

Design & TECHNOLOGIES:

Years 3-4



- Section 1:**
Design And Technologies In Our Community
- Section 2:**
Investigating Materials And Forces
- Section 3:**
Food And Fibre Technologies
- Section 4:**
Designing Solutions
- Section 5:**
Designing Safely

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Curriculum Links

Recognise the role of people in design and technologies occupations and explore factors, including sustainability that impact on the design of products, services and environments to meet community needs (ACTDEK010)

- considering the impact of environments on users, for example a school vegetable garden, a protected outdoor play area
- exploring and testing factors that impact on design decisions, for example considering the demographics of an area or the impact of natural disasters on design of constructed environments such as the structural design of buildings in Japan to withstand earthquakes
- critiquing designed products, services and environments to establish the factors that influence the design and use of common technologies, for example the characteristics that contribute to energy-efficient cooking such as wok cooking; the suitability and sustainable use of particular timbers

Investigate how forces and the properties of materials affect the behaviour of a product or system (ACTDEK011)

- conducting investigations to understand the characteristics and properties of materials and forces that may affect the behaviour and performance of a product or system, for example when a design

Investigate food and fibre production and food technologies used in modern and traditional societies (ACTDEK012)

- identifying the areas in Australia and Asia where major food or fibre plants and animals are grown or bred, for example the wheat and sheep belts, areas where sugar cane or rice are grown, northern Australia's beef industry, plantation and native forest areas
- recognising the benefits food technologies provide for health and food safety and ensuring that a wide variety of food is available and can be prepared for healthy eating
- investigating the labels on food products to determine how the information provided contributes to healthy eating, for example ingredients and nutrition panels

Investigate the suitability of materials, systems, components, tools and equipment for a range of purposes (ACTDEK013)

- conducting experiments and tests to understand the properties of materials, for example strength, durability, warmth, elasticity

Critique needs or opportunities for designing and explore and test a variety of materials, components, tools and equipment and the techniques needed to produce designed solutions (ACTDEP014)

- generating a range of design ideas for intended products, services, environments
- visualising and exploring innovative design ideas by producing thumbnail drawings, models and labelled drawings to explain features and modifications

Generate, develop and communicate design ideas and solutions using appropriate technical terms and graphical representation techniques (ACTDEP015)

- generating a range of design ideas for intended products, services, environments
- visualising and exploring innovative design ideas by producing thumbnail drawings, models and labelled drawings to explain features and modifications

Select and use materials, components, tools and equipment using safe work practices to make designed solutions (ACTDEP016)

- using tools and equipment accurately when measuring, marking and cutting; and explaining the importance of accuracy when designing and making, for example creating a template, measuring ingredients in a recipe, sowing seeds
- selecting and using materials, components, tools, equipment and processes with consideration of the environmental impact at each stage of the production process

Evaluate design ideas, processes and solutions based on criteria for success developed with guidance and including care for the environment (ACTDEP017)

- evaluating the functional and aesthetic qualities of a designed solution

Plan a sequence of production steps when making designed solutions individually and collaboratively (ACTDEP018)

Teachers' Notes

What is Design and Technologies?

Design and Technologies is an area of the Australian Curriculum that challenges students to draw upon their experience and imagination to develop designed solutions that can be ideated, constructed and enjoyed. The embedded use of digital technologies enables students to collaborate and communicate their solutions.

How you can use this book:

Design & Technologies: Year 3 – 4 has been organised into five sections that address the content descriptors and process and production skills outlined in the curriculum for this level.

Section 1: Design And Technologies In Our Community

In this section, students will contemplate the role of designers in a community and the associated technology used in various occupations linked to design and technologies. They will discover how ideas for new products, services and environments are generated to meet the specific needs of users.

Section 2: Investigating Materials And Forces

The focus in this section is investigating how materials behave under certain conditions and therefore, their suitability for specific purposes. Students will explore properties such as elasticity and absorbency through conducting tests and create a domino topple to observe force and movement in action.

Section 3: Food And Fibre Technologies

The remarkable properties of wool fibre and the fibre resources of Indigenous communities is approached through research activities. Students will also analyse food labels to explain in an oral report the nutrition information displayed.

Section 4: Designing Solutions

Generating, communicating and critiquing designed solutions for a variety of everyday problems is featured in this section. Students will have the opportunity to build and test a model for a design challenge of their choice.

Section 5: Designing Safely

Activities include formulating good practice rules for working safely in Design and Technology lessons and the importance of working accurately to achieve design outcomes.

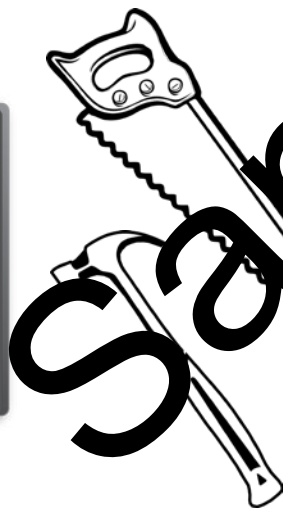
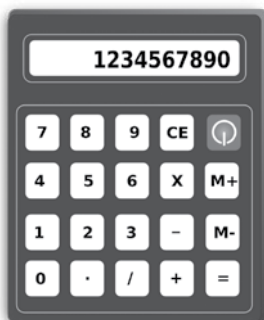
PEOPLE WHO PLAN, DESIGN AND CREATE PRODUCTS USE SPECIFIC TOOLS AND TECHNOLOGIES IN THEIR WORK.

1. Brainstorm the tools and technologies you use during your day at school (don't forget clubs and sports activities).

**TOOLS AND
TECHNOLOGIES
AT SCHOOL**

2. Can you identify the occupation/s that would use the tools and technologies pictured below? In the space provided, describe how these tools and technologies could help people in their design process.

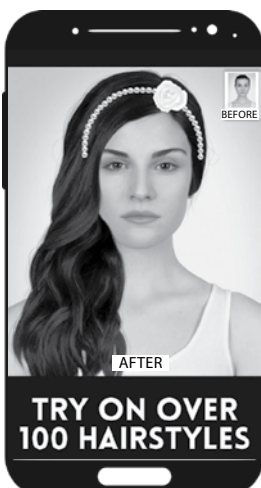
A.



Occupation/s: _____

How these tools and technologies help the designer:

B.



Occupation/s: _____

How these tools and technologies help the designer:

1. Study the product below and read the information about its materials and use (function).

Product 1 - The Scooner

Sturdy plastic handle to squeeze to make spoon shape

Scoop/spoon component made of flexible silicone

Can be used to scoop food or spoon liquids.



2. Work with another peer who has been given a "Student A" sheet. Look at the criteria in the table below that asks you to comment on the design of "The Scooner." Discuss this product with your partner and fill in the table.

How suitable are the product's materials for its function?	
How does the product work?	
Who would most likely use this product?	
Can you identify any problems with the product?	

3. With your partner, give an oral presentation of your critique of "The Scooner" to peers with the "Student B" sheet. Give this designed product a star rating from 1 (poor) to 5 (excellent).



Activity How People Used Materials

HOW PEOPLE USE MATERIALS TO DESIGN PRODUCTS AND SYSTEMS HAS CHANGED OVER TIME. THE CREATION OF NEW MATERIALS LIKE SOUND-PROOF GLASS AND PLASTIC BUBBLE WRAP AND THE USE OF MORE ADVANCED TECHNOLOGY SUCH AS 3D PRINTERS AND INDUSTRIAL ROBOTS HAVE CHANGED THE WAY WE DESIGN AND LIVE.

- ☐ Look at these designs and technologies from the past used for everyday items. In the space under each image:
- Identify the materials we use today for the same item. You may have to do some research to find the present-day materials and technologies used.
 - List one advantage or disadvantage of changing the material.

1. wooden spoon (16th century)



Credit: the Mary Rose Trust. License: cc 3.0

2. porcelain doll (about 1900)



3. car tyre (solid rubber, 1886)



4. rope sandals (about 5th century)



Credit: Luis García. License: cc 3.0

Activity The Big Bounce Test 1

Does the material a ball is made from affect its ability to bounce? You are going to find out the answer to this question by carrying out an investigation using balls of approximately the same size but made from different materials.

☐ Your teacher will organise the class into small groups.

Equipment needed

- i. Four balls of approximately the same size but made from different material. Select four of the following:

TENNIS BALL

CRICKET BALL

RUBBER BALL

WIFFLE BALL

GOLF BALL

TABLE TENNIS

SQUASH BALL

SPONGE BALL

** Make a note of the material that each ball in your investigation is made of.*

- ii. a metre ruler

My Prediction

I predict that the _____ will be the bounciest

because _____

Method

1. Secure the metre ruler to a wall with tape or Blu-tack.
2. Hold a ball level at the 100 cm mark of the ruler. Drop the ball (do not throw or exert any force on it).
3. Observers in the group will measure how high the ball bounces (in cm) after it is dropped. Measure the first bounce only.
4. Record the bounce height of each type of ball in the results table on the next page.

How can our group ensure that this investigation is a 'fair test'?

Activity Technology And Food

Advances in technology have improved the way we grow food and eat food. Who could imagine fifty years ago that plants could be genetically modified to yield more vitamins or that you could enjoy eating tropical fruit all year round? Technology has played an important part in providing safe and nutritious food.

What could be the benefits for people's health and food supply of the following advances in technology? Write your ideas in the space provided.

Problem 1

Corn plants are not very resistant to frost in the early months of growth. Frost can kill off young corn plants.

Technology Used

Corn plants have been genetically modified to be more frost tolerant. Can be grown over a wider area.

Benefits



Problem 2

There is a period of time between when a fish is caught and when it goes on sale. During this time, fish could develop harmful bacteria.

Technology Used

Seafood is sent to a laboratory to be tested. Tests can detect harmful bacteria and stop fish being sold.

Benefits



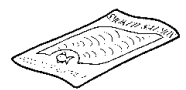
Problem 3

A lot of food is wasted as it has a limited *shelf life* (time a product is fit to eat) and must be thrown out.

Technology Used

Taking out the air in packaging food (vacuum packaging) extends shelf life and seals in flavours.

Benefits



Problem 4

Microwave ovens don't always heat food evenly. Some parts of the food are not warm enough.

Technology Used

Antennae microwave technology enables food to be heated thoroughly and can also pasteurise food.

Benefits



Activity Designing Solutions 2

For the task on this page, you will be challenged to come up with a solution for the situation described.

☐ Write notes, doodle and describe your solution under the headings in the boxes.

The Situation:

A budgie has worked out how to open its cage door. That's OK, but not when the cat's around! A lock is not a good solution because it is too fiddly to open and close the door and a peg is no good either because the budgie chews plastic pegs.

Have I experienced or seen a situation like this before?

Doodles:

My Solution:



☐ Discuss your solutions with a peer. After the discussion, is there anything you would like to add, remove or adapt in your design?

1. Design a safety leaflet to display in your classroom which includes practical advice for working safely in your D & T lesson. You can base your layout on the task from the previous page or choose a layout of your own.

Sample

