



Australian Cotton: Following the thread.....

An Educational Resource for

Agriculture & Food Technologies

Technology Mandatory Years 7-8



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Acknowledgements

This online curriculum-linked resource was produced by the Angela Colliver and Greg Mills from FutureGen Education for Cotton Australia.

The curriculum-linked resource is designed to support teachers in NSW schools implement the NESA Technology Mandatory Syllabus.



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Introduction

Schools across Australia are now teaching about food and fibre production, and Australia's primary industries that produce natural fibres and how people in related professions contribute to society.

This resource book aims to support teachers in secondary schools engage students in appreciating more about food and fibre production, understand what Australian cotton growers and processors do and produce, and how they convert cottonseed and lint into products suitable for sale.

Aim

This resource book provides schools with opportunities to:

- implement food and fibre production, design technologies and food and textiles-related content and processes;
- encourage students to design and create using natural oils and fibres;
- demonstrate to students that everyone can design, and create innovative ideas and creative solutions to authentic problems;
- discover and envision a range of creative solutions to real-world problems;
- use project based learning (PBL) approaches to investigate and respond to a challenge, task or project;
- apply thinking skills and develop an appreciation of the processes they can apply as they encounter problems, unfamiliar information and new ideas;
- design research projects with the ultimate goal of reflecting on appropriate local actions to ensure sustainable food and fibre production;
- design the steps required to create sustainable solutions for the problems;
- dream and consider the many possible solutions to deal with fibre production challenges;
- deliver and debrief real-world solutions; and
- practise and reinforce the food and fibre production understandings delivered in Technology Mandatory in Years 7-8.

In schools, there is scope for teachers to integrate this resource book into their existing classroom programs.

How to use this resource book

This resource book provides learning experiences to support your school's involvement in learning about science and technology, specifically food and fibre production, agriculture and textiles and design.

Teachers can use the following learning experiences to plan, publicise, provoke, stimulate, support and inspire their learning about these important areas.

The resource book includes ideas to support students' involvement in investigating, exploring, experimenting, designing, creating and communicating their understandings about what Australian cotton growers and processors do and produce, and how they convert cottonseed and lint into products suitable for sale.



Curriculum focus

This learning resource has a variety of student activities that link to the NSW Education Standards Authority (NESA) Syllabuses in Technology Mandatory 7-8 and Technology Electives. It also has many opportunities to integrate the Sustainability Cross Curriculum Priorities (CCP) and General Capabilities.

The NESA Technology Mandatory Years 7-8 Syllabus states:

'Knowledge and understanding of technological content is developed through pedagogical approaches, such as project and problem-based learning. Through the production of innovative solutions to contextually relevant problems, students are provided with opportunities to use a variety of thinking strategies, embrace new concepts and learn through trialling, testing and refining ideas. The practical nature of Technology Mandatory engages students in design and production activities as they develop safe practices and refine skills working with varied materials and production technologies. These authentic learning experiences provide students with a sense of satisfaction and are the foundation for life-long learning.' (Source: [NESA Technology Mandatory Years 7-8 Syllabus page 10](#))

Students:

- develop practical skills with tools, materials and processes while working safely, independently and collaboratively on design projects;
- develop thinking skills when designing and producing digital and non-digital solutions; and
- develop and apply skills in project management and evaluation when designing and producing solutions.

Students develop knowledge and understanding of:

- how traditional, contemporary and advancing technologies are used when designing sustainable products and solutions;
- how data is used in the development and automation of digital solutions; and
- the role of people and technologies in developing innovative solutions for preferred futures.

Students:

- appreciate the contribution and impact of innovation and technologies now and in the future;
- appreciate the dynamic nature of design and production processes and how they are used to develop solutions to personal, social and global issues;
- appreciate the finite nature of some resources and the impact of their use on the environment and society; and
- value the development of skills and gain satisfaction from their use to solve problems and create quality products.

(Source: [NESA Technology Mandatory Years 7-8 Syllabus page 13](#).)

Pedagogy used in the learning sequence

The Project Based Learning (PBL) learning sequence used in this book are underpinned by the work of Lee Watanabe-Crockett.

PBL uses the *solution fluency* through six phases: Define; Discover; Dream; Design; Deliver and Debrief. The phases of the model are based on the 21st Century Fluencies created by Crockett et al. (2011).

The Essential Fluencies are outlined extensively in the book '*Mindful Assessment*' (Crockett, L. & Churches, A. (2016) *Mindful Assessment*. Published by Solution Tree. See also '[Solution Fluency](#)', Global Digital Citizen Foundation website.

The fluencies are:

- **Define:** The 'Define' phase begins with lessons that intellectually engage students with a challenge, problem, question and task. This phase captures their interest, provides an opportunity for them to express what they know about the topic, share understandings being developed, and helps them to make connections between what they know and the new ideas.
- **Discover:** The 'Discover' phase includes activities in which students can explore, investigate, research, read, discuss, gather, organise and compare knowledge and data. They grapple with the challenge, problem, question or phenomenon and describe it in their own words. This phase provides a context and enables students to acquire a common set of experiences that they can use to help each other make sense of the new knowledge or understandings.
- **Dream:** The 'Dream' phase enables students to imagine and develop possible solutions and explanations for the challenge, problem, question and task they have experienced. The significant aspect of this phase is that the students' explanations follow substantive conversations and higher order thinking experiences.
- **Design:** The 'Design' phase provides opportunities for students to apply what they have learned to new situations, to map production processes and so develop a deeper understanding of the challenge, problem, question or phenomenon. It is important for students to extend explanations and understandings, using and integrating different modes such as diagrammatic images, written language and media.
- **Deliver:** The 'Deliver' phase has two stages – production and publication or presentation. In the production phase, the task comes to life – this is the doing phase. At the end of this phase, the student task should be completed. Next, they present or publish their work sample to an audience.
- **Debrief:** The 'Debrief' phase provides an opportunity for students to revisit, review and reflect on their own learning and new understanding and skills. This is also when students provide evidence for changes to their understanding, beliefs and skills.

Source: '[Solution Fluency](#)', Global Digital Citizen Foundation website.

Project-Based-Learning (PBL)

In this resource book, the emphasis is on providing teachers with ideas and activities that enable students to investigate and respond to a challenge, task or project and these enable students to pursue deep real-world investigations where they:

- Design real and complex projects for learning;
- Think and create in digital and non-digital environments to develop unique and useful solutions by both adapting and improving on current designs as well as designing the innovation of new possibilities;
- Think analytically and communicate using multi-media formats and engage in authentic assessment; and
- Present their learning via exhibitions.

The NSW Department of Education considers that PBL is an important element for future-focused learning and teaching. It is an

“... approach to teaching and learning that engages students in rich and authentic learning experiences. PBL can be transformative for your teaching practice but requires strong, supportive leadership and a commitment to innovation and contemporary pedagogies”

Key reasons for using PBL include:

- well-scaffolded PBL engages students in their personal learning journey
- offers students an opportunity to build confidence, solve problems, work in teams, communicate ideas, and manage themselves more effectively
- encourages students to use technology in authentic ways
- connects students and schools with communities locally and globally.

Source: [NSW Department of Education](#)

Teacher Notes

The aim of this unit is to help teachers and students in secondary schools investigate how cotton is produced in managed environments and source information and resources about how the characteristics and properties of cotton and cottonseed determine how these products can be used.

Using the ‘Solution Fluency’ students develop knowledge and understandings about how cotton is grown, produced and processed in managed environments. Students also investigate and explain how both cotton and cottonseed oil have certain characteristics and properties that determine how they can be used.

Using ‘design and production skills’ students design either a cotton muslin bag or an infused cottonseed oil with a detailed label design that educates consumers about how it was produced.

The following outcomes are integrated into the learning sequence in this resource.

Outcomes

Design and Production Skills

TE4-1DP designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities

TE4-2DP plans and manages the production of designed solutions

TE4-3DP selects and safely applies a broad range of tools, materials and processes in the production of quality projects

Knowledge and Understanding

TE4-5AG investigates how food and fibre are produced in managed environments

TE4-6FO explains how the characteristics and properties of food determine preparation techniques for healthy eating

TE4-9MA investigates how the characteristics and properties of tools, materials and processes affect their use in designed solutions

Life Skills

TELS-1DP communicates ideas and solutions to authentic problems or opportunities

TELS-2DP participates in planning for the production of designed solutions

TELS-3DP participates in the production of designed solutions

TELS-4DP follows safe practices in the use of tools, materials and processes for design projects

TELS-6AG describes how food and fibre are produced

Cross-curriculum priority:

Sustainability 🌱

General capabilities:

Critical and creative thinking 🧠, Literacy 🗣️, Numeracy 📊, Personal and social capability 🧑, Information and communication technology capability 💻, Work and enterprise 🏢

Thinking skills:

Design thinking and Systems thinking

Assessment

The assessment methodology is based on using two rubrics, one specifically for the task set in this unit, and the other based on the learning process. The assessment rubrics provided in this resource, are the summation of the student's learning tasks. The rubrics provide:

- A common language for discussing student achievement in relation to the tasks undertaken, and
- A means of engaging with, and communicating student achievement, to the student and his/her parents or caregivers.

The rubric columns: levels

Each of the rubrics is divided into four levels.

Level 1: Basic

Level 2: Sound

Level 3: Very High

Level 4: Outstanding

The rubric rows: aspects of the task

Each of the rubrics is divided into rows, with each row representing critical aspects of the student task. The task in this learning sequence involves students:

Gathering and analysing information about how cotton is grown, produced and processed in managed environments. Students investigate and explain how both cotton and cottonseed oil have certain characteristics and properties that determine how they can be used.

The students are required to design either a cotton muslin bag or an infused cottonseed oil with a detailed label design that educates the consumer about how it was produced.

The label design must include an infographic that sequences the process of converting cotton or cottonseed into a product suitable for sale. It must be eye-catching to the consumer and identify an actual Australian locality and Australian cotton grower as the point of its origin.

The cotton muslin bag's label needs to educate consumers about the properties of cotton. It needs to include a QR code that provides the consumer with information about how the muslin bag with its specific characteristics and properties can be used.

The infused cottonseed oil product needs to comply with state law, list the product's ingredients by name and quantity, along with its use-by date. It needs to include a QR code that provides the consumer with information about how the cottonseed oil with its specific characteristics and properties can be used for healthy eating.

Students are also required to make a five minute presentation sharing the designed product and its label to an audience and educate them about how cotton or cottonseed is produced and processed in Australia and how its properties and characteristics determine what it can be used for.

OVERALL PROJECT RUBRIC FOR DESIGNING AN INFUSED COTTONSEED OIL:

This rubric is designed to specifically evaluate what has been asked of the students from the scenario presented to the class.

Syllabus	Level 4	Level 3	Level 2	Level 1
TE4-5AG TE4-6FO TE4-9MA TELS-6AG Literacy Critical & creative thinking ICT's Numeracy Personal and social capability Work and enterprise Thinking skills	An infused cottonseed oil with a detailed label design, with an infographic that sequences the process of producing cottonseed oil into a product suitable for sale, and a design that identifies an actual Australian locality and an Australian cotton grower as the point of origin, lists the product's ingredients by name and quantity, as well as its use-by date and includes a QR code and information about how the cottonseed oil with its specific characteristics and properties can be used for healthy eating, has been created. The design shows evidence of extensive research of the subject matter.	An infused cottonseed oil with a detailed label design, with an infographic that sequences the process of producing cottonseed oil into a product suitable for sale, and a design that identifies an actual Australian locality and an Australian cotton grower as the point of origin, lists the product's ingredients by name and quantity, as well as its use-by date and includes a QR code and information about how the cottonseed oil with its specific characteristics and properties can be used for healthy eating, has been created. The design shows evidence of research of the subject matter.	An infused cottonseed oil with a detailed label design, with an infographic that sequences the process of producing cottonseed oil into a product suitable for sale, and a design that identifies an actual Australian locality and an Australian cotton grower as the point of origin, lists the product's ingredients by name and quantity, as well as its use-by date and includes a QR code and information about how the cottonseed oil with its specific characteristics and properties can be used for healthy eating, has been created. The design shows evidence of some research of the subject matter.	An infused cottonseed oil with a detailed label design, with an infographic that sequences the process of producing cottonseed oil into a product suitable for sale, and a design that identifies an actual Australian locality and an Australian cotton grower as the point of origin, lists the product's ingredients by name and quantity, as well as its use-by date and includes a QR code and information about how the cottonseed oil with its specific characteristics and properties can be used for healthy eating, has been created. The design shows evidence of little research of the subject matter.
TE4-5AG TE4-6FO TELS-6AG Literacy Critical & creative thinking Thinking skills	The content showed clear evidence of research and understanding of the different practices used to produce and process cotton and cottonseed oil; and how the students might prepare it for eating.	The content showed some evidence of research and understanding of the different practices used to produce and process cotton and cottonseed oil; and how the students might prepare it for eating.	The content showed limited evidence of research and understanding of the different practices used to produce and process cotton and cottonseed oil; and how the students might prepare it for eating.	The content showed little evidence of research and understanding of the different practices used to produce and process cotton and cottonseed oil; and how the students might prepare it for eating.
TE4-1DP TE4-2DP TE4-3DP Critical & creative thinking Literacy Numeracy Thinking skills	The design and layout of the label makes it very easy to understand and interpret the information provided.	The design and layout of the label makes it easy to understand and interpret the information provided.	The design and layout of the label makes it possible to understand and interpret the information provided.	The design and layout of the label makes it difficult to understand and interpret the information provided.
TE4-5AG TE4-6FO TE4-9MA TELS-6AG Critical & creative thinking Literacy ICT's Personal and social capability Work and enterprise Thinking skills	The presentation of the infused cottonseed oil and its label educated consumers about how cotton and cottonseed oil are produced and processed in Australia, and how its properties and characteristics determine preparation and cooking techniques was communicated with a logical flow and without pauses.	The presentation of the infused cottonseed oil and its label educated consumers about how cotton and cottonseed oil are produced and processed in Australia, and how its properties and characteristics determine preparation and cooking techniques was communicated with a mostly logical flow and with few pauses.	The presentation of the infused cottonseed oil and its label educated consumers about how cotton and cottonseed oil are produced and processed in Australia, and how its properties and characteristics determine preparation and cooking techniques was communicated with a logical flow and with some pauses.	The presentation of the infused cottonseed oil and its label educated consumers about how cotton and cottonseed oil are produced and processed in Australia, and how its properties and characteristics determine preparation and cooking techniques was communicated with a little logic and many pauses.
TE4-5AG TE4-6FO TE4-9MA TELS-6AG	The student answered all questions clearly and accurately.	The student answered most questions clearly and accurately.	The student answered some questions clearly and accurately.	The student answered a few questions clearly and accurately.

OVERALL PROJECT RUBRIC FOR DESIGNING A MUSLIN BAG:

This rubric is designed to specifically evaluate what has been asked of the students from the scenario presented to the class.

Syllabus	Level 4	Level 3	Level 2	Level 1
TE4-5AG TE4-6FO TE4-9MA TELS-6AG Literacy Critical & creative thinking ICT's Numeracy Personal and social capability Work and enterprise Thinking skills	A muslin bag with a detailed label design, with an infographic that sequences the process of producing cotton into a product suitable for sale, and a design that identifies an actual Australian locality and an Australian cotton grower as the point of origin, lists the product's ingredients by name and includes a QR code and information about how the muslin bag with its specific characteristics and properties can be used has been created. The design shows evidence of extensive research of the subject matter.	A muslin bag with a detailed label design, with an infographic that sequences the process of producing cotton into a product suitable for sale, and a design that identifies an actual Australian locality and an Australian cotton grower as the point of origin, lists the product's ingredients by name and includes a QR code and information about how the muslin bag with its specific characteristics and properties can be used has been created. The design shows evidence of research of the subject matter.	A muslin bag with a detailed label design, with an infographic that sequences the process of producing cotton into a product suitable for sale, and a design that identifies an actual Australian locality and an Australian cotton grower as the point of origin, lists the product's ingredients by name and includes a QR code and information about how the muslin bag with its specific characteristics and properties can be used has been created. The design shows evidence of some research of the subject matter.	A muslin bag with a detailed label design, with an infographic that sequences the process of producing cotton into a product suitable for sale, and a design that identifies an actual Australian locality and an Australian cotton grower as the point of origin, lists the product's ingredients by name and includes a QR code and information about how the muslin bag with its specific characteristics and properties can be used has been created. The design shows evidence of little research of the subject matter.
TE4-5AG TE4-6FO TE4-9MA TELS-6AG Literacy Critical & creative thinking Thinking skills	The content showed clear evidence of research and understanding of the different practices used to produce and process cotton; and how the muslin bag with its specific characteristics and properties can be used.	The content showed some evidence of research and understanding of the different practices used to produce and process cotton; and how the muslin bag with its specific characteristics and properties can be used.	The content showed limited evidence of research and understanding of the different practices used to produce and process cotton; and how the muslin bag with its specific characteristics and properties can be used.	The content showed little evidence of research and understanding of the different practices used to produce and process cotton; and how the muslin bag with its specific characteristics and properties can be used.
TEA4-1DP TEA4-2DP TEA4-3DP Critical & creative thinking Literacy Numeracy Thinking skills	The design and layout of the label makes it very easy to understand and interpret the information provided.	The design and layout of the label makes it easy to understand and interpret the information provided.	The design and layout of the label makes it possible to understand and interpret the information provided.	The design and layout of the label makes it difficult to understand and interpret the information provided.
TE4-5AG TE4-6FO TE4-9MA TELS-6AG Critical & creative thinking Literacy ICTs Personal and social capability Work and enterprise Thinking skills	The presentation of the muslin bag and its label educated consumers about how cotton is produced and processed in Australia, and how its properties and characteristics determine how can be used, was communicated with a logical flow and without pauses.	The presentation of the infused cottonseed oil and its label educated consumers about how cotton is produced and processed in Australia, and how its properties and characteristics determine how can be used, was communicated with a mostly logical flow and with few pauses.	The presentation of the infused cottonseed oil and its label educated consumers about how cotton is produced and processed in Australia, and how its properties and characteristics determine how can be used, was communicated with a logical flow and with some pauses.	The presentation of the infused cottonseed oil and its label educated consumers about how cotton is produced and processed in Australia, and how its properties and characteristics determine how can be used, was communicated with a little logic and many pauses.
TE4-5AG TE4-6FO TE4-9MA TELS-6AG Literacy	The student answered all questions clearly and accurately.	The student answered most questions clearly and accurately.	The student answered some questions clearly and accurately.	The student answered a few questions clearly and accurately.

LEARNING PROCESS RUBRIC

Each of the learning progressions in the learning sequence has a prerequisite for progression – a list of what the student needs to accomplish in order to proceed to the next step in the process. The text from those areas is duplicated in this rubric and can be used with students to guide their progress with feedback, in a mini-debrief, helping them to refine their process and product at critical points throughout the learning sequence.

Level 4	Level 3	Level 2	Level 1
A clear definition of the task was provided.	A somewhat clear definition of the task was provided.	A rather ordinary definition of the task was provided.	A definition of the task could not be provided.
Research and analysis was completed with no prompting.	Research and analysis was completed with minimal prompting.	Research and analysis was completed with some prompting.	Research and analysis was completed with significant prompting.
A clear visualisation of the cotton based product and label was provided.	A mostly clear visualisation of the cotton based product and label was provided.	A somewhat clear visualisation of the cotton based product and label was provided.	No clear visualisation of the cotton based product and label was provided.
An extremely clear plan of what cotton based product and label will be and contain was provided.	A very clear plan of what the cotton based product and label will be and contain was provided.	A mostly clear plan of what the cotton based product and label will be and contain was provided.	A somewhat unclear plan of what the cotton based product and label will be and contain was provided.
An extremely clear plan of the accompanying narrative was provided.	A very clear plan of the accompanying narrative was provided.	A mostly clear plan of the accompanying narrative was provided.	A somewhat unclear plan of the accompanying narrative was provided.
The cotton based product and label have been created and presented to an audience with a logical presentation about how it educates consumers about how cotton is produced and processed in Australia, and how its properties and characteristics determine how it can be used.	The cotton based product and label have been created and presented to an audience with a mostly logical presentation about how it educates consumers about how cotton is produced and processed in Australia, and how its properties and characteristics determine how it can be used.	The cotton based product and label have been created and presented to an audience with a somewhat logical presentation about how it educates consumers about how cotton is produced and processed in Australia, and how its properties and characteristics determine how it can be used.	The cotton based product and label have been created and presented to an audience with little logic about how it educates consumers about how cotton is produced and processed in Australia, and how its properties and characteristics determine how it can be used.

Industry Facts

In 2016-17 there were 1436 cotton farms in Australia. 66 percent were in NSW, 33 percent were in Queensland and 0.01 percent was in Victoria. *Source: Monsanto audited numbers, May 2018.*

Cotton is grown in 152 regional communities across Queensland, NSW and Victoria. *Source: Cotton Australia towns list database.*

The ratio of dryland cotton (rain grown) to irrigated cotton varies depending on the market and conditions. Of the 2016-17 crop 8 percent was dryland and 92 percent was irrigated. *Source: Cotton Australia Tables.*

In the 2017-2018 seasons, Australia's cotton growers produced approximately 4.6 million bales of cotton. In 2017, the average price offered per bale was \$539.

In 2016-17 the Australian cotton crop was worth almost \$2.3 billion at the farm gate. The value of cotton lint was \$2 billion and the value of cottonseed was \$300 million. *Source: Cotton Australia tables (compilation of industry sources).*

The average cotton farmer provides jobs for 6.6 people.

In 2016-17 Australia is the third largest exporter of cotton in the world behind the United States of America and India. 99 percent of Australia's raw cotton is exported. *Source: ABARES.*

For more information visit [Cotton Australia's Annual 2018](#).

Technology Mandatory

Stage 4

The NESA Technology Mandatory Years 7-8 Syllabus states:

'By the end of Stage 4, students explore problems and opportunities considering functional, economic, environmental, social, technical and/or usability constraints. They investigate, select, justify and safely use a range of tools, materials, components, equipment and processes to develop, test and communicate design ideas using appropriate technical terms and technologies. Students plan, manage and evaluate the production of design solutions. They develop thinking skills to communicate the development of digital and non-digital solutions.

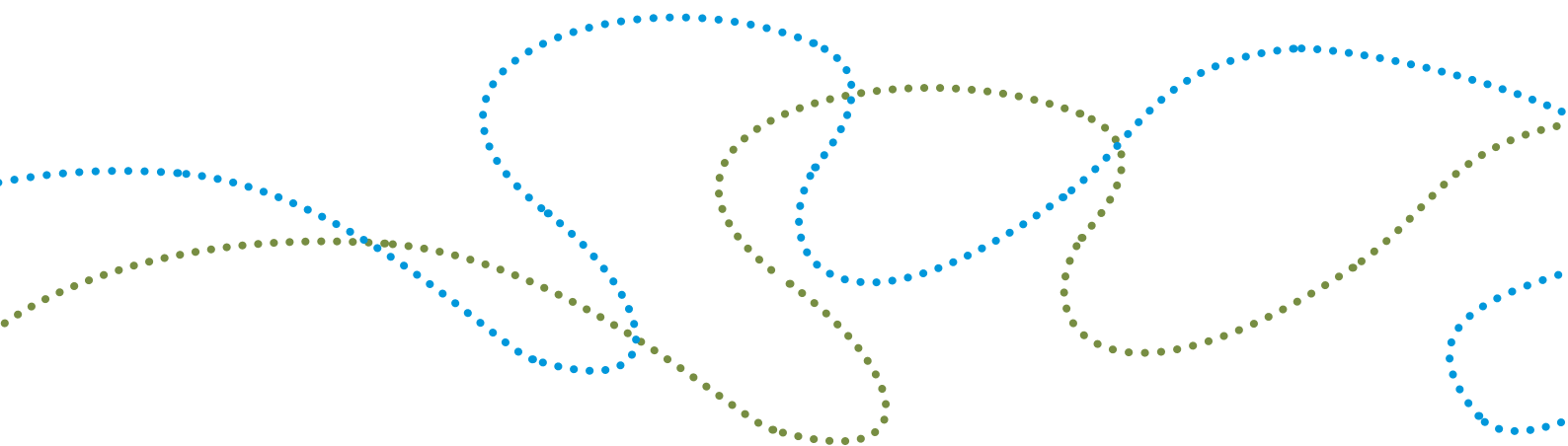
Students investigate how managed systems are used to sustainably produce food and fibre. They explain food selection and preparation, food safety, and make informed and healthy food choices. Students collect and interpret data from a range of sources to assist in making informed judgements. They explain how data is represented in digital systems, and transmitted and secured in networks.

Students explain how force, motion and energy can be used in systems, machines and structures. They investigate characteristics and properties of a range of materials, develop skills and techniques in the use of a broad range of tools and safely apply them in the production of projects.

Students are responsible users of technology, capable of designing and producing solutions to identified needs or opportunities. They develop an appreciation of the contribution of technologies on their lives now and the impact of innovations for creating preferred futures. They develop an appreciation of the dynamic nature of design and production processes and how thinking skills are used to develop solutions to personal, social and global issues'.

Source: ([NESA, Technology Mandatory Years 7-8 Syllabus](#) page 18, 2018)

In the Technology Mandatory Syllabus, students use thinking skills (including systems thinking, computational thinking and design thinking), to design and produce products, environments and services in agriculture contexts.



Australian Cotton: Following the thread

The essential question:

What benefits accrue in agriculture, food and material technologies when we understand all the things cotton growers do to bring us a natural and versatile textile and a food source?

Scenario and design brief:

Bring your love of fibres, textiles and food together and discover how cotton and cottonseed oil are produced and processed so we can have natural fibre products to use and wear, and margarine and cooking oils to cook with!

Did you know that thousands of people employed across the supply chain in the cotton industry?

Find out about the Australian cotton industry that is made up of cotton growers, cotton classers, ginnerers and cotton merchants and what they do in order to deliver top quality, safe and nutritious cottonseed and lint products to consumers in Australia and overseas.

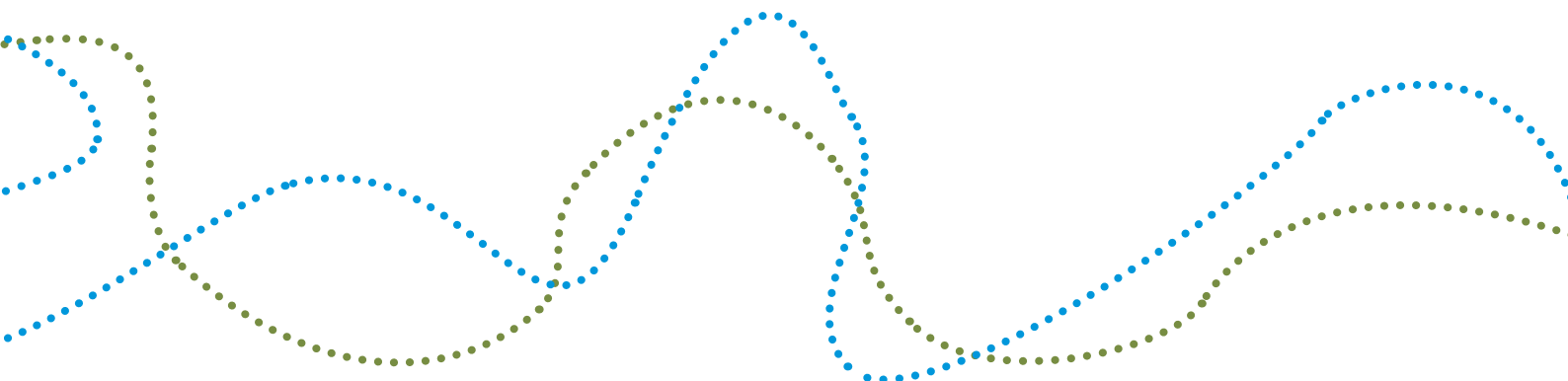
In Design Teams, view videos and images, and read about this industry that produces enough cotton to clothe 500 million people. Then, explore the variety of products produced from cottonseed such as oil, plastics, stockfeed, cosmetics and margarine that are a 'Product of the Australian Cotton Industry'.

Your Design Task is to design and produce either a cotton muslin bag or an infused cottonseed oil with a detailed label design that educates the consumer about how it was produced. The label design must include an infographic that sequences the process of converting cotton or cottonseed into a product suitable for sale. It will need to be eye-catching to the consumer and identify an actual Australian locality and Australian cotton grower as the point of its origin.

The cotton muslin bag's label needs to educate consumers about the properties of cotton. It needs to include a QR code that provides the consumer with information about how the muslin bag with its specific characteristics and properties can be used.

The infused cottonseed oil product needs to comply with state law, list the product's ingredients by name and quantity, along with its use-by date. It needs to include a QR code that provides the consumer with information about how the cottonseed oil with its specific characteristics and properties can be used for healthy eating.

You are also required to make a five-minute presentation of the designed product and its label to an audience. You need to communicate how your designed label can educate consumers about how cotton or cottonseed is produced and processed in Australia and how its properties and characteristics determine what it can be used for. Are you up for the challenge?



Step 1:

Define

Objective: Have students illustrate their understanding of the challenges set out in the scenario by providing an oral definition of the task.

Introduce students to the design and production process as outlined in the Technology Mandatory Syllabus Years 7-8, 2017, page 22 and how it aligns with the 'Solution Fluency'. (See information and table below).

The NSW Syllabus uses the following Technology Mandatory Design and Production Processes:

- Identifying and defining
- Researching and planning
- Producing and implementing
- Testing and evaluating

These processes align themselves with the Solution Fluency in the following ways.

Identifying and defining	Define
	Discover
Researching and planning	Discover
	Dream
Producing and implementing	Dream
	Design
Testing and evaluating	Deliver
	Debrief

Share the scenario and design brief with the class and talk about the tasks that need to be addressed. Assign teams if appropriate, and ask students to define the task they have been set. (See [Resource 1.1](#) in the Student Project Files).

Highlight key terms in the design situation and record these terms on a whiteboard.

As a class establish evaluation criteria through brainstorming and then share the assessment rubrics with the class.

Ask students to highlight the evaluation criteria on the assessment rubrics.

Capture students' interest and find out what cotton products they use, eat or wear.

Talk with students about what they know about the way cotton is produced and processed, and the people who produce and process it, what cotton production and processing is, what it comprises, and how cotton products are marketed in shops.

Make lists of sentences and phrases that describe what students know about these ideas and ask students to share these with a partner. After sharing students' ideas make a list of sentences and phrases as a whole class. Keep these lists and use them as a reference point for discussion later in the unit.

Categorise these ideas into groups about what is known about the way cotton is grown, the many stages involved in producing and processing cotton, and the many products produced.

Use [Pinterest](#) and search for different 'cotton products'. Similarly, search 'Google' for images and charts of different cotton products, or search for more information using Cotton Australia's [Education Kit](#)

Invite students to create a folder and 'save' images of cuts of cotton products for their work later in the unit.

Brainstorm and record the different types of cotton products known to the class.

Create a 'Word Cloud' using [Wordle](#) highlighting the different cotton products and display around the classroom.

Introduce students to a variety of labels that are used on cotton products. Ask students to use the Internet to search for images of labels used on cotton products.

Share these labels and/or a variety of other labels and ask students if they have ever really looked onto and read food and fibre related labels before.

Invite students to visit their local supermarket to explore the types of cooking oils available and to report back on the products found, the different ones and the labelling used.

Collate students' ideas and display for future reference.

Talk with students about responsible digital citizenship in online environments. Work with students to have them understand that during this unit they will be using a range of websites, gathering information about cotton and cottonseed production, labels, recipes and design ideas. Students need to continuously check that the research is correct by using reliable sites. Similarly, discuss the use of free and open sources for images, and videos and the need to request the use of software and media others produce. Remind students about the importance of referencing their sources.

Introduce students to bibliographies and how to source information. Find a template [here](#).

Remind students that there are two cotton products that can be designed in this unit and that there are high-tech; low-tech and no-tech options that they can consider when designing and creating their product label.

Invite students to recall the focus of the task that they have been asked to undertake.

Ask students what they might need to know more about, in order to undertake the challenge. Might they need to know whether any cotton growers and processors are to be found in their state or territory? Might they need to know something about how cotton is grown, produced and processed? Might they need to know something about cottonseed? Might they need to know something about labels that are used on cotton products? Might they need to check out some cottonseed oil recipes or muslin bag designs?

Ask students how they might evaluate their cotton muslin bag or infused cottonseed oil with a detailed label design that includes:

- an infographic that identifies an actual Australian locality and Australian cotton grower as the point of its origin
- sequences the process of converting cotton or cottonseed into a product suitable for sale
- includes a QR code
- educates the consumer about how it was produced; and is eye-catching to the consumer

Remind students that the cotton muslin bag's label needs to educate consumers about the properties of cotton. It needs to include a QR code that provides the consumer with information about how the muslin bag with its specific characteristics and properties can be used.

Remind students that the infused cottonseed oil product needs to comply with state law, list the product's ingredients by name and quantity, along with its use-by date. It needs to include a QR code that provides the consumer with information about how the cottonseed oil with its specific characteristics and properties can be used for healthy eating.

Revisit the assessment rubrics for the unit with the students or create an assessment rubric using the student's ideas.

Prerequisite for progression:

Ask students to articulate their understanding of the task/challenge through oral conversation and if appropriate a written (scribed) statement. (See [Resource 1.2](#) in the Student Project Files).

Note: The Prerequisite for Progression are the checkpoints that occur at the end of each stage of the learning sequence. This is the time at which formative feedback is given to the students about what they have accomplished in that stage. It describes what the students must complete before they move onto the next phase of the unit. (Crockett, et, al)

Step 2:

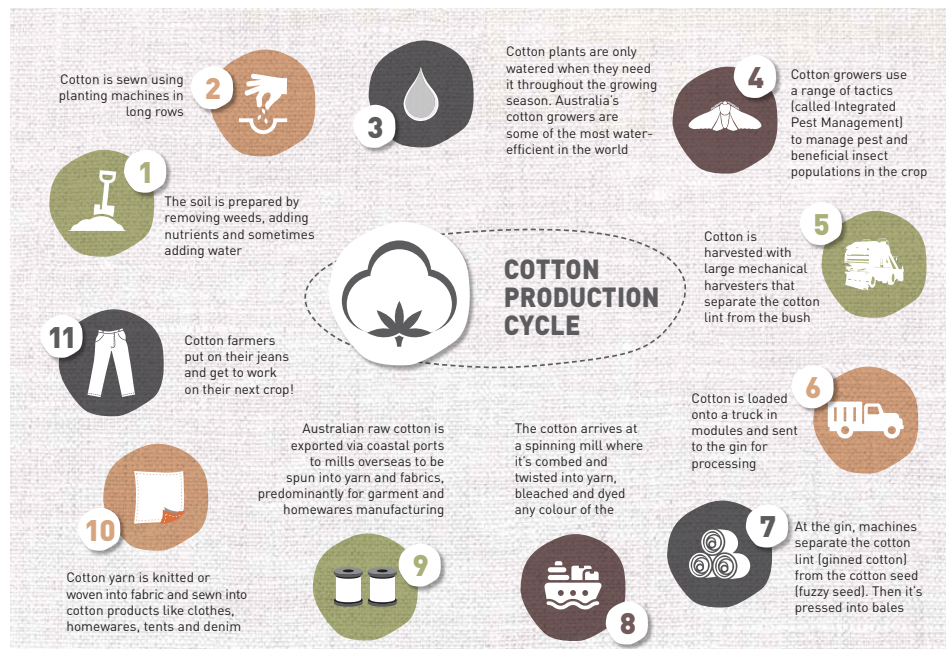
Discover

Objective: Have students research, read, view, listen to, discuss, and gather, organise and analyse ideas about what Australian cotton growers and processors do and produce, and how they convert cottonseed and lint into products suitable for sale. Have students explore QR codes, and the specific characteristics and properties of cottonseed oil and cotton.

Ask students to consider the questions ‘What is involved in cotton production?’; ‘What might cotton growers and ginnerers do?’; ‘Where are Australian cotton growers located?’; ‘How might we explore how cotton and cottonseed are converted into a product?’ and ‘How might we discover more about how cotton and cottonseed oil get from the field to us?’.

Introduce the terms “farm to fork”, “paddock to plate”, “field to fabric” or “from farmer to consumer” and share ideas about how cotton gets from the field where it is grown to us.

Use the graphics following to discover how cotton is grown by farmers and produced for consumers. Share [Resource 1.2](#) in the Student Project Files with the class.



Share ideas about how cottonseed oil gets from the field where it is grown to us. For example: farmers buy the cottonseed; it is grown and harvested; it is then processed at a gin, separating the raw fibre (the lint) from the seed; the hard shell or hull is separated from the seed; cottonseed kernels are crushed using rollers and heated to high temperatures; the kernels are squeezed and crushed and produce oil; the oil is then processed and refined, packaged and distributed to wholesalers, supermarkets, b and chefs in restaurants; and cooked with and consumed.

Invite students to summarise the concepts portrayed in the 'Cotton Grower's Calendar' and the 'Cotton Production Cycle' graphics in their own words and then pose three questions for whole class discussion.

Use the following 'Question Grid' to encourage students to devise additional angles to their questions. For example: What might dryland cotton be? Where is dryland cotton production happening? Where might irrigated cotton production be happening? Who is researching cotton production? What did scientists most recently report?

What is?	Where/when is?	Which is?	Who is?	Why is?	How is?
What did?	Where/when did?	Which did?	Who did?	Why did?	How did?
What can?	Where/when can?	Which can?	Who Can?	Why can?	How can?
What would?	Where/when could?	Which could?	Who would?	Why would?	How would?
What will?	Where/when will?	Which will?	Who will?	Why will?	How will?
What might?	Where/when might?	Which might?	Who might?	Why might?	How might?

Talk with students about how it is important to source reputable authors, books or web sites, and to interpret, evaluate and authenticate information when researching any topic. Discuss how the students might evaluate their sources. They might ask:

- Who is the source's author?
- Where did they get their information from?
- Why might they be portraying the information in this way?
- What language are they using (i.e. is it emotional or informative)?

Refer to [Resource 1.3](#) in the Student Project Files and ask students to:

Use Cotton Australia's resources in the '[Cotton Classroom](#)' to find information about where cotton growers are located in Australia.

Use Google Earth and explore maps and identify cotton growers and gins closest to where you live.

Play videos to find out and record information about what's involved in grow cotton and convert cotton lint and cottonseed into a variety of different products. For example:

- [The Australian Cotton Story Primary Version](#) on YouTube (9:03 min)
- [The Australian Cotton Story for high schools](#) on YouTube (9:43 min)
- [Australian Cotton, from Seed to Sock](#) on YouTube (6:12 min)

Play a slideshow titled '[Grow a Pair of Jeans](#)', and discover more information about how cotton is grown, processed and produced.

Read for information and record notes about how cotton is grown, processed and produced. For example:

- [How Cotton is Grown](#)
- [How Cotton is Grown \(continued\)](#)
- [Processing from Gin to Fabric](#)
- [Cotton as a Consumer Product](#)

Delve deeper, find and record information about how cotton lint and cottonseed are produced, processed and made available to customers.

Explore and record information about how cottonseed oil is processed and refined.

Complete a flow chart diagram on the production and processing of cotton and cottonseed to demonstrate their understanding.

Encourage students to find out more about technologies and best environmental practices used by the industry to produce cotton and cottonseed. Ask students to prepare questions to help them find out relevant information; prepare a record sheet for answers and to check these with other students to ensure they are comprehensive and accurate.

Ask students to draw conclusions about what has been learned and develop concept maps using key words. Ask students to draw connecting lines between words and indicate how they believe their words relate to each other. From the concept maps, encourage students to come up with statements about cotton and cottonseed production.

Use the Edward de Bono's Six Thinking Hat technique to explore cotton and cottonseed production in more depth. Students, in groups, each with a different hat, discuss and document their ideas according to their given perspectives and come together at the end to share their ideas. (See [Resource 1.3.1](#) in *Student Project Files*).

Learn more about the [nutritional value of cottonseed oil](#).

Discover how to [infuse cottonseed oil](#) with a range of different flavours.

Talk about common ingredients that can be used in cottonseed oil infusions. For example: garlic, chilli, rosemary, herbs etc. Talk about how it is important to recognise that the ingredient used for any oil infusion has different methodologies to ensure a safe product is created, and how it is vital for food safety principles to be followed to prevent botulism.

Highlight how dried ingredients are deemed the safest and easiest ingredients for culinary oil infusions. Discuss how dried ingredients can be sourced or alternatively spices and herbs can be dried in a food dehydrator or oven and simply added to the oil using either heat infusion or cold infusion. Dried ingredients, such as, whole springs of thyme, rosemary or dried peppers can also help to decorate the inside of the oil bottle. For locations with consistently high humidity (typically greater than 60% relative humidity), ensure that the dried ingredient have not absorbed moisture from the air.

Research how to [design and make muslin bags](#).

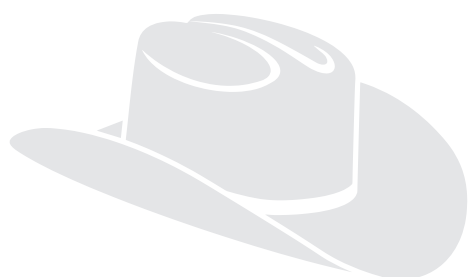
Discover more about the [properties of cotton fibre](#).

Research websites and record information about the way cotton based muslin bags can be used in homes, restaurants, cafes and canteens.

Investigate [QR codes](#) and then create and design one.

Delve deeper to appreciate the new [food labelling laws](#) introduced in Australia from July 1, 2016.

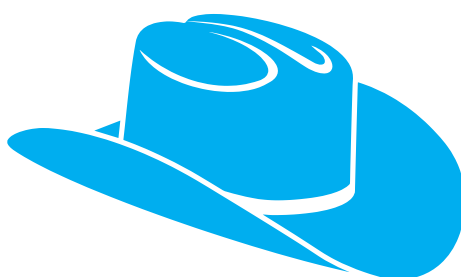
View and analyse the new labels that feature a kangaroo, text and a bar chart which shows the percentage of Australian content in different foods.



White Hat

Information

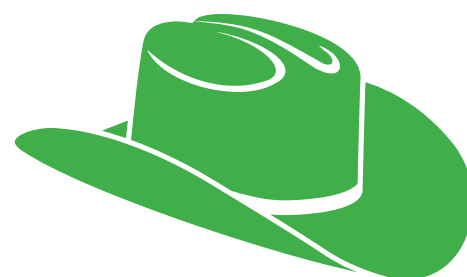
List the facts you know about present technology and best management practices being used to produce cotton and cottonseed.



Blue Hat

What thinking is needed?

What has happened so far? What should happen next? What questions should be considered?



Green Hat

New ideas

How could any problems and opportunities related to cotton and cottonseed production be solved?

Discover what is required by [law](#) on a cotton textile label.

As a class:

Talk about the importance of being able to trust a label's claims and the importance of claims being based on science and not a sales pitch.

Re-focus students' attention on the essential question in this unit, 'What benefits accrue in agriculture, food and material technologies when we understand all the things cotton growers do to bring us a natural and versatile textile and a food source?'

Remind students that their Design Task is to design and produce either a cotton muslin bag or an infused cottonseed oil with a detailed label design that educates the consumer about how it was produced. The label design must include an infographic that sequences the process of converting cotton and cottonseed into a product suitable for sale. It will need to be eye-catching to the consumer and identify an actual Australian locality and Australian cotton grower as the point of its origin.

The cotton muslin bag's label needs to educate consumers about the properties of cotton. It needs to include a QR code that provides the consumer with information about how the muslin bag with its specific characteristics and properties can be used.

The infused cottonseed oil product needs to comply with state law, list the product's ingredients by name and quantity, along with its use-by date. It needs to include a QR code that provides the consumer with information about how the cottonseed oil with its specific characteristics and properties can be used for healthy eating.

Design Teams are also required to make a five-minute presentation of the designed product and its label to an audience. Teams need to communicate how their designed label can educate consumers about how cotton is produced and processed in Australia and how its properties and characteristics determine what it can be used for.

Invite students to sketch a plan of what their label might contain and look like. Ask students to consider the placement of their infographic in addition to any pictures and text.

Ask the students to share their understandings with others.

Ask each student to share what their research has told them and what they still have to accomplish within the task with their peers, the teacher and family.

Prerequisite for progression:

Students have worked as a class, individually and in pairs and collected research on what Australian cotton growers and processors do and produce, and how they convert cottonseed and lint into products suitable for sale. Have students explore QR codes, and the specific characteristics and properties of cottonseed oil and cotton.

Students have viewed and collected research about labels, what manufacturers are legally required to list on labels.

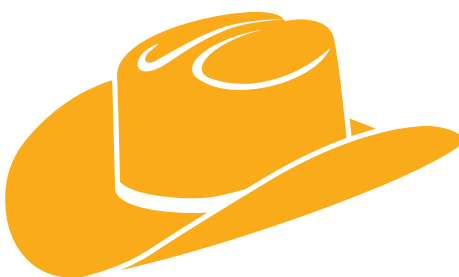
Websites, videos, images, and texts are used to contextualise understanding. Students will share their ideas with peers, the teacher and family.



Black Hat

Weaknesses

What might some of the negative aspects and outcomes of cotton and cottonseed production be?



Yellow Hat

Strengths

What might some of the positive aspects and outcomes of cotton and cottonseed production be?



Red Hat

Feelings

What are the emotions and feelings associated with cotton and cottonseed production? How do you feel?

Step 3:

Dream

Objective: Have students imagine how they are going to design and produce either a cotton muslin bag or an infused cottonseed oil with a detailed label design that educates the consumer about how it was produced, that includes an actual Australian locality where it was grown and an infographic that sequences the process of converting cotton and cottonseed into a product suitable for sale, includes a list of the product's ingredients by name and quantity, and incorporates a QR code that provides the consumer with information.

Ask students to visualise their muslin bag or infused cottonseed oil, including its label. (See [Resource 1.4](#) in the Student Project Files).

Ask design teams to create a vision for their concept, idea, and product that they are re-imagining.

Ask teams to use all the knowledge they have gathered to visualise a creative and appropriate solution about how they see their muslin bag or infused cottonseed oil being produced.

Ask students to play with shapes, recipes, procedures, ideas, colours and the intended statements that their label will make.

Ask students to consider and make decisions about how many bottles, labels and metres of muslin might be required for their designs. What size and shape might the labels be? What colours might be used on the white muslin bags?

Ask students to pose questions about the possible ways of designing and creating their labels. Questions include:

Consider the many possible ways you can design and create a label that includes:

- an infographic that sequences the process of converting the cotton or cottonseed into a product for sale;
- identifies an Australian locality and cotton grower as the point of origin;
- lists the product's ingredients by name and quantity; and
- includes a QR code that provides the consumer with information about how the muslin bag with its specific characteristics and properties can be used, or how the QR code provides the consumer with information about how the cottonseed oil with its specific characteristics and properties.

What might you have to do to make your design idea possible?

What might it include?

On what might it be focussed?

How might it be created?

What are the different ways it could be created?

Ask students to record their draft ideas.

Introduce students to [information](#) about some designing principles.

Talk about colour schemes and how colour is used by graphic designers and artists to invoke connections, senses and emotion.

Invite students to generate their draft design ideas.

Challenge students to think about the materials, tools, and equipment they will need to design and create the designs. Will they use digital or non-digital equipment and tools? How might they work safely and cooperatively? How might they appropriately source their images and information that is used to create the label?

Ask students how they might evaluate whether their label and accompanying five minute presentation meet the original criteria of their task? Might they create a matrix of success criteria?

Progressions for Learning:

The class have brainstormed ideas and begin designing either a cotton muslin bag or an infused cottonseed oil with a detailed label design, that educates the consumer about how it was produced, that includes an actual Australian locality where it was grown, and an infographic that sequences the process of converting cotton and cottonseed into a product suitable for sale, includes a list of the product's ingredients by name and quantity, and incorporates a QR code that provides the consumer with information.

Step 4:

Design

Objective: Have students explain, prepare and action how they are going to design and produce either a cotton muslin bag or an infused cottonseed oil with a detailed label design, that educates the consumer about how it was produced, that includes an actual Australian locality where it was grown, and an infographic that sequences the process of converting cotton and cottonseed into a product suitable for sale, includes a list of the product's ingredients by name and quantity, and incorporates a QR code that provides the consumer with information.

Ask students to explain, prepare and action how they are going to document their design ideas for either a cotton muslin bag or an infused cottonseed oil with a detailed label design, that educates the consumer about how it was produced, that includes an actual Australian locality where it was grown, and an infographic that sequences the process of converting cotton and cottonseed into a product suitable for sale, includes a list of the product's ingredients by name and quantity, and incorporates a QR code that provides the consumer with information.

Ask students to draft a storyboard with the messaging being used in the accompanying presentation they are going to design.

Invite students to develop a project plan outlining the planning and production steps required to produce infused cottonseed oil or muslin bag and their label and accompanying presentation. (See [Resource 1.5](#) in the *Student Project Files*).

What?	How?	When?	Who?	How can our products and processes be improved?

Talk about the importance of a clear layout and design that makes it easy for an audience to understand and interpret the information given.

Talk about the importance of sourcing graphics, clip art and information correctly and keeping records of sources in a bibliography.

Review rules on personal safety, group safety, and classroom and furniture safety with the students.

Ask students to establish a work station and to gather the materials and tools they require.

Talk about safely storing their work samples and keeping a record of the processes they use to create it.

Ask students to start actioning the steps involved in making their chosen digital or non-digital work samples.

Ask students to gather the materials, tools, and equipment needed and then plan each step involved in creating the digital or non-digital work samples.

Invite students to start creating the infused cottonseed oil or muslin bag, label and presentation.

Talk with students about how they might share and present their infused cottonseed oil or muslin bag, label and accompanying to an audience?

Ask students to explain how they plan to finalise and create their work samples to another peer in the class and seek feedback on their ideas.

Invite students to draft their presentation narrative.

Progressions for Learning:

Students are able to document in oral or written/digital forms how this project is to occur. The understanding is demonstrated by the students explaining their design and production thinking to a peer in the class.

Step 5:

Deliver

Objective: Have students deliver their cotton muslin bag or infused cottonseed oil with a detailed label design, that educates the consumer about how it was produced, that includes an actual Australian locality where it was grown, and an infographic that sequences the process of converting cotton and cottonseed into a product suitable for sale, includes a list of the product's ingredients by name and quantity, and incorporates a QR code that provides the consumer with information.

The Delivery phase has two stages – production and publication. In the production stage the project comes to life – this is the doing phase. At the end of this phase the publication/presentation of the infused cottonseed oil or muslin bag, labels and accompanying presentation about how cotton or cottonseed is produced and processed in Australia and how its properties and characteristics determine what it can be used for should be completed.

Ask students to finalise their design and create their label and accompanying presentation.

Invite students to finalise their presentation narrative.

In the Publish phase, students get to showcase all of their thinking and planning. This is the time when students deliver their infused cottonseed oil or muslin bag, labels and accompanying five minute presentation to each other or an audience. This is a good time for peer or self-assessment.

Invite students to photograph their designed solution and insert it in [Resource 1.6](#) in the Student Project Files.

Ask students to share their label and accompanying presentation with others.

Video presentations of the students' labels and enjoy a day of showcasing what has been discovered about how cotton and cottonseed are produced and processed in Australia and how its properties and characteristics determine what it can be used for.

Progressions for Learning:

Each student has produced either a cotton muslin bag or an infused cottonseed oil with a detailed label design, that educates the consumer about how it was produced, that includes an actual Australian locality where it was grown, and an infographic that sequences the process of converting cotton and cottonseed into a product suitable for sale, includes a list of the product's ingredients by name and quantity, and incorporates a QR code that provides the consumer with information. They have also made a presentation to an audience.

Step 6:

Debrief

Objective: Assess the results of the designs and accompanying five minute presentation about how cotton and cottonseed are produced and processed in Australia and how its properties and characteristics determine what it can be used for.

Ask students to reflect on their learning. Ask students to:

Re-tell their findings about how cotton and cottonseed are produced and processed in Australia.

Identify and describe a dedicated locality in Australia that grows and produces cotton and a specialised Australian gin that processes lint and cottonseed.

Identify and describe what is legally required to be listed on a food label or textile label.

Identify and describe how the properties and characteristics of cottonseed and cotton determine what it can be used for.

Evaluate their infused cottonseed oil or muslin bag and their labels, and accompanying presentation and write about whether their work:

- matched the definition of the task
- used a clear layout and design, and
- has included sources of any graphics, images and information used whilst creating the label and presentation.

Write about the quality of their planning, their finished infused cottonseed oil or muslin bag, labels and presentation and whether they enjoyed the task. (See [Resource 1.7](#) in the Student Project Files).

In addition, students might also like to assess other student's work samples and presentations too.



Student Project Files

Resource 1.1

Design Brief

The essential question: What benefits accrue in agriculture, food and material technologies when we understand all the things cotton growers do to bring us a natural and versatile textile and a food source?

Scenario and design brief:

Bring your love of fibres, textiles and food together and discover how cotton and cottonseed oil are produced and processed so we can have natural fibre products to use and wear, and margarine and cooking oils to cook with!

Did you know that thousands of people employed across the supply chain in the cotton industry?

Find out about the Australian cotton industry that is made up of cotton growers, cotton classers, ginner and cotton merchants and what they do in order to deliver top quality, safe and nutritious cottonseed and lint products to consumers in Australia and overseas.

In Design Teams, view videos and images, and read about this industry that produces enough cotton to clothe 500 million people. Then, explore the variety of products produced from cottonseed such as oil, plastics, stockfeed, cosmetics and margarine that are a 'Product of the Australian Cotton Industry'.

Your Design Task is to design and produce either a cotton muslin bag or an infused cottonseed oil with a detailed label design that educates the consumer about how it was produced. The label design must include an infographic that sequences the process of converting cotton or cottonseed into a product suitable for sale. It will need to be eye-catching to the consumer and identify an actual Australian locality and Australian cotton grower as the point of its origin.

The cotton muslin bag's label needs to educate consumers about the properties of cotton. It needs to include a QR code that provides the consumer with information about how the muslin bag with its specific characteristics and properties can be used.

The infused cottonseed oil product needs to comply with state law, list the product's ingredients by name and quantity, along with its use-by date. It needs to include a QR code that provides the consumer with information about how the cottonseed oil with its specific characteristics and properties can be used for healthy eating.

You are also required to make a five-minute presentation of the designed product and its label to an audience. You need to communicate how your designed label can educate consumers about how cotton or cottonseed is produced and processed in Australia and how its properties and characteristics determine what it can be used for. Are you up for the challenge?

Resource 1.2

Define

What is your challenge?

Write a definition of the challenges your Design Team needs to undertake.

Resource 1.3

Discover

What do you know about this topic?

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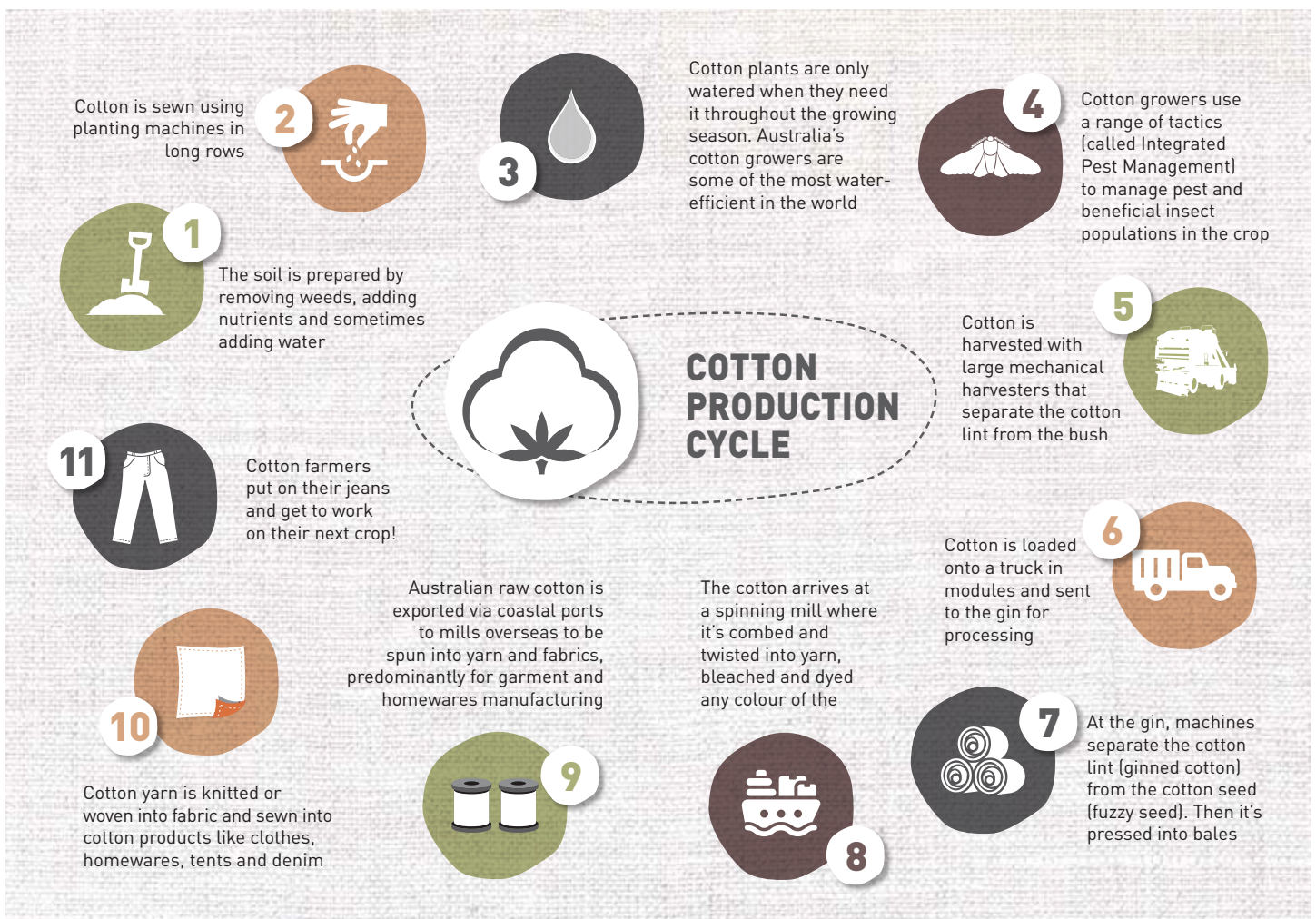
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Let the research begin. Identify what you need to know and what you need to be able to do.

Use the graphics following and discover more about cotton production.



COTTON GROWER'S CALENDAR



Spring

30				Plant cotton seeds. Seedlings emerge after a few days	1
2	3	4			8
				Water the crop, if required	13 14 15
16	17			Remove weeds, add fertiliser if required	
23				Check for the balance between pests and beneficial insects	

Summer

				Water the crop, check for bugs, control pests	1
2	3	4		Cotton grows into a bushy shrub	
				Cotton bolls appear, then split open to reveal the fibre	14 15
16					21 22
				Prepare crop, staff and machinery for busy harvest	28 29

Autumn

				Harvest crop mechanically	1 2 3
4	5	6	7		
				Cotton is ginned to separate seeds from cotton lint	14
21	22	23	24	Send cotton in modules on trucks to the gin for processing	
25	26	27		Growers take a well-earned break	

Winter

				Cotton bales are shipped overseas to spinning mills	1
				Winter crops are produced (like wheat or chickpeas) and this helps maintain healthy soils	5 6 7 8
					12 13 14 15
16	17	18		Repair machinery and maintain the farm	
23	24			Prepare the soil for next season's cotton crop	



Here are some links to use for your research.

Cotton Production

Use Cotton Australia's resources in the '[Cotton Classroom](https://cottonaustralia.com.au/cotton-classroom)' to find information about where cotton growers are located in Australia. <https://cottonaustralia.com.au/cotton-classroom>

Use Google Earth and explore maps and identify cotton growers and gins closest to where you live.

Play videos to find out and record information about what's involved in grow cotton and convert cotton lint and cottonseed into a variety of different products. For example:

- [The Cotton Story \(Part 1\) https://youtu.be/cbKh1Xtfmao](https://youtu.be/cbKh1Xtfmao)
- [The Cotton Story \(Part 2\) https://youtu.be/ZgqUbTY7nxo](https://youtu.be/ZgqUbTY7nxo)
- [Australian Cotton, from Seed to Sock https://youtu.be/t6pITYrBth4](https://youtu.be/t6pITYrBth4)
- [Grow a Pair of Jeans' https://cottonaustralia.com.au/cotton-classroom/grow-a-pair-of-jeans](https://cottonaustralia.com.au/cotton-classroom/grow-a-pair-of-jeans)

Read for information and record notes about how cotton is grown, processed and produced. For example:

- [How Cotton is Grown https://cottonaustralia.com.au/uploads/resources/CEK_Chap_5A_How_Cotton_is_Grown.pdf](https://cottonaustralia.com.au/uploads/resources/CEK_Chap_5A_How_Cotton_is_Grown.pdf)
- [How Cotton is Grown \(continued\) https://cottonaustralia.com.au/uploads/publications/CEK_Chap_5B_How_Cotton_is_Grown.pdf](https://cottonaustralia.com.au/uploads/publications/CEK_Chap_5B_How_Cotton_is_Grown.pdf)
- [Processing from Gin to Fabric https://cottonaustralia.com.au/uploads/resources/CEK_Chap_7_Processing_From_Gin_To_Fabric.pdf](https://cottonaustralia.com.au/uploads/resources/CEK_Chap_7_Processing_From_Gin_To_Fabric.pdf)
- [Cotton as a Consumer Product https://cottonaustralia.com.au/uploads/resources/CEK_Chap_9_Cotton_As_A_Consumer_Product.pdf](https://cottonaustralia.com.au/uploads/resources/CEK_Chap_9_Cotton_As_A_Consumer_Product.pdf)

My notes:

How cotton lint and cottonseed are produced, processed and made available to customers.

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Resource 1.3.1

Edward De Bono's Six Thinking Hat Technique

Use the Edward de Bono's Six Thinking Hat technique to explore cotton and cottonseed production in more depth. Use a different hat and document your ideas according to your given perspectives.



White Hat

Information

List the facts you know about present technology and best management practices being used to produce cotton and cottonseed.



Blue Hat

What thinking is needed?

What has happened so far? What should happen next?
What questions should be considered?



Green Hat

New ideas

How could any problems and opportunities related to cotton and cottonseed production be solved?



Black Hat

Weaknesses

What might some of the negative aspects and outcomes of cotton and cottonseed production be?



Yellow Hat

Strengths

What might some of the positive aspects and outcomes of cotton and cottonseed production be?



Red Hat

Feelings

What are the emotions and feelings associated with cotton and cottonseed production? How do you feel?

My notes:

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Cottonseed

Learn more about the nutritional value of cottonseed oil at <https://www.verywellfit.com/cottonseed-oil-nutrition-facts-calories-carbs-and-health-benefits-4165691>

Discover how to [infuse cottonseed oil](https://www.exploratorium.edu/cooking/seasoning/kitchen/recipe-oils.html) with a range of different flavours at <https://www.exploratorium.edu/cooking/seasoning/kitchen/recipe-oils.html>

My notes:

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Muslin Bags

Research how to [design and make muslin bags](https://wellnessmama.com/119222/diy-produce-bags/). See <https://wellnessmama.com/119222/diy-produce-bags/>

Discover more about the [properties of cotton fibre](https://cottonaustralia.com.au/uploads/resources/CEK_Chap_9_Cotton_As_A_Consumer_Product.pdf). See https://cottonaustralia.com.au/uploads/resources/CEK_Chap_9_Cotton_As_A_Consumer_Product.pdf

QR Codes

Investigate QR codes and then create and design one <https://www.qr-code-generator.com/>

Labelling Laws

Delve deeper to appreciate the new food labelling laws introduced in Australia from July 1, 2016 <http://www.foodlabels.industry.gov.au/>

Discover what is required by law on a cotton textile label. <https://www.ftc.gov/tips-advice/business-center/guidance/calling-it-cotton-labeling-advertising-cotton-products>

My notes:

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Resource 1.4

Dream

What does the solution look like in your mind?

Visualise a creative and appropriate design solution.



Resource 1.5

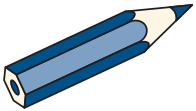
Design

Prepare a project plan and outline what needs to be done, who is responsible, when things will be done and write it down as a suggested order of the work.

What do I need to do?	How will I gather the information? How will I create my designs?	When will I do this?	How can my products and processes be improved?	Other notes and ideas



Draw your solutions. Include labels.



Design your presentation

Write the introduction:

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Write the body:

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Write the conclusion:

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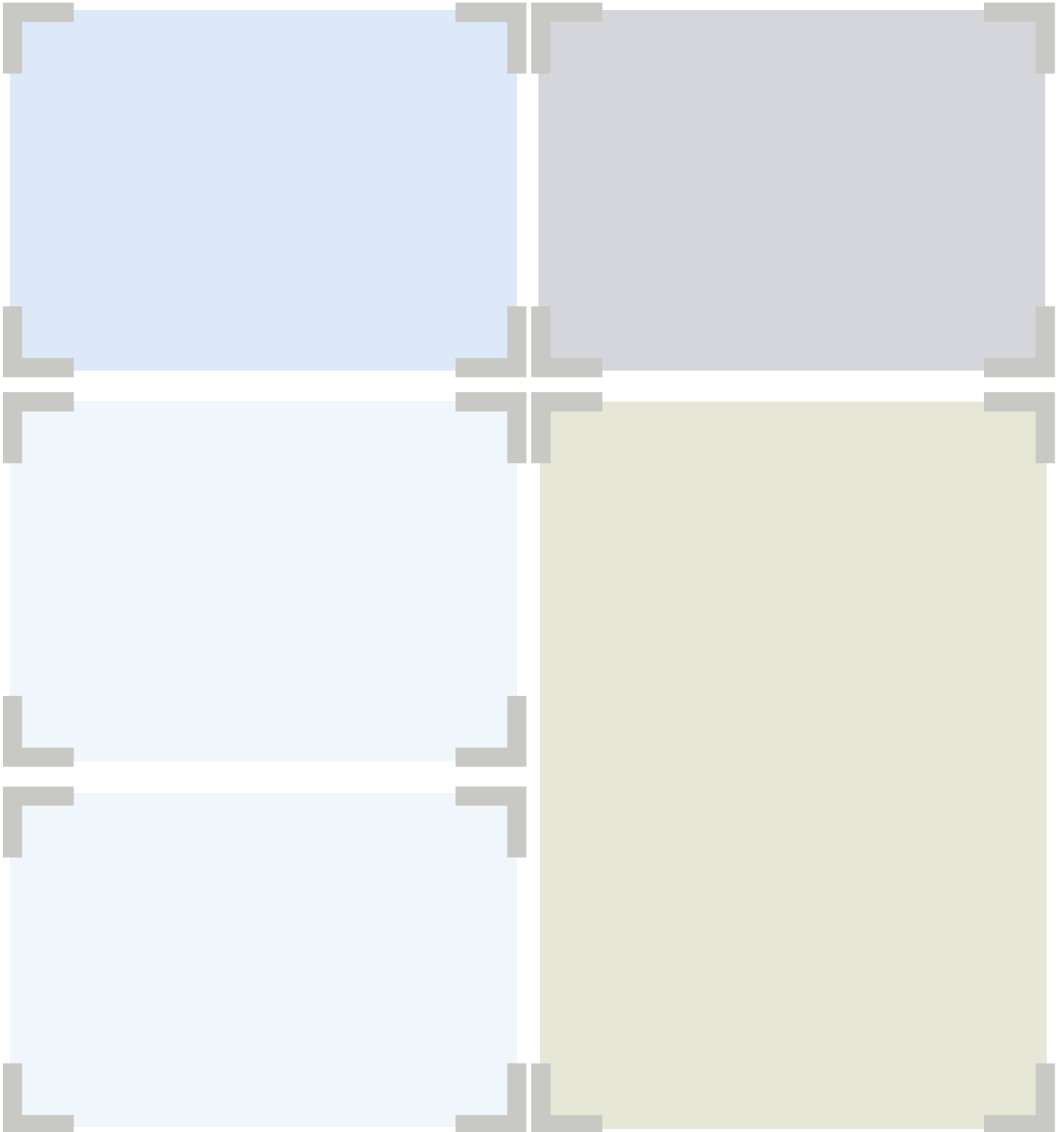
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Resource 1.6

Deliver

Make your solution(s) and place a photo of them here.



Resource 1.7

Debrief

Were you successful? Why or why not?

Resource 1.8

Re-Design

How would you improve your designs?



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