Department of Primary Industries

The Yabby Unit

Technology Mandatory

Area of Study - Agriculture and Food Technologies

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Lesson sequence – Teacher and parent guide

Supporting document

NSW DPI Schools Program

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The Yabby Unit teacher and parent guide

Background

The Yabby unit provides students with the opportunity to investigate the importance of aquaculture production to our society. This unit supports student learning of Australian freshwater crayfish production.

NSWDPI have developed the lesson sequence in this guide to assist teachers, parents and students to complete remote learning and home-schooling. This resource provides lesson sequences for approximately eight lessons (two weeks).

The following lesson sequence is a guide and refers to the following documents:

- Workbook – students work directly into and complete activities in
- Answer guide – provides suggested answers to the workbook activities

Students will either need a digital or physical copy of the Yabby unit workbook, and access to the internet. These documents can be downloaded along with other DPI Schools Program Primary and Secondary resources at: https://www.dpi.nsw.gov.au/education-and-training/school-resources/secondary-schools

The Answer guide for the workbook is currently only available by request. Email megs.dunford@dpi.nsw.gov.au for a copy.

- For parents: The workbooks and activities in The Yabby unit were written for Years 7 and 8 Technology Mandatory students. However, it is an achievable learning unit for students from Years 6-9.
- For teachers: The Yabby unit was developed to cover outcomes from the NSW Technology Mandatory Stage 4 (Year 7 and 8) syllabus context areas: Agricultural technologies and Food technologies. It also covers syllabus content from Agricultural Technology Years 7-10 syllabus, 2019 and Marine and Aquaculture Technology, Years 7-10 Syllabus, 2019. Teachers are advised to refer to p8-10 of this resource for the syllabus outcomes covered.

The following lesson sequence does not utilise all documents from the Yabby unit of work. The full unit of work consists of five resources: a workbook, answer guide, coding guide and two major design folios. The major designs and some practical activities have not been included as they may be difficult to achieve a home.

Planning for practical activities at home

While the dissection of a yabby is included as a suggested practical activity at school, animal welfare regulations governing the use of animals in schools, do not permit dissections to be undertaken by students at home. (Reference: http://nswschoolanimals.com/index/homework-using-animals/)

Students could complete either of the two major design projects found on the Yabby unit page at https://www.dpi.nsw.gov.au/education-and-training/school-resources/secondary-schools. Students and parents need to assess the resources, equipment and skills required to undertake the projects.

- Design project 1 "Design and code an aquaponics system"
- Design project 2 "Design and build an aquaponics system"

Verbs and Key Words

Throughout the booklet, questions may use the following NSW Education Standards Authority (NESA) key terms and verbs when asking questions. The following glossary developed by the NSW Education Standards Authority is provided to assist with the answering of activities throughout the booklet.

Key Word	Definition
Account	Account for: state reasons for, report on Give an account of; narrate a series of events or transactions
Analyse	Identify components and the relationship between them; draw out and relate implications
Apply	Use, utilise, employ in a particular situation
Appreciate	Make a judgement about the value of
Assess	Make a judgement of value, quality, outcomes, results or size
Calculate	Ascertain/determine from given facts, figures or information
Clarify	Make clear or plain
Classify	Arrange or include in classes/categories
Compare	Show how things are similar or different
Construct	Make; build; put together items or arguments
Contrast	Show how things are different or opposite
Critically (analyse/ evaluate)	Add a degree or level of accuracy depth, knowledge and understanding, logic, questioning, reflection and quality to (analyse/evaluate)
Deduce	Draw conclusions
Define	State meaning and identify essential qualities
Demonstrate	Show by example
Describe	Provide characteristics and features
Discuss	Identify issues and provide points for and/or against
Distinguish	Recognise or note/indicate as being distinct or different from; to note differences between
Evaluate	Make a judgement based on criteria; determine the value of
Examine	Inquire into
Explain	Relate cause and effect; make the relationships between things evident; provide why and/or how
Extract	Choose relevant and/or appropriate details
Extrapolate	Infer from what is known
Identify	Recognise and name
Interpret	Draw meaning from
Investigate	Plan, inquire into and draw conclusions about
Justify	Support an argument or conclusion
Outline	Sketch in general terms; indicate the main features of
Predict	Suggest what may happen based on available information
Propose	Put forward (for example a point of view, idea, argument, suggestion) for consideration or action
Recall	Present remembered ideas, facts or experiences
Recommend	Provide reasons in favour
Recount	Retell a series of events
Summarise	Express, concisely, the relevant details

Source: NSW Education Standards Authority, 2018

Lesson	Resources	Pages	Description
1 **What is aquaculture?**	• Internet access • Digital or physical copy of workbook • Digital or physical copy of answer guide	p5-8 workbook	Students will be introduced to national and state aquaculture production in Australia, as well as historical production. • Students read the Glossary to learn words that may be used throughout the unit p5 • Agriculture in Australia- students to read with assistance 'What is aquaculture' and 'The history of aquaculture in Australia' p6-7. Then access the following link to CSIRO's 'The detective work behind the Budj Bim eel traps World Heritage bid" ✓ https://theconversation.com/the-detective-work-behind-the-budj-bim-eel-traps-world-heritage-bid-71800 *Activities:* • Complete activities q1-13 p7-8 • Check student answers
2 **The value of aquaculture in NSW**	• Internet access • Digital or physical copy of workbook • Digital or physical copy of answer guide	p9-11 workbook	Students learn about the importance of aquaculture to the NSW economy. • Students read with assistance 'The value of aquaculture in NSW' p9-10 *Activities:* • Complete activities q1-4 p11 • Check student answers
3 **Freshwater crayfish production in Australia** ***1-2 lessons***	• Internet access • Digital or physical copy of workbook • Digital or physical copy of answer guide	p12-15 workbook	Students learn about freshwater crayfish in Australia and the species used in aquaculture. • Agriculture in Australia- students read with assistance 'Freshwater crayfish production in Australia' and 'Crayfish production – fast facts" p12-14 *Activities:* • Complete research activities q1-2 p14-15 • Findings from q1-2 to be presented in a word document as a report. • Report will take a minimum of 1-2 lessons dependant on student ability.
4 **Freshwater crayfish production -** **continued**	• Internet access • Digital or physical copy of workbook • Digital or physical copy of answer guide	p12-15 workbook	Students learn about freshwater crayfish in Australia and the species used in aquaculture production. *Activities:* • Continue research report q1-2 p14-15 • Findings from q1-2 to be presented in a word document or similar digital document as a report. • Check student answers

Lesson	Resources	Pages	Description
5 **Practical - Observe the parts of a freshwater crayfish**	Alternative research practical: • Internet access • Digital or physical copy of workbook • Digital or physical copy of answer guide	p16-20 workbook	Students will learn about yabby anatomy. **Note:** the dissection of a yabby practical activity cannot be undertaken by students at home due to welfare regulations governing the use of animals in schools. (http://nswschoolanimals.com/index/homework-using-animals/). Instead students can use secondary sources to identify the different parts of the yabby. • Students read with assistance 'Anatomy' and 'Glossary' p16-18 *Activities:* • Record findings into table p18-19 • Label the parts of the crayfish p20
6 **Yabby biology & behaviours- diet, reproduction and growth**	• Internet access • Digital or physical copy of workbook • Digital or physical copy of answer guide	p21-23 workbook	Students learn about diet, reproduction, growth and management of yabbies. • Students read with assistance 'Diet', 'Reproduction' and 'Growth' p21-22 *Activities:* • Complete learning activity 'Develop a calendar of operations for yabby management' p22-23. Answers can by typed/written directly into the table. • Check student answers
7 **Aquaculture production of yabbies- regulations and biosecurity**	• Internet access • Digital or physical copy of workbook • Digital or physical copy of answer guide	p25-26 workbook	Students learn about regulations and biosecurity management of in aquaculture production. • Students read with assistance 'Regulations' and 'Biosecurity' p25 and access the following links: ✓ Crayfish plague, a fatal disease a freshwater crayfish species not present in Australia. (https://www.agriculture.gov.au/sites/default/files/documents/infection_with_aphanomyces_astaci.pdf) ✓ White spot is a highly contagious virus which affects all fresh water and marine decapod crustaceans and some species of marine worms. (https://www.outbreak.gov.au/current-responses-to-outbreaks/white-spot-disease) ✓ Porcelain Disease also known as white tail or white muscle disease, is usually a fatal disease caused by the parasite Thelohania. It is transmitted by marron or yabbies feeding on an infected, dead or dying crayfish. (https://www.dpi.nsw.gov.au/fishing/aquaculture/publications/species-freshwater/freshwater-yabby) *Activities:* • Complete learning activity 'Regulations and welfare' p26 q1-2. • Check student answers

Lesson	Resources	Pages	Description
8 **Aquaculture production of yabbies – pond design, supplementary feeding and harvesting**	• Internet access • Digital or physical copy of workbook • Digital or physical copy of answer guide	p26-29 workbook	Students learn about yabby management in terms of pond design, supplementary feeding and harvesting. • Students read with assistance 'Pond design', "Supplementary feeding' and 'Harvesting' p26-28 and access the following links: ✓ Watch and find out how to build a small-scale DIY aquaponics system to grow vegetables and crayfish (https://youtu.be/VaY5hMxTExQ) ✓ Research the FAO Fisheries and Aquaculture Department's Cultured aquatic species information- *Cherax quadricantus* to investigate crayfish pond set ups and harvesting methods (http://www.fao.org/fishery/culturedspecies/Cherax_quadricarinatus/en) ✓ Watch 'Farming and handling of yabbies' produced by Fisheries Research AU, 2012 (https://youtu.be/mJJHAitV_gQ) *Activities:* • Answer q1-18 p 29 • Check student answers

Extension activities

Undertake either of the 2 major design projects found on the Yabby unit page at https://www.dpi.nsw.gov.au/education-and-training/school-resources/secondary-schools. Students and parents to assess resources and skills required to undertake the projects.

- Design project 1 "Design and code an aquaponics system"
- Design project 2 "Design and build an aquaponics system"

For more NSW DPI Schools Program resources for secondary and primary go to https://www.dpi.nsw.gov.au/education-and-training/school-resources

NSW syllabus outcomes – for teachers

Technology Mandatory 2017 Stage 4

Outcomes	Content
Agriculture and Food Technologies	
TE4-1DP designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities **TE4-5AG investigates how food and fibre are produced in managed environments** **TE4-10TS explains how people in technology related professions contribute to society now and into the future**	Identifying and defining • investigate the importance of food and fibre production to Australia's food security and economy including Asia's imports and exports (ACTDEK029) • investigate how food and fibre production is managed in environments as a system and how sustainability can be improved, for example: (ACTDEK032) **ST** – plants and/or animal species grown in managed environments – land management by Aboriginal and/or Torres Strait Islander Peoples – boundaries, inputs, outputs, processes and feedback occurring in a managed environment Researching and planning • research legal and ethical requirements associated with agricultural production, e.g. keeping animals • investigate ideal conditions for growth and development of an agricultural plant or animal (ACTDEK032) **ST** • develop a schedule or calendar for ongoing care of a plant or animal species associated with an agricultural project (ACTDEP039) **ST** • acquire and interpret data, for example: (ACTDIP025, ACTDIP026) **CT ST** – local environmental and/or physical conditions, eg rainfall, temperature Producing and implementing • identify and apply safe and ethical work practices, for example: **DT** – correct use of tools and equipment – food safety and hygiene practices

Agricultural Technology Years 7-10 Syllabus, 2019

Outcomes	Content
AG5-1 explains why identified plant species and animal breeds have been used in agricultural enterprises and developed for the Australian environment and/or markets **AG5-3 explains the interactions within and between the agricultural sector and Australia's economy, culture and society** **AG5-4 investigates and implements responsible production systems for plant and animal enterprises** **AG5-7 explains and evaluates the impact of management decisions on animal production enterprises** **AG5-8 evaluates the impact of past and current agricultural practices on agricultural sustainability**	Core A: Introduction to Agriculture • identify the characteristics of animal breeds and plant types specific to chosen enterprises, for example: identify pasture types – associate plant growth patterns with local climate patterns • collect climatic data that affects plant and animal production and relate it to the selection of plants and animals for a particular location, for example: (ACTDEK044) • identify the impact of a range of cultures, including those of Aboriginal and/or Torres Strait Islander Peoples, on Australian agricultural production, for example: (ACTDEK040) – Aboriginal land management – Italian/Asian market gardeners' influence on vegetable production – Aboriginal bush tucker influence and initiatives on contemporary diets • evaluate intensive and extensive production systems, for example Animal Production 1 • describe an animal enterprise, for example: – fresh cow's milk for the domestic market – fine wool from Merino sheep – bulls for the beef seedstock market • investigate a range of important animal management skills, for example: – monitoring and recording production data, eg growth rates – drenching, drafting, mustering, yarding, catching and restraining • research the markets available for chosen animal agricultural products, for example: – chilled export lamb market – domestic fresh milk market – free-range egg market • assess the market specifications required to market chosen animal agricultural products, for example: – quality and quantity criteria for beef, lamb, milk • explore the effect of European and Aboriginal agricultural practices on agricultural production and environmental sustainability, for example: (ACTDEK040) – seasonal/cyclical occupation to care for Country – fish traps which modify the environment to trap specific fish – breeding of the wrinkly-skin merino • research an agricultural issue relevant to the animal enterprise and propose possible solutions, for example: (ACTDEK044) – stock theft – shearer shortage – live exports – rising cost of feed Animal Production 2 • investigate timing and impact of relevant operations in an animal production cycle, for example: – shearing – breeding – drenching – culling

Marine and Aquaculture Technology, Years 7-10 Syllabus, 2019

Outcomes	Content
MAR5-5 assesses the potential of aquaculture to sustain wild fish stocks and the aquatic environment **MAR5-7 identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment** **MAR5-10 demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations**	Focus area: Aquaculture – Module 27 Biology of Native Crayfish • identify and compare the types of crayfish native to NSW waters • identify crayfish from live or preserved specimens and/or photographs • describe the general characteristics of crayfish • label the external features of crayfish • outline the anatomy of crayfish and investigate the function of specific organs • determine the sex of crayfish from live or preserved specimens and/or photographs Focus area: Aquaculture – Module 28 Growing Crustaceans • describe the environmental requirements of a common crustacean • identify the nutritional requirements of a common crustacean during its life cycle