TEACHER NOTES

A year in the life of an almond tree

Design and Technologies (food and fibre production) Content description: South Australian Scope and Sequence	
YEAR 7	**Explain how food and fibre are produced in managed environments and how these can become sustainable** • identify the components that need to be managed sustainably in a food or fibre production system, including soil, organisms, and water • identify the key principles for management of food or fibre environments • identify mainstream food production systems

Science understanding Content description: South Australian Scope and Sequence		
YEAR 7	**Model cyclic changes in the relative positions of the Earth, Sun and Moon and explain how these cycles causes eclipses and influence predictable phenomena on Earth, including seasons and tides** • Seasons are caused through the combination of: - the tilt of the Earth's axis - the Earth's rotation on that axis - revolution of Earth around the Sun. • Seasonal variation is connected with the angle of the Sun, shadow length, and day length.	**Use models, including food chains and food webs, to represent matter and energy flow in ecosystems, and predict the impact of changing abiotic and biotic factors on populations** • Ecosystems are biological communities of interacting organisms and their physical environment. • Interactions between (biotic) organisms that affect population sizes include: - predator and prey - parasites - competitors - pollinators - introduced species - disease.

TASK DESCRIPTION

Students will monitor an almond tree across the school year, linking science and technology concepts to a horticultural context. Ideally observations would begin at the start of the school year which is harvest time for almonds.

RESOURCES REQUIRED:

- **One almond tree** – could be established in an orchard or garden, or newly planted in a large tub to be transplanted at the conclusion of the project
- **Almond Board of Australia PowerPoint presentation**
  Links to videos and websites referenced in the PowerPoint:
  - An almond story: **https://shorturl.at/dJSW2**
  - Centre For Bee Education – The Wheen Bee Foundation: **https://www.wheenbeefoundation.org.au/c4be/**
  - Inversion activity: **https://youtu.be/mpEhU7SVf9c**
  - Almond Centre of Excellence (PIRSA): **https://vimeo.com/756364415/ee05fa834f**
  - Insight TRAC Rover 2.0 – almond mummy removal demo: **https://youtu.be/tGZMfZoWrcI?si=DKoBS9yBfSUc88Yn**
  - Monchiero 2095 nut harvester: **https://shorturl.at/yzJOP**
  - Water sensitive spray paper can be purchase online

Students will record their responses in a format of their choice. A collaborative story board approach would work well.

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12 MONTHS OF ACTIVITIES

Watch the Almond Board PowerPoint with students and explore the links provided. Refer back to this presentation throughout the year. A variety of activities are provided below for each part of the year. Select those that are suitable for your students. Record regular observations and images of the tree across the seasons.

1. **How many almond trees are there in Australia?**
   17.7 million

2. **What is the value of almonds exported from Australia each year?**
   a) More than $5,000,000
   b) More than $50,000,000
   c) More than $500,000,000
   (Answer: c)

3. **Which country produces the most almonds in the world?**
   United States of America (mainly in California)

4. **What are almonds used for?**
   Almond kernels: whole nuts, slivered almonds, flaked almonds, almond meal, almond flour, almond milk, almond oil

   Almond shells: animal beddings or gardening substrates, biofuels, e.g. as pellets or briquettes, smoke chips

   Almond hulls: source of fibre in stock feed rations (especially for cattle)

5. **What are the student's favourite ways of enjoying almonds?**

Watch the PowerPoint and explore the links provided. Refer back to the presentation throughout the year. Record regular observations and images of the tree across the seasons.

January, February

- Investigate the tree as an ecosystem. Record all the different organisms that interact with it and categorise them; for example predator/prey/competitors/pathogens/parasites
- Discuss and design bird management strategies
- Observe differences if more than one variety of almond is present
- Observe hull split as a ripeness indicator

February to May

- Harvest the almonds. Model and discuss mechanical harvesting compared to hand harvesting
- Record the yield (weight)
- Assess kernel moisture (using a grain moisture meter) and crack out percentage

  1. Separate the hulls, shells and almonds into three buckets and weigh each component.

  2. Calculate the "edible yield" by dividing the weight of the kernels by the weight of the three components combined:

     Weight of kernels ÷ (weight of hulls + shells + kernels) x 100 = edible yield

     Achieving a "crack out" value of 30% edible yield or more is considered good.

- Discuss which weather conditions are key during harvest (rainfall, humidity, temperature, wind)
- Investigate seasons
- Monitor weather conditions using a handheld weather meter, fixed weather station or Bureau of Meteorology data, and relate to harvest suitability

May, June

- Kernel quality assessments – use the almond defect recognition images provided.
- As the tree loses it leaves, compare it to evergreen trees and other deciduous trees.
- Investigate pruning strategies and the benefits of each option
- Remove "mummies" (left over kernels still on the tree) and discuss how technology could help with this, and why the process is important
- Discuss climate zones and mark them on a map of Australia

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July to September

- Observe flowering and pollination – record bee numbers and behaviour using the Wheen Bee resources

***IMPORTANT* Complete a risk assessment regarding bee allergies and ensure safety protocols and suitable PPE are in place.**

- Investigate ways to support bee populations
- Observe differences if more than one variety of almond is present
- Monitor weather conditions and the impact on flowers. Frost is particularly important during flowering.
- Dissect flowers and identify key structures
- Set up a watering system or check existing systems for leaks and complete repairs

September to December

- Dissect flowers and immature kernels as they form to observe changes during kernel fill and maturity
- Visit a retail outlet to investigate fertilisers and the options available
- Conduct soil tests for pH, N, P, K using soil testing kits
- Assess spray patterns using water from a hand spray unit and water sensitive paper
- Investigate pest & disease control strategies in different production systems ie conventional, organic, biodynamic
- Assess watering systems by recording drip rates (litres per hour), comparing actual rates to expected
- Model inversion layers and discuss spray drift risk
- Make a yield prediction based on the number of kernels forming and compare it to the yield from the previous harvest.
- Discuss the factors that will impact on yield and almond quality and what farmers can do about managing them

ALMOND DEFECT RECOGNITION

REFERENCE 14

NPA NUT PRODUCERS AUSTRALIA

These photos refer to defects listed in almond product specifications in use at Riverland Almonds.

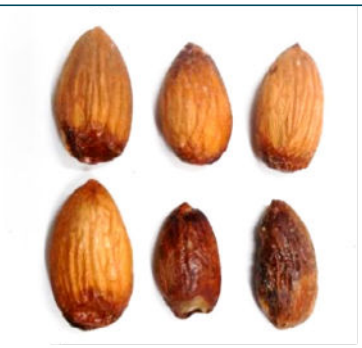
Dissimilar		Double	
Scratches - 4mm or larger			
Splits & Broken			
Foreign			
Stain			

ALMOND DEFECT RECOGNITION

REFERENCE 14

NUT PRODUCERS AUSTRALIA

These photos refer to defects listed in almond product specifications in use at Riverland Almonds.

Shrivel		**Sap**	
Embedded Shell			
Mould			
Insect Damage