - b. Choose a suitable display format.
 - c. Add all labels and titles.
 - d. Check that all data is easy to view.



Analysis of data – Compare today with yesterday

1. Compare the **totals** for each home in each time period.

Look for similarities and differences.
2. Compare your **predictions** with the data in Today's table.

Look for similarities and differences.



Conclusions – What was learned?

1. What interesting findings were made?
2. How well do modern practices for using water compare with the past?
3. What can we learn from the past to help us better manage our water usage today and into the future?



Elaboration

Part C: Sustainable living challenge

How sustainable are your current living practices?

What can you do to make your living practices more sustainable?

Activity Overview – What you will do

In this activity you will look closely at the domestic practices in your place of living then make suggestions for improvements that will lead to a more sustainable future.

Your suggestions should seek to improve any or all of the following areas:

- Lifestyle
- Health
- Cost
- Environmental impact

Collect data – How sustainable is your object?

- Choose one object** from each of the following use areas:
 - Energy e.g. Light bulb
 - Water e.g. Hose nozzle
 - Environment.. e.g. Spray can
 - Materials ... e.g. Plastic packaging
- Rate each of the objects** for its impact in each of the following areas:
 - Lifestyle
 - Health
 - Cost
 - Environment

Students enter their data into Sheet #3: Sustainability impacts.

Use this scale for rating:

- 2	has a very bad impact
- 1	has a bad impact
0	has no impact
+1	has a good impact
+2	has a very good impact

- Students share data with other groups and enter their data to complete Sheet #3.

Look closely – What can be changed?

- Choose one object that has a bad or very bad impact in one area.
- In groups, brainstorm some ideas that might improve this object's rating.
- Choose the best ideas and be prepared to share this with other groups.

- Publish the group's findings in a suitable medium or format to help educate the public about how to work towards a more sustainable future by changing domestic practices (objects).

Evaluation

- Students should reflect on how well their suggestions meet sustainability objectives.

Ideas for insect control



Fly trap



Insect sprayer



Mosquito net



Electronic insect zappers

Part D: How sustainable are you?

What do people **know** about sustainable practices?

How much do people **act** in sustainable way?

Activity Overview – What you will do

In this activity you will complete a survey that will ask you about:

1. What you know about sustainable practices and
2. What you do about it.

Making predictions - What do you think?

1. How much do you think you **know** about sustainable living practices ... a lot ... a little? Why do you think this?
2. How much do you **act** in a sustainable way ... a lot ... a little? Why do you think this?

Collecting data – Complete the survey

The survey is available online for you at <http://www.surveymonkey.com> at the following links:

1. [What you know](#)
2. [What you do](#)

Alternatively, the surveys are available in pdf format on this website.

Analysing the data – What does it mean?

Scoring:

You will first need to score your responses so that you can compare what you know with others. Scoring is done by comparing your responses with the responses of an expert on sustainable living. (What do you Know about Sustainable Living.pdf)

For each match between your responses and the expert's, give yourself one point. Many questions have multiple answers so you get a point for each match.

However, if you have an extra response for the question that doesn't match then deduct one point.

Find the total score for each section and record your result:

What you know

Section	my score	expert score
Introduction		
Energy		
Water		
Materials		
Environmental Impact		

What you do

Section	my score	expert score
Introduction		
Energy		
Water		
Materials		
Environmental Impact		

Comparing:

1. How much do you know about sustainable living compared to an expert?
2. How much do you act in a sustainable way?
3. How much does the survey score match what you thought at the start (the predictions)?

Conclusions – What have you learned?

Is there a difference between what you know and how you act? Why?

More research – What others think

Repeat the process you have just completed on yourself to find out about what others think.

You could collect the data from the whole class and work out the average score.

Enter this data into similar tables as above.

Now compare the data with the expert's score or with the wider population result from survey monkey.

[What you know](#)

[What you do](#)

Elaboration (Technology Practice)

Part E: Design Challenge

To design and construct a domestic tool or device that meets acceptable sustainability standards. The tool should have the following characteristics:

- Use cost effective sustainable materials in construction
- Achieve reduced energy or water usage over other similar devices
- Have low environmental impact
- Improves health or lifestyle for the user

Evaluation (Technology)

- Once constructed, you will need to **demonstrate with evidence** how each characteristic can be achieved.
- How well does your device meet the sustainability requirements?

Resources

Kits:

- Olden days at home
- Kitchen technology
- Sustainable futures

Documents:

- Sustainable Living Practices
- Object Analysis
- Object Analysis: Sustainability

Exhibitions:

- Eagle's Nest (Cobb&Co)

Publications:

- Queensland House (QM)

Expertise:

- Inquiry Centre
<http://www.qm.qld.gov.au/inquiry/>

Web:

- Queensland House
<http://www.qm.qld.gov.au/features/qldhouse/>



Incandescent bulb



Hose



Spray can



Plastic packaging

Modern objects for sustainability analysis

Part A: Sheet #1:	Object Analysis	Category: <input type="checkbox"/> Energy <input type="checkbox"/> Water <input type="checkbox"/> Materials <input type="checkbox"/> Environment
Object:	Observe & Discuss <i>What can you find out about this object by using your senses and by talking about this object?</i>	Research <i>What questions would you like to answer about this object?</i>
Physical Features What is it made of? Describe its shape, size, weight, smell, and sound. Is this a complete object or part of one?		
Construction How was the object made? Would this have needed special skills or equipment? Describe the materials it is made from.		
Function What was it made to do? Does it have a practical function? Is it a toy? Is it decorative?		
Design Does it do what it should? How well? Has the design of similar objects changed over time?		
History Who made it? When? Why?		

Object:

Objectives

For each sustainability objective, identify the positives and negatives in using this object or practice.

Positives

What do you think is good about using this object?

Negatives

What do you think is not good about using this object?

Not sure?

What would you like to know more about to decide whether it is good or not good?

Lifestyle

*How often would the object be used?
How much time would be needed to use it?
How easy was it to use?*

Health

*Does this object have a role in health and hygiene? What is it?
How important is this role?*

Cost effectiveness

*How expensive would this object be to make and use?
Can it be reused or repurposed?
Can resources be recovered?*

Environment

What impact would using and disposing of this object have on the environment?

Part C: Sheet #3:

Sustainability impact

Issue	Objects	Practice	Impact rating			
			Lifestyle	Health	Cost effectiveness	Environment
Energy	Early iron	Laundry				
	Lamp	Lighting				
	Kitchen utensil	Cooking				
	Kitchen tool	Cooking				
Water	Water jug	Hygiene				
	Night pot	Hygiene				
	Wash basin	Hygiene				
	Wash board	Laundry				
Materials	Candle maker	Lighting				
	Kerosene tin	Lighting				
	Embroidered cloth	Decoration				
Environment	Peg	Laundry				
	Curling tongs	Personal				
	Insect control device	Health				

Appendix 1

Sustainable Living Practices

Curriculum Links

- **Planning in Key Learning Areas**
- **Links to Key Learning Areas**
- **Essential Learnings**

in

- **Studies of Society and Environment**
 - **Time Continuity and Change**
 - **Place and Space**
- **Technology**
 - **Technology Practice**
 - **Materials**
 - **ICT's**
- **Mathematics (minor)**
 - **Chance and Data**

Planning in Key Learning Areas

Studies of Society and Environment

Ref: <http://www.qsa.qld.edu.au/yrs1to10/kla/docs/plan-kla.pdf>

The links between these activities and the SOSE syllabus is indicated as shown:

Key messages:

- Key values of democratic process, social justice, ecological and economic sustainability and peace
- Social and environmental inquiry processes of investigating, creating, participating, communicating, and reflecting

Planning advice:

Planning should focus on development of key concepts and processes of social and environmental enquiries on which core learning outcomes are based. Content may be selected from the core content that is strand and level specific.

Strands:

Time, Continuity and Change

- Evidence over time
- Changes and continuities
- People and contributions
- Causes and effects
- Heritage

Place and Space

- Human — environment relationships
- Processes and environments
- Stewardship
- Spatial patterns
- Significance of place

Technology

Ref: <http://www.qsa.qld.edu.au/yrs1to10/kla/docs/plan-kla.pdf>

The links between these activities and the Technology syllabus is indicated as shown:

Key message:

- 'Working technologically' - a way of working that interweaves technology practice, information, materials and systems with considerations of appropriateness, contexts and management.

Planning advice:

Strands are interrelated and should not be considered in isolation from each other. The learning outcomes of the Technology Practice strand must be associated with learning outcomes in one or more of the other strands and planning should include 'working technologically'. Content should be selected from the core content that is arranged in strands and is not level specific.

Strands:

Technology Practice

- Investigation is carried out to gather knowledge, ideas and data for use in meeting design challenges.
- Ideation is undertaken to generate and communicate ideas that meet design challenges, and to justify the selection of these ideas.
- Production procedures can be identified, described and managed when making products that meet design challenges.
- Evaluation is undertaken to make judgments about the appropriateness of design ideas, processes and products when meeting design challenges.

Information

- Information originates from different sources, exists in various forms and can be used for different purposes.
- Information can be manipulated, presented and managed in different ways for different purposes.

Materials

- Materials have characteristics that affect their selection and use in products.
- Materials can be manipulated and processed by using suitable equipment and techniques.

Systems

- Systems are comprised of interactive components and have inputs, processes and outputs that can be controlled in logical ways based on certain principles.
- Systems can be developed, refined and optimised by organising their components.

Links to Key Learning Areas

✓ Technology

STRAND	Organisers	LEVEL 3	LEVEL 4	LEVEL 5
Technology Practice	Investigation	✓TP3.1 Students examine knowledge, ideas and data from a range of sources and establish the relevance of this information when meeting design challenges.	✓TP4.1 Students use consultative methods to gather knowledge, ideas and data when researching alternatives within design challenges.	✓TP5.1 Students analyse links between knowledge, ideas and data gathered to meet design challenges and the design and development of new and improved products.
	Ideation	✓TP3.2 Students collaboratively generate design ideas and communicate these using presentations, models and technical terms.	✓TP4.2 Students generate ideas through consultation and communicate these in detailed design proposals.	✓TP5.2 Students generate ideas and communicate these in design proposals that indicate an understanding of factors influencing production of the option(s) they have selected.
	Production	✓TP3.3 Students cooperatively develop and follow production procedures to make products that reflect their design ideas.	✓TP4.3 Students identify and make use of the practical expertise of others when following production procedures to make products for specific users.	✓TP5.3 Students meet predetermined standards as they follow production procedures to make quality products.
	Evaluation	✓TP3.4 Students test and judge how effectively their own or others' processes and products meet the design challenge.	✓TP4.4 Students gather feedback to gauge how effectively their design ideas and processes meet design challenges and how effectively products meet the needs of specific users.	✓TP5.4 Students use predetermined criteria to judge how well processes and products meet the needs of specific users, and recommend modifications or improvements.
Materials	Nature	✓MAT 3.1 Students choose materials according to various characteristics that best suit the product and user.	✓MAT 4.1 Students explain how characteristics of materials affect ways they can be manipulated.	✓MAT 5.1 <i>Students compare and contrast materials according to their characteristics to determine how effectively the materials meet predetermined standards.</i>
	Techniques	✓MAT 3.2 Students select and use suitable equipment and techniques to combine accurately in order to meet design requirements.	✓MAT 4.2 Students employ their own and others' practical knowledge about equipment and techniques for manipulating and processing materials in order to enhance their products.	✓MAT 5.2 Students operate equipment and apply techniques for manipulating and processing materials to meet predetermined standards.

✓ Studies of Society and Environment

STRAND	Conceptual organiser	LEVEL 3	LEVEL 4	LEVEL 5
Time, Continuity and Change	1. Evidence over time <i>investigating</i>	✓TCC 3.1 Students use evidence about innovations in media and technology to investigate how these have changed society.	✓TCC 4.1 Students use primary sources to investigate situations before and after a change in Australian or global settings.	✓TCC 5.1 Students use primary and secondary evidence to identify the development of ideas from ancient to modern times.
	3. People & contributions <i>participating</i>	✓TCC 3.3 Students use knowledge of people's contributions in Australia's past to cooperatively develop visions of preferred futures.	✓TCC 4.3 Students share empathetic responses to contributions that diverse individuals and groups have made to Australian or global history.	✓TCC 5.3 Students collaborate to locate and systematically record information about the contributions of people in diverse past settings.
	4. Causes & effects <i>communicating</i>	TCC 3.4 Students organise information about the causes and effects of specific historical events.	✓TCC 4.4 Students critique information sources to show the positive and negative effects of a change or continuity on different groups.	TCC 5.4 Students explain the consequences of Australia's international relations on the development of a cohesive society.
	5. Heritage <i>reflecting</i>	TCC 3.5 Students describe various perspectives based on the experiences of past and present Australians of diverse cultural backgrounds.	✓TCC 4.5 Students review and interpret heritages from diverse perspectives to create a preferred future scenario about a global issue.	✓TCC 5.5 Students identify values inherent in historical sources to reveal who benefits or is disadvantaged by particular heritages.
Place and Space	1. Human-environment relationships <i>investigating</i>	✓PS 3.1 Students compare how diverse groups have used and managed natural resources in different environments.	✓PS 4.1 Students make justifiable links between ecological and economic factors and the production and consumption of a familiar resource.	PS 5.1 Students synthesise information from the perspectives of different groups to identify patterns that constitute a region.
	5. Significance of place <i>reflecting</i>	PS 3.5 Students describe the values underlying personal and other people's actions regarding familiar places.	✓PS 4.5 Students explain whether personal, family and school decisions about resource use and management balance local and global considerations.	✓PS 5.5 Students evaluate ideas concerning sustainability to identify who may benefit and who may be disadvantaged from changes to a Queensland industry.

Essential Learnings

Studies of Society and Environment

Knowledge and understanding

By the end of **Year 5**

Place and space

Environments are defined and changed by interactions between people and places.

- Sustainability of local natural, social and built environments can be influenced by positive and negative attitudes and behaviours

e.g. positive responses to water management can influence the quality of river systems; negative responses to town planning principles can lead to traffic problems.

By the end of **Year 7**

Place and space

Environments are defined by physical characteristics and processes, and are connected to human activities and decisions about resource management.

- Sustainability requires a balance between using, conserving and protecting environments, and involves decisions about how resources are used and managed

e.g. “rethink, reduce, reuse and recycle”; renewable versus non-renewable energy sources.

By the end of **Year 9**

Place and space

Environments are defined by spatial patterns, human and physical interactions, and sustainable practices can balance human activity and environmental processes.

- Governments and communities need to balance economic, social, political and environmental factors through sustainable development, consumption and production

e.g. resource use and environmental impacts;

Ways of working

By the end of Year 5

Students are able to:

- pose and refine questions for investigations
- plan investigations based on questions and inquiry models
- collect and organise information and evidence
- evaluate sources of information and evidence to determine different perspectives, and distinguish facts from opinions
- draw and justify conclusions based on information and evidence
- communicate descriptions, decisions and conclusions, using text types selected to match audience and purpose
- share opinions, identify possibilities and propose actions to respond to findings
- apply strategies to influence decisions or behaviours and to contribute to groups
- reflect on and identify personal actions and those of others to clarify values associated with social justice, the democratic process, sustainability and peace
- reflect on learning to identify new understandings and future applications.

By the end of Year 7

Students are able to:

- identify issues and use common and own focus questions
- plan investigations using inquiry models
- collect and analyse information and evidence from primary and secondary sources
- evaluate sources of information and evidence for relevance, reliability, origins and perspective
- draw conclusions and make decisions based on information and evidence by identifying patterns and connections
- communicate descriptions, decisions and conclusions, using different text types for specific purposes and the conventions of research-based texts
- respond to investigation findings and conclusions by planning and implementing actions
- apply strategies to contribute effectively to representative groups and to participate in civic activities
- reflect on and identify different perspectives, and recognise and clarify beliefs and values relating to social justice, the democratic process, sustainability and peace
- reflect on learning, apply new understandings and identify future applications.

By the end of Year 9

Students are able to:

- identify a research focus from broad topics and design focus questions and sub-questions
- plan investigations, using discipline-specific inquiry models and processes
- research and analyse data, information and evidence from primary and secondary sources
- evaluate sources of data, information and evidence for relevance, reliability, authenticity, purpose, bias and perspective
- draw conclusions and make decisions supported by interpretations of data, information and evidence
- communicate descriptions, decisions and conclusions, using text types specific to the context and purpose and the conventions of research-based texts
- respond to local and global issues by taking action in planned and enterprising ways
- apply strategies for making group decisions and for taking informed social and environmental action
- reflect on different perspectives, and recognise and evaluate the influence of values and beliefs in relation to social justice, the democratic process, sustainability and peace
- reflect on learning, apply new understandings and justify future applications.

TECHNOLOGY

Knowledge and understanding

By the end of **Year 5**

Technology as a human endeavour

Technology influences and impacts on people, their communities and environments.

- Different ideas for designs and products are developed to meet needs and wants of people, their communities and environments
- Aspects of appropriateness influence product design and production decisions
- The products and processes of technology can have positive or negative impacts

Information, materials and systems (resources)

The characteristics of resources are matched with tools and techniques to make products to meet design challenges.

- Resources have particular characteristics that make them more suitable for a specific purpose and context
- Techniques and tools are selected to appropriately manipulate characteristics of resources to meet design ideas

By the end of **Year 7**

Technology as a human endeavour

Technology influences and impacts on people, their communities and environments.

- Design and development of products are influenced by societies' changing needs and wants, and include artefacts, systems, environments and services
- Product design and production decisions are influenced by specifications, constraints and aspects of appropriateness including functions, aesthetics, ethics, culture, available finances and resources, and sustainability
- Decisions made about the design, development and use of products can impact positively or negatively on people, their communities and environments.

Information, materials and systems (resources)

The characteristics of resources are matched with tools and techniques to make products to meet design challenges.

- Resources are selected according to their characteristics, to match requirements of design challenges and suit the user
- Techniques and tools are selected to manipulate or process resources to enhance the quality of products and to match design ideas, standards and specifications

By the end of **Year 9**

Technology as a human endeavour

Technology influences and impacts on people, their communities and environments in local and global contexts.

- New products and technologies are designed and developed to meet changing needs and wants of intended audiences, and include artefacts, systems, environments, services and processes
- Product design and production decisions are influenced by aspects of appropriateness and by detailed specifications, constraints and standards of production
- People can influence decisions made about the design, development and use of technology to change the impact on people, their communities and environments at local and global levels

Information, materials and systems (resources)

Resources originate from different sources, exist in various forms and are manipulated to meet specifications and standards to make products.

- Characteristics of resources are compared, contrasted and selected to meet detailed specifications and predetermined standards of production to best suit the user

e.g. materials can be compared to determine those most appropriate to the task, such as selecting from a variety of timbers taking account of size, strength, finish and durability; choosing from natural resources to produce a product.

- Techniques and tools are selected, controlled and managed to manipulate or process resources to meet detailed specifications and predetermined standards of production

Ways of working

By the end of Year 5

Students are able to:

- identify and analyse the purpose and context for design ideas
- generate design ideas that match requirements
- communicate the details of their designs using 2D or 3D visual representations
- select resources, techniques and tools to make products
- plan production procedures by identifying and sequencing steps
- make products to match design ideas by manipulating and processing resources
- identify and apply safe practices
- evaluate products and processes to identify strengths, limitations, effectiveness and improvements
- reflect on and identify the impacts of products and processes on people and their communities
- reflect on learning to identify new understandings and future applications.

By the end of Year 7

Students are able to:

- investigate and analyse the purpose, context, specifications and constraints for design ideas
- generate and evaluate design ideas and determine suitability based on purpose, specifications and constraints
- communicate the details of designs showing relative proportion, using labelled drawings, models and/or plans
- select resources, techniques and tools to make products that meet specifications
- plan and manage production procedures and modify as necessary
- make products to meet specifications by manipulating and processing resources
- identify risks and justify and apply safe practices • evaluate the suitability of products and processes for the purpose and context, and recommend improvements
- reflect on and identify the impacts of products and processes on people, their communities and environments
- reflect on learning, apply new understandings and identify future applications.

By the end of Year 9

Students are able to:

- investigate and analyse specifications, standards and constraints in the development of design ideas
- consult, negotiate and apply ethical principles and cultural protocols to investigate, design and make products
- generate and evaluate design ideas and communicate research, design options, budget and timelines in design proposals
- select resources, techniques and tools to make products that meet detailed specifications
- plan, manage and refine production procedures for efficiency
- make products to meet detailed specifications by manipulating or processing resources
- identify, apply and justify workplace health and safety practices
- evaluate the suitability of products and processes against criteria and recommend improvements
- reflect on and analyse the impacts of products and processes on people, their communities and environments
- reflect on learning, apply new understandings and justify future applications.

Information and Communication Technologies

Inquiring with ICTs

By the end of **Year 5**

Students explore, select and use ICTs in the processes of inquiry across key learning areas. They:

- plan, conduct and manage structured searches for data and information
- organise and identify relationships between data and information from a variety of sources
- evaluate the data and information gathered for usefulness, credibility, relevance and accuracy

By the end of **Year 7**

Students explore, select and use ICTs in the processes of inquiry and research across key learning areas. They:

- identify the inquiry focus, data and information requirements and possible digital information sources
- plan, conduct and manage structured searches and advanced searches for data and information in response to questions
- organise and analyse, experiment with and test data and information from a variety of sources
- evaluate data and information gathered for usefulness, credibility, relevance, accuracy and completeness

By the end of **Year 9**

Students explore, select and use ICTs in the processes of inquiry and research across key learning areas. They:

- identify the inquiry focus, data and information requirements and a range of digital information sources
- plan, conduct and refine advanced searches, and select appropriate sources of digital information in response to research questions
- classify, organise, analyse and interpret data and information from a variety of sources to respond to inquiries, or to identify new paths for inquiries
- evaluate data and information gathered for usefulness, credibility, relevance, accuracy, completeness and authenticity
- reflect on, analyse and evaluate how ICTs have assisted in addressing research questions and sub-questions for the inquiry purposes and in developing new understandings.

MATHEMATICS

Chance and Data Outcomes

Data	✓CD 3.2 Students design and trial a variety of data collection methods and use existing sources of data to investigate their own and others' questions, organise data and create suitable displays, identifying and interpreting elements of the displays.	✓CD 4.2 Students plan and carry out data collections using their own data record templates, choose and construct appropriate displays and make comparisons about the data based on the displays and measures of location.	✓CD 5.2 Students plan investigations involving discrete and continuous data, produce and compare data displays involving grouping, and compare measures of location.
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Knowledge and understanding

By the end of **Year 5**

Chance and data

Chance events have a range of possible outcomes that can be described using predictions. Data can be collected to support or adjust predictions.

- Data collected from experiments or observations can be organised in tables and graphs and used to respond to questions about the likelihood of possible outcomes of events
- Collected data can be used to justify statements and predictions
- Sets of data may contain expected or unexpected variation, and this may mean that additional data are needed

By the end of **Year 7**

Chance and data

Probability of events can be calculated from experimental data. Data can be summarised and represented to support inferences and conclusions.

- Events have different likelihoods of occurrence and estimates of probability can be expressed as percentages, common fractions or decimal fractions between 0 and 1
- Data may be discrete and can be allocated to categories or numbered
- Data may be continuous and described as distributions of quantities
- Sample data drawn from a given population can be summarised, compared and represented in a variety of ways *e.g. two-way tables; pie charts; bar or line graphs.*
- Measures of location such as mean, median and mode, and frequency and relative frequency, can be used to explore distributions of sample data
e.g. the mean is the averaged daily water consumption for the school across a period of days; the median is the middle value of the ordered daily water consumption; the mode is the most common daily water consumption level
- Variation and possible causes of bias can be identified in data collections
e.g. the method of collection may exclude possible participants; the personal opinions of participants may obscure data collection.

By the end of **Year 9**

Chance and data

Judgments can be based on theoretical or experimental probability. Data can be displayed in various ways and analysed to make inferences and generalisations.

- Data can be gathered from samples and surveys, experiments and simulations, published data and databases, and used to estimate probabilities of events and to respond to claims and questions
- Data interpretation is simplified through the use of suitable representations and descriptive statistics
e.g. using two-way tables, histograms, stem and leaf plots and measures of location.

Ways of working

By the end of Year 5

Students are able to:

- pose questions and make predictions based on experience in similar situations
- plan activities and investigations to explore concepts, pathways and strategies and solve mathematical questions, issues and problems
- identify and use mental and written computations, estimations, representations and technologies to generate solutions and check for reasonableness of solutions
- make statements, predictions, inferences and decisions based on mathematical interpretations
- evaluate their own thinking and reasoning, in relation to the application of mathematical ideas, strategies and procedures
- communicate and justify thinking and reasoning, using everyday and mathematical language, concrete materials, visual representations and technologies
- reflect on learning to identify new understandings and future applications.

By the end of Year 7

Students are able to:

- pose questions that draw on familiar examples to clarify thinking and support predictions
- plan activities and investigations to explore concepts through selected pathways, and plan strategies to solve mathematical questions, problems and issues
- select and use suitable mental and written computations, estimations, representations and technologies to generate solutions and to check for reasonableness
- develop arguments to justify predictions, inferences, decisions and generalisations from solutions
- evaluate thinking and reasoning, to determine whether mathematical ideas, strategies and procedures have been applied effectively
- communicate thinking and justify reasoning and generalisations, using mathematical language, representations and technologies
- reflect on learning, apply new understandings and identify future applications.

By the end of Year 9

Students are able to:

- pose and refine questions to confirm or alter thinking and develop hypotheses and predictions
- plan and conduct activities and investigations, using valid strategies and procedures to solve problems
- select and use mental and written computations, estimations, representations and technologies to generate solutions and to check for reasonableness of the solution
- use mathematical interpretations and conclusions to generalise reasoning and make inferences
- evaluate their own thinking and reasoning, considering their application of mathematical ideas, the efficiency of their procedures and opportunities to transfer results into new learning
- communicate thinking, and justify and evaluate reasoning and generalisations, using mathematical language, representations and technologies
- reflect on learning, apply new understandings and justify future applications.