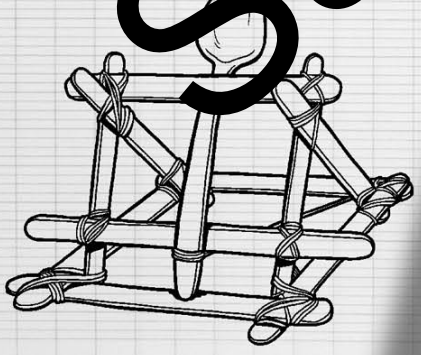
Ready-Ed Publications

PHOTOCOPY MASTERS

Design & TECHNOLOGIES:

Years 5–6



By Lisa Craig

CURRICULUM LINKED

Contents

Curriculum Links

Examine how people in design and technologies occupations address competing considerations, including sustainability in the design of products, services, and environments for current and future use (ACTDEK019)

- reflecting on the features of designed solutions that ensure safety and wellbeing of users, for example smoke alarms
- evaluating the sustainability implications of materials, systems, components, tools and equipment, for example materials can be recycled or re-used to reduce waste; systems may benefit some, but disadvantage others
- considering the impact designed products, services or environments have in relation to sustainability and also on local, regional and global communities, including Aboriginal and Torres Strait Islander communities and countries in the Asia region
- identifying the impact of the designed features of an environment, for example a modification to a home to reduce environmental impact; restoring a natural environment and retaining access for the public

Investigate how electrical energy can control movement, sound or light in a designed product or system (ACTDEK020)

- deconstructing a product or system to discover how movement, sound or light can be controlled, for example deconstructing a torch or buzzer and exploring circuit design
- investigating the properties of materials to solve problems requiring the control of movement, sound or light, for example the amount of light reflected from different surfaces to control a sensor
- investigating the technologies in a control system for an identified need or opportunity and user, for example a system that allows safe passage at pedestrian crossings

Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy (ACTDEK021)

- describing the relationship between plant types and animal breeds and their environmental suitability when selecting suitable plants or animals for an environment
- sequencing the process of converting 'on-farm' food or fibre products into a product suitable for retail sale, that is, the 'paddock to plate' supply chain, or when making yarn or fabric from fibre
- using current food guides and government-endorsed food policies to plan food choices
- experimenting with tools, equipment, combining ingredients and techniques to design and make food products or meals for selected groups for healthy eating taking into consideration environmental impacts and nutritional benefits
- considering traditional and contemporary methods of food preparation used in a variety of cultures, including Aboriginal and Torres Strait Islander methods

Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use (ACTDEK023)

- identifying the properties of materials for the design and construction of a sustainable household item, for example a product for storing harvested water
- comparing the design and production of products, services and environments in Australia and a country in the Asia region

Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions (ACTDEP024)

- exploring the steps involved in the process to satisfy a design brief, need or opportunity
- investigating designed solutions from around the world to make suitable, quality decisions that meet the design brief, challenge or scenario

Generate, develop and communicate design ideas and processes for audiences using appropriate technical terms and graphical representation techniques (ACTDEP025)

- generating a range of design ideas for products, services or environments using prior knowledge, skills and research

- experimenting with materials, tools and equipment to refine design ideas, for example considering the selection of materials and joining techniques to suit the purpose of a product

Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions (ACTDEP026)

- matching material and joining techniques to the design intention, for example accurately cutting and sewing the fabric pieces to make a community banner or joining components to produce an electric circuit
- using appropriate personal protective equipment required for the use of some tools and equipment, for example protective eyewear

Negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions (ACTDEP027)

- independently and collaboratively identifying criteria for success, processes and planning, for example using visual representations such as a flowchart
- evaluating the suitability of materials, tools and equipment for specific purposes

Develop project plans that include consideration of resources when making designed solutions individually and collaboratively (ACTDEP028)

- setting milestones for production processes and allocating roles to team members
- identifying when materials, tools and equipment are required for making the solution

Teachers' Notes

What is Design and Technologies?
Design and Technologies is an area of the Australian Curriculum that challenges students to draw upon their experiences 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.

What is in each section of this resource?

Section 1: Designs For Safety And Wellbeing
In this section, students will investigate designed solutions that ensure people are safe and comfortable in different environments. They will determine how food packaging and refrigeration contribute to a healthy life and evaluate meal deals in a school canteen. Other tasks include finding solutions for unsafe cooking practices and house designs in earthquake-prone areas.

Section 2: Sustainable Designs
The focus in this section is living sustainably. Students will be invited to design a street verge, compare how rainwater is harvested and stored in Australia and Thailand and tackle the growing problem of wardrobe waste.

Section 3: Critiquing And Creating Designs
Generating, communicating and critiquing designed solutions for a variety of everyday problems is featured in this section. A silent wind chime, a messy soup ladle and designing bunting for an event are just some of the challenges presented.

Section 4: Electrical Technologies
Students will explore the inner workings of a flashlight's circuitry and the wonderful functions of sensors in household appliances and remote cameras. The age-old question – Does pushing the button at the pedestrian crossing give a "walk" signal faster? – will also be addressed.

Section 5: Food And Fibres
Activities include: identifying the benefits of wild-harvesting food in indigenous communities, examining the processes involved in bringing food from the farm to the family table and discovering how alpacas are raised in Australia for more than just their fleece.

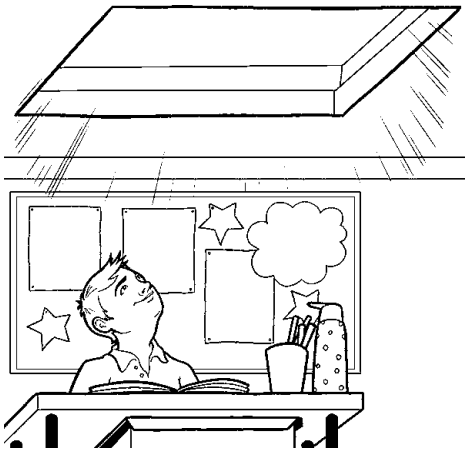
Section 6: Design Templates
Templates are provided to help students organise their ideas, assign roles in design projects and negotiate success criteria.

Activity Great Designs

Designs can increase our safety and wellbeing.

❑ Study the following designs below with a friend. How do the designs affect people's safety or wellbeing? Jot down your thoughts about each design. Add your own design example. Write down its benefits.

A. Skylight



B. Raised flowerbed

C. Electric car charger

D.

Activity Sustainable Verges

Across Australia, communities are designing and developing verges that are more sustainable, but look great too. A verge is a strip of land between the street and the footpath (see left).

Traditionally, verges were created with thirsty lawns that needed mowing and trees that needed maintenance. Times have changed! Today, recent designs of verges are both aesthetic (look great) and sustainable (environmentally-friendly).

❑ Your task is to plan a design for a verge which considers aesthetic and sustainable purposes. Complete the table to help you.

Design Choice	Aesthetic purpose	Sustainable purpose
Types of plants, trees, greenery		
Watering system		
Other unique features		

(ACTDEK019) Elaboration: considering the impact of environments on users, for example a school vegetable garden, a protected outdoor play area

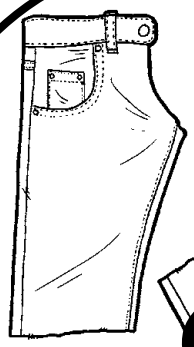
Activity Wardrobe Waste 3

❑ Write notes, make doodles and describe your solutions under the headings in the boxes.

The Problem:

Mum cut the legs off some old jeans to make shorts. She doesn't want to waste the cut-off parts.

Have I experienced or seen a problem like this before?



Doodles:

My Solution:

❑ Discuss your solution with a peer. After this discussion, is there anything you would like to add, remove or adapt in your design?

_____

_____

_____

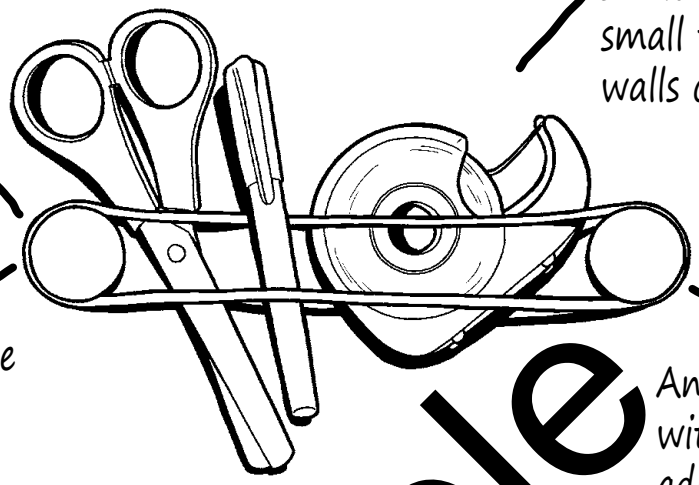
_____

(ACTDEK019) Elaboration: evaluating the sustainability implications of materials, systems, components, tools and equipment, for example materials can be recycled or re-used to reduce waste; systems may benefit some, but disadvantage others

Activity Lacky Storage

1. Study the design below. Read the annotations about its design features.

Design: Lacky Storage



2. Work with another peer. Look at the criteria in the table below that asks you to comment on the design of "Lacky Storage". Discuss this product with your partner and make notes about its design in the table.

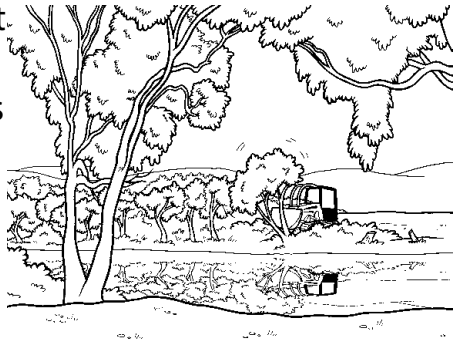
Can you identify any problems with the product?	
Can you think of one way that this product could be improved?	
Would you use this product? Why, why not?	

3. With your partner, give an oral presentation of your critique of "Lacky Storage" to peers. Give this designed product a thumbs up rating from 0 (poor) to 5 (excellent).

(ACTDEP024) Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions

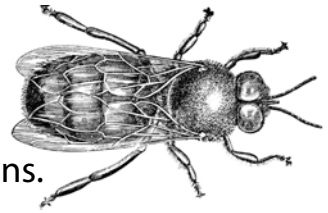
STUDENT B

About half the Australian continent is farming land that has been changed to grow crops and graze livestock. Land is cleared of trees, boulders blasted, and wetlands drained so that farms can expand to produce food for Australia's growing population. In this process, native fauna and flora can be lost. However, farmers have discovered that conserving the biodiversity on their farms and making a living are both possible.



YOUR TASK

Investigate the threats to native insects and animals that pollinate plants. What can farmers do to attract native pollinators to their farming system?

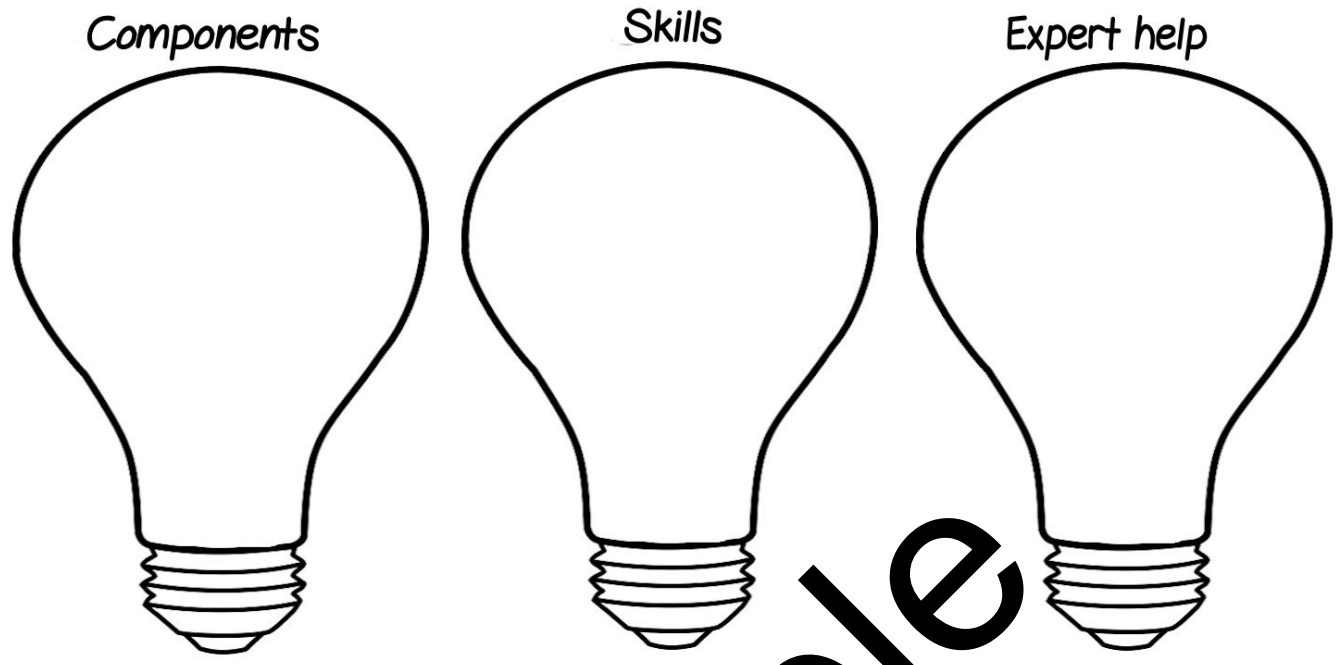


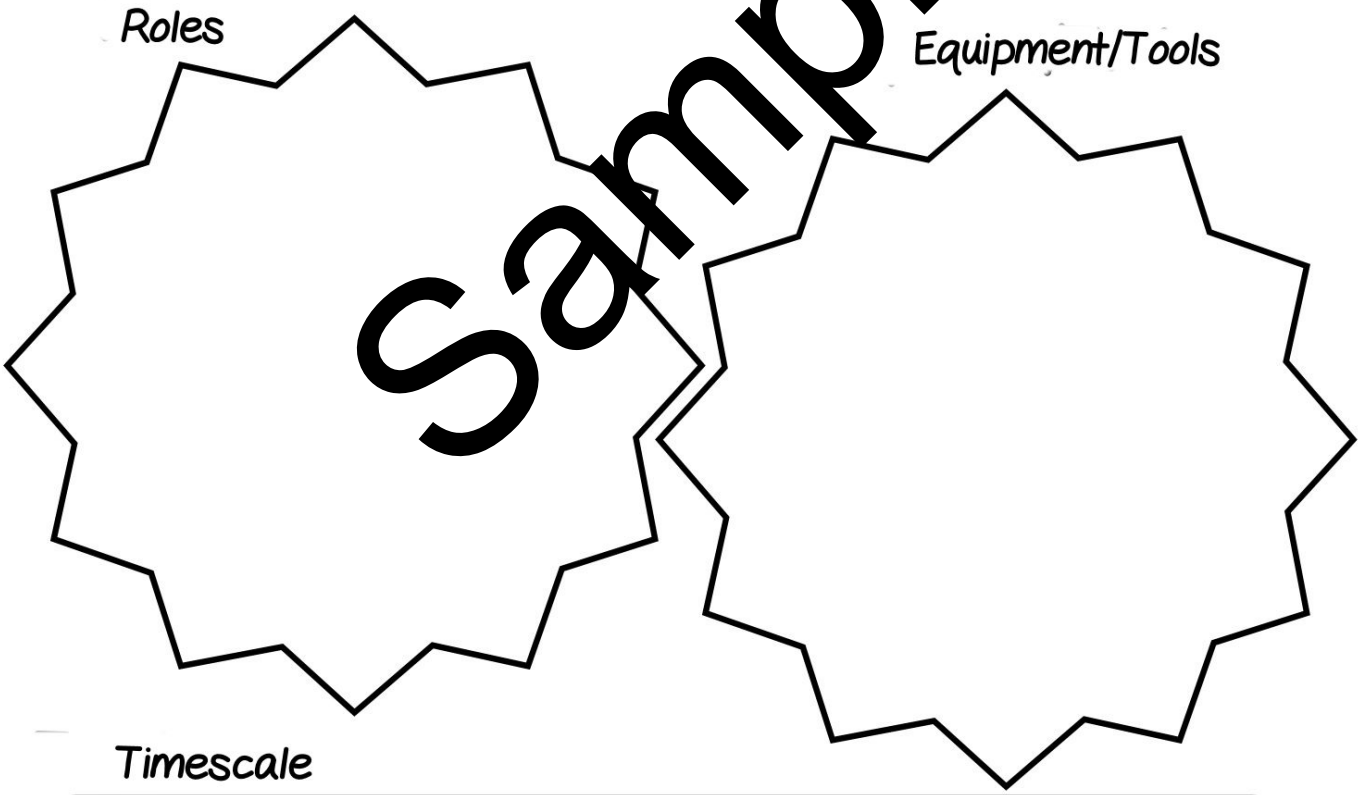
❑ In the space below, make sketches of solutions with annotations.

❑ Choose a partner with the STUDENT A worksheet. Use your annotated sketches to explain how native vegetation can be protected to promote biodiversity on a farm.

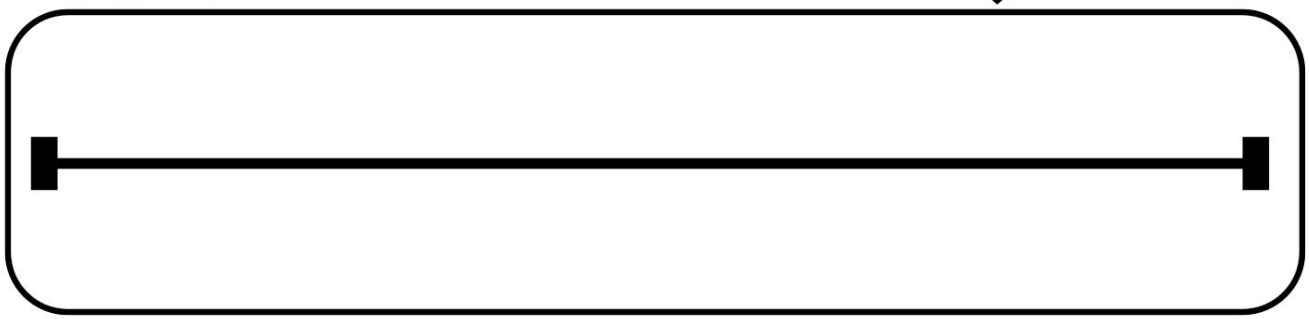
Activity Design Brief Template

❑ Before you design, this template will help you to: analyse what you need, assign roles to group members and agree on a timeline for completing the design.





Timescale



(ACTDEP028) Elaboration: identifying when materials, tools and equipment are required for making the solution: setting milestones for production processes and allocating roles to team members.