

# Year 7–8

DESIGN AND TECHNOLOGIES



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Agriculture in Education: an educational resource for Year 7–8 Design and Technologies

## Using technology and design in agriculture. Is there an app. for that?



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## Resource: Using technology and design in agriculture. Is there an app. for that?

Content Descriptor:		
Year 7–8 Design and Technologies	Investigate the ways in which products, services and environments evolve locally, regionally and globally through the creativity, innovation and enterprise of individuals and groups	ACTDEK030
Year 7–8 Design and Technologies	Analyse how food and fibre are produced when designing managed environments and how these can become more sustainable	ACTDEK032

Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), downloaded from the Australian Curriculum website on 18 December 2014 .



### Learning Outcome/s

Students should be able to:

- Describe the factors that have influenced design, technology and innovation in creating improved agricultural methods.
- Recognise the need to increase food production using cost efficient, ethical and sustainable production techniques.

### Resource Description

This resource aims to have students:

1. explore the role of technology and innovation in agriculture and recognise the fact that they have always played a significant role in the industry;
2. analyse some of the issues experienced in producing food and fibre;
3. further explore how products and services in agriculture have changed over time to manage issues such as climate variability and predict future developments; and
4. by designing their own app, innovation or invention to assist in overcoming issues experienced in the production of food and fibre, contemplate the role technology and innovation has in making farming more productive and sustainable.

This resources is made up of a:

1. Teacher Guide
2. 3 Powerpoints – [Technology, Design and Innovation in Australia](#), [Problems Faced by Agriculture](#), [Technology Cards](#)
3. Agriculture Innovation and Invention Task

### Overview

Work Task 1: Students will discuss the different types of technology used on farms and construct a word wall and quiz.

Work Task 2: Using a virtual farm, students explore the technology actually being used on farms today and create a news broadcast.

Work Task 3a: Why is Technology important in Agriculture?

Work Task 3b: Careers Related to Agricultural Technology

Students have the opportunity to consolidate their ideas about the importance of technology in agriculture as well as exploring the careers that have an influence on technological change and innovation in agriculture.

Work Task 4: Students will create a slideshow or video showing how technology is used to overcome problems experienced in agriculture.

Work Task 5: Students will design an app., invention or innovation that will make producing food and fibre more productive and sustainable.



### Setting the scene: Overview of Technology and Design in Agriculture

Begin by having students consider the concepts of Technology, Design and Invention.

Display the first (1) and second (2) slides on the PowerPoint, [Technology in Australia](#) and in a discussion; review the meaning of the words: technology, design and innovation. The notes as part of the PowerPoint provide a definition of technology.

#### Discuss

Discuss the following questions (as a class, in small groups or think, pair, share):

- Where do you get your food?
- Where does your food grow?
- How does your food get from the farm to the supermarket?
- What does a farmer do to help the food grow?
- What kinds of things can cause problems on a farm?

Have the students make notes to capture the outcome of the discussion.

Show students Slide 3 of the Powerpoint: [Technology, Design and Innovation in Australia](#) – How agriculture has changed in Australia over time. (Slide 3 captures the following information for students and for you to use on smartboard etc).

Have students review the [Technology Cards](#). They may have seen these before, if not have them make notes, providing 2-3 sentences:

- describing each item and its related activity eg irrigation pivots are critical to enabling farmers water greater areas of land = to increase crop yields; and
- the approximate dates or century in which the item of technology may have been invented or introduced into Australia.

Discuss briefly with students the technological changes that have occurred and why they may have occurred? Have them capture their thoughts in notes.



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### Work Task 1: Technology used on farms = Smart farming

In this activity, students will consider the types of technology used on farms.

Instruct students to create a “word wall”.

This can be done electronically or on poster paper.



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It should include information on:

- The forms of technology used in farming (if students are having difficulty identifying technologies, you could ask them to consider farm machinery such as tractors and milking machines as well as things like crop sprays, genetic engineering, irrigation pipes, water pumps, machines for sowing and harvesting, computers, apps.).

NOTE: To assist Slide 4 of PowerPoint [Technology, Design and Innovation in Australia](#) outlines the work task for the students so it can be displayed via smartboard etc.



#### Discuss

- What are the advantages of these technologies?
- What are the disadvantages of these technologies?

Then, instruct students to create a quiz in Google Forms. Students can use 10-15 of the ideas that have been posted to the wall. These quizzes could be posted on a classroom website for students to access.

Here is a “how to” <http://planetoftheweb.com/components/promos.php?id=534>



work  
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### Work Task 2: Technology used in 3 different farming environments

In this activity, students will investigate the technology that is actually being used on farms to ensure increased production and sustainability. Have students visit the MLA Virtual farm <http://virtualfarm.mla.com.au/>.



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Three (3) different types of farms and the technology used in farming is shown. Place students into small groups of four and allocate each group one of the farms.

By exploring the technology used on the farm, ask students to create a news broadcast explaining how the technologies being used has assisted in creating more sustainable farm practices and why this has been significant.

Student focussed activity

In your group you will create a news broadcast about the technology used on the farm you are investigating. Your news broadcast should include:

- a detailed description of the technology and how it is used
- be interesting for viewers
- a story about how and why the technology was created
- pictures of the technology
- an interview with a farmer about how it makes his/her life easier

You will show your news item to the rest of the class and be prepared to ask and answer questions.

After sharing information with each other, have students explore this site freely, either independently or in the same groups. This is a time for them to look at this site in a rather casual way, according to their interest.



work  
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### Work Task 3a: Why is Technology important in Agriculture?

Student focussed activity:

NOTE: Slide 5 PowerPoint – [Technology, Design and Innovation in Australia](#) – have students consider how they think technology may be important in managing the following – have them make notes as they may need them as part of a later activity:

- Feeding the world's growing population
- Sustainable practices and the environment
- Better value for money
- More efficient
- Solves these problems and more..
- Social media



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### Work Task 3b: Careers Related to Agricultural Technology

As an extra activity you may wish to have students explore the careers identified in Slide 6 – [Technology in Agriculture](#)

To support this activity show students the video Lunchbox Legends - the people behind your lunch. It is a fun video that introduces students to not only how food gets from the paddock to the plate but the people who make it happen. It can be found at: (<https://youtu.be/-GY1mHiRHmU>)

There are a number of careers related to agricultural technology. Have students research one of the following careers and explain their importance to technology and agriculture:

- Entomologist
- Chemist
- Geneticist
- Food scientist
- Agronomist



discuss

Setting the Scene: How technology and design have been used to manage the agricultural environment, creating greater productivity and sustainability.

Using the PowerPoint 2 – [The Problems Faced by Agriculture](#) discuss with students some of the problems that currently exist in agriculture: climate variability, pests and weeds, water use, increasing productivity to feed the world, energy, land management and waste management.



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Work Task 4: Using technology to overcome problems in agriculture

Working in pairs (or individually) students will brainstorm the problems that currently exist in farming and agriculture (climate variability, pests and weeds, water use, increasing productivity to feed the world, energy, land management, waste management) and

Why is technology important in agriculture? Consider and have students review their notes from Work Task 3a :

- Feeding the world's growing population
- Sustainable practices and the environment
- Better value for money
- More efficient
- Social networking
- Solving these problems and more...

(they could do their brainstorming online using Mindomo [www.mindomo.com](http://www.mindomo.com))



assess

A student research activity (possible Assessment Option):

Students are to undertake a research project by choosing one of the current problems faced by farmers, as identified in the PowerPoint – [The Problems Faced by Agriculture](#), and explain how technology has assisted in overcoming the problem. They will be required to turn their research into a video or slideshow to share with the class.

Their research should:

1. clearly identify their chosen problem and explain it;
2. describe what is being done to overcome these problems:
  - In your state
  - In Australia
  - Across the world
3. explain the role of design, innovation and/or technology has played in managing the problem.

To assist students in thinking about how technology is being used to overcome key problems such as water management you might like to view [Technology in Agriculture – Irrigation Efficiency](#) <https://youtu.be/gb7GOz-xvsl> for some more ideas.

Students now use the information they have gathered to construct a video or slideshow.

See <http://cooltoolsforschools.wikispaces.com/> for ideas.



work  
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Work Task 5: Create an app., invention or innovation (assessment opportunity):

- Imagine all students are inventors who work in agriculture or are agricultural scientists.
- Each individual or pair will select an agricultural problem or issue that they have already researched.
- Students are to invent something that would make farmers' lives easier, produce more food and fibre, improve sustainable practices or solve other problems. For example: create an invention that will stop crops being ruined by changes in weather, an invention that will ensure enough food and fibre is produced to feed and clothe all the world, or an invention that will help reduce the amount of energy used on farm.
- They will need to discuss with the class how their idea will make producing food and fibre more productive and sustainable.



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Using the worksheet Agricultural Innovation and Invention Task (provided), work through the following:

- Brainstorm possible solutions to the problem.
- What is your invention idea?
- How will your invention solve the problem?
- Will it lead to an increase in food production
- Is it cost effective? (do the benefits gained from this innovation outweigh its costs)
- Will it have benefits globally or be specific to one region or country?
- Is it sustainable?
- Draw, label and explain your invention, innovation, app.
- Name your invention, innovation, app.

You may have students:

- celebrate their innovations/inventions by presenting their ideas to the class;
- perhaps organise an “Innovation Day” and invite a scientist from CSIRO to judge their work; and
- discuss what they learnt and found interesting about the invention/innovation presented.

#### Additional Teacher Resource information

- Technology is the practical application of science. It involves the use of tools and machines, materials techniques and power sources to make people’s lives easier and more productive. People in all phases of agribusiness – farmers, food, processors, grocery stores and many others all use technology to produce food, fibre and other products efficiently and sustainably.
- Some technology you can see everyday – tractors, iPhone, scanners and harvesters.
- Some technology is not visible such as plant and animal breeding techniques and sustainable technology.
- Innovation: The act or process of inventing or introducing something new that can be applied to meet new requirements and/or to solve existing problems
- Ethical: conforming to accepted standards of professional or social behaviour.
- Sustainable: the ongoing capacity of Earth to maintain all life.



assess

#### Extension and assessment suggestion

- Investigate other problems or issues that exist on farms.
- Research apps. that are currently being used in agriculture. What do you think are the most exciting benefits of these?
- Using digital technology, design your own app.

#### Design and Technologies Achievement Standard

By the end of Year 8 students explain factors that influence the design of products, services and environments to meet present and future needs. They explain the contribution of design and technology innovations and enterprise to society. Students explain how the features of technologies impact on designed solutions and influence design decisions for each of the prescribed technologies contexts.



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#### Teacher Support Resources/Sources

- Google Quiz – <http://planetoftheweb.com/components/promos.php?id=534>
- Meat and Livestock Australia Virtual farm <http://virtualfarm.mla.com.au/>.
- Brainstorming online using Mindomo [www.mindomo.com](http://www.mindomo.com)
- Technology in Agriculture – Irrigation Efficiency <https://www.youtube.com/watch?v=Dc6Up17Oiss>



## Agricultural Innovation and Invention Task

1. Brainstorm problems that currently exist in farming and agriculture. Circle your choice.

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2. Brainstorm solutions to your problem.

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3. What is your idea for an invention, innovation or app.?

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4. How will your invention, innovation or app. help? Are there any negatives?

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5. Will it increase food production in a cost effective way? Why/why not?

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6. Is it ethical and sustainable? Explain.

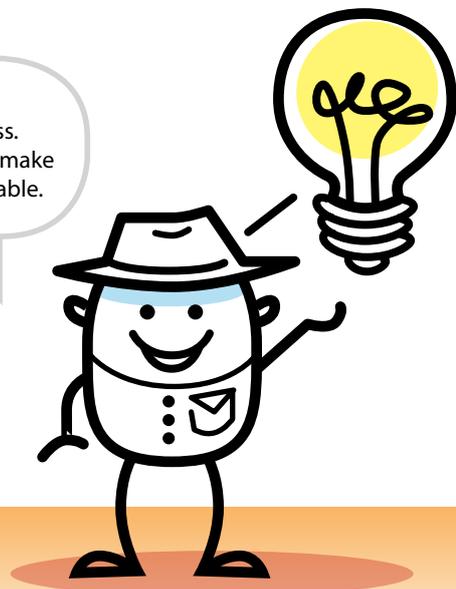
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7. Design time.

Name your invention, innovation or app.

On the back of the page – draw, label and explain your invention. Be prepared to share your ideas with the class. Remember to discuss with the class how your idea will make producing food and fibre more productive and sustainable.



Produced by



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