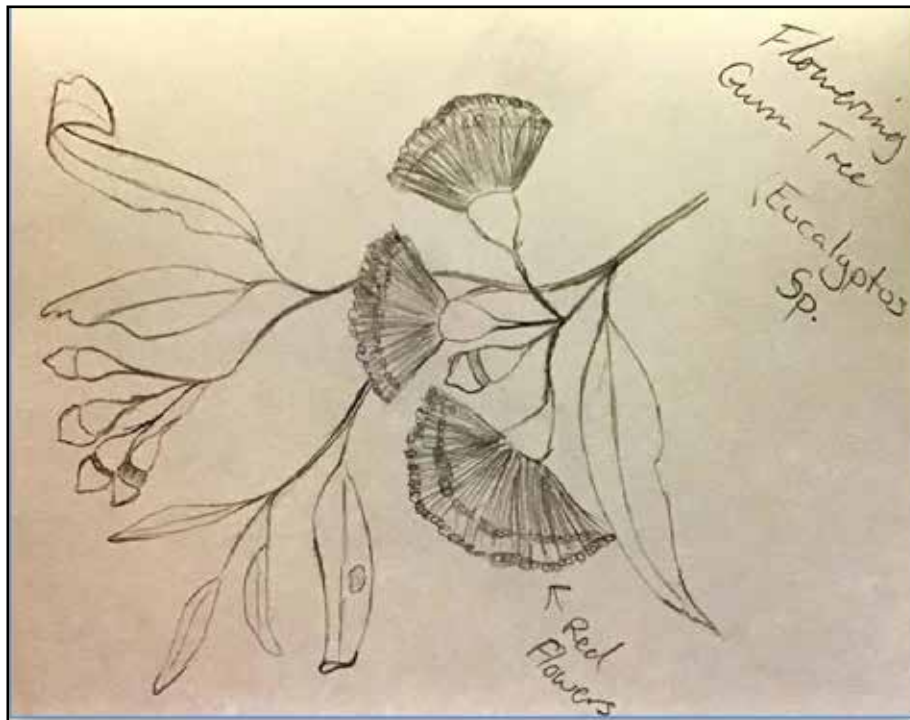


Written by: Alexandra Fowler



Number of lessons: 4-7

Year level(s): Year 7-8

Australian Curriculum content descriptions:

Studies in Natural History Illustrations can be linked to Australian Curriculum in many different subjects. The curriculum links in this Lesson set focus on science as a human endeavor and scientific skills. Concepts can be used to also cover science understanding (biological sciences), Digital and Visual Arts, the Technologies and HASS.

Year 7: Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available (ACSHE119)

Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures (ACSHE223)

Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital

technologies as appropriate (ACSIS129)

Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence (ACSIS130)

Reflect on scientific investigations including evaluating the quality of the data collected, and identifying improvements (ACSIS131)

Communicate ideas, findings and evidence based solutions to problems using scientific language, and representations, using digital technologies as appropriate (ACSIS133).

Year 8: Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures (ACSHE226)

People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE136)

Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital technologies as appropriate (AC SIS144)

Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence (AC SIS145)

Reflect on scientific investigations including evaluating the quality of the data collected, and identifying improvements (AC SIS146)

Communicate ideas, findings and evidence based solutions to problems using scientific language, and representations, using digital technologies as appropriate (AC SIS148)

Achievement standard:

Studies in Natural History Illustrations are about observations and recording information as accurate visual representations. Students can use and create appropriate drawings to study the biological concepts, however the focus should be on developing skills of observation, recording data (through images), analysing visual data and evaluating and improving these processes.

Year 7: describe situations where scientific knowledge from different science disciplines and diverse cultures has been used to solve a real-world problem.

Draw on evidence to support their conclusions.

Summarise data from different sources, describe trends and refer to the quality of their data when suggesting improvements to their methods.

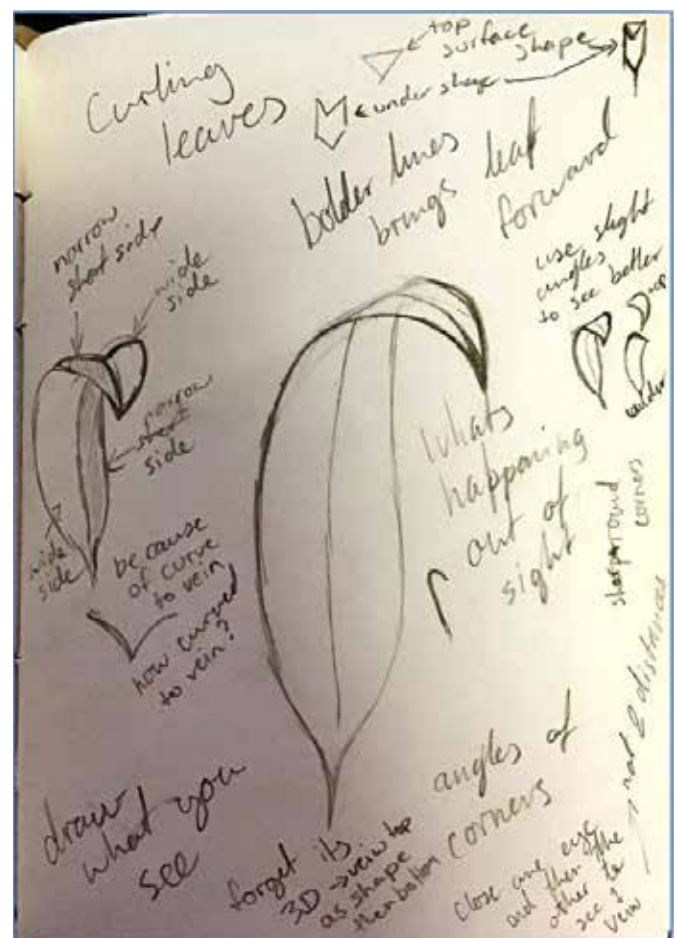
Communicate their ideas, methods and findings using scientific language and appropriate representations.

Year 8: Students examine the different science knowledge used in occupations.

Students construct representations of their data to reveal and analyse patterns and trends, and use these when justifying their conclusions.

Explain how modifications to methods could improve the quality of their data.

Use appropriate language and representations to communicate science ideas, methods and findings in a range of text types.



Lesson 1 –Introduction To Scientific Art

Context

This lesson introduces the concept of scientific illustration through Beatrix Potters' own journey. Students then explore their school yard considering what they often ignore and observing nature. Students will be required to keep a folio over the course of this topic. The folio should contain their notes, drafts, photos, post-it notes and any other relevant work.

Materials and equipment

- Picture Book – Beatrix Potter, Scientist Book by Lindsay H. Metcalf (Online reading: <https://www.youtube.com/watch?v=UCutZPx17nw>)
- Devices with Cameras – one between two or individual (students will need to be able to transfer photo to computer to print).
- Post-it notes and pens/pencils
- Computers/Devices with Internet access
- Books with natural history illustrations in them e.g. encyclopedias, animal and plant identification books, etc.
- Folio – art book and/or folder to keep all drawings, notes and ideas in.

Safety Advice

Outdoor work:

- Hats
- Sunscreen
- Insect repellent
- Reminder that when outside looking at nature there is a risk of finding dangerous or aggressive wildlife (snakes, kangaroos, spiders, scorpions – depending on location), respect the wildlife, we are intruding on their homes.

Objectives

Introduce students to the importance of observing and looking.

To show students that art is an important part of science

Introduction

Explain to students that they will be required to keep a folio over the course of this topic. The folio should contain their notes, drafts, photos, and any other relevant work.

Discuss Beatrix Potter as a class

- Have you heard of Beatrix Potter?
- What do you know about her?
- What books have you read of hers?
- What characters did she create?

Read Beatrix Potter, Scientist by Lindsay H. Metcalf (or use the online reading)

Students brainstorm and take some notes about the book

- What surprised you about the book?
- How did she use her studies to enrich her picture books?
- Do you think it was a good way for her to transfer her skills and knowledge?
- How does the book reflect other uses for scientific knowledge?
- What else could Beatrix have done with the knowledge she gained? What could you do in a similar situation these days?

Core

In the school yard with the cameras. Depending on the size of the school property and the group of students you are working with you may choose to either keep the class together in one large area (or as you walk around the school) or allow them to split up but return to class at a specific time.

Students need to take photos of different things they observe around the school.

- Encourage them to look for things that are usually not looked at e.g. insects, patterns in bark, spider webs, etc.
- They should be allowed to flip over objects like rocks if they only take photos and then return the object to its original place (or as close as can be).
- Students should not move objects that are too large or heavy.
- reminder that when outside looking at nature there is a risk of finding dangerous or aggressive wildlife (snakes, kangaroos, spiders, scorpions, centipedes – depending on location)
- respect the wildlife, we are intruding on their homes.

Return to class to discuss and share best photos – works best if students can print their best photo(s) or have them open on a tablet or computer. Give each student some post-it notes to write comments on for each persons photos. Encourage positive or constructive comments that show each person is observing the photo in detail e.g.

“I like the way you’ve used the shadow to make the inside of the flower seem mysterious”

“The choice of subject is good, but the sun makes it difficult to see. Maybe you should take the photo with the sun behind you”

“Using black and white in this photo makes it look really cool”

Students then take their photos and feedback to look over it. Allow the students time to consider and discuss their feedback with a partner.

Conclusion

Give students the resource links below and get students to look and explore natural history illustrations. The Natural History Museum of Britain has the most drawings in a single link (https://nhm.primo.exlibrisgroup.com/discovery/collectionDiscovery?vid=44NHM_INST:44NHM_V1&collectionId=81171976000002081)

Provide students with access to books with natural history illustrations in them e.g. encyclopedias, animal and plant identification books, etc.

As a class discuss what students thought made a good observation, or things they discovered that was interesting.

Homework

- Make 3 observations of nature in your house, yard or community
- Photograph, sketch or write about what these observations are.
- Bring these observations as a hard copy to the next lesson (e.g. print photos, bring sketch, etc.)

Resources

- The Art of Nature exhibition by the State Library of South Australia
<https://digital.collections.slsa.sa.gov.au/nodes/view/1>
- The Art and Details of Scientific Illustration by the Natural History Museum of Utah
<https://nhmu.utah.edu/blog/2017/01/29/art-and-details-scientific-illustration>
- The Natural History Museum of Britain
https://nhm.primo.exlibrisgroup.com/discovery/collectionDiscovery?vid=44NHM_INST:44NHM_V1&collectionId=81171976000002081
<https://www.nhm.ac.uk/discover/the-art-of-scientific-illustration.html>
<https://www.nhm.ac.uk/discover/nature-on-our-doorstep-the-art-of-british-natural-history.html>
<https://www.nhm.ac.uk/discover/art-highlights-by-two-masters-of-scientific-illustration.html>

Lesson 2, 3 & 4: Drawing what you see

Context

This lesson set starts with the concept of doing scientific illustrations of a leaf. Then takes students through the process of drawing an insect and providing productive criticism. Students will be required to add their leaf drawing to their folio as well as their insect drawings and post-it note suggestions.

Materials and equipment

- Paper (or small artbook pers student), clip boards, pencils, sharpener, and eraser.
- Leaf Template (one for each student)
- Access to various leaves
- Computer & smartboard with Internet access
- Printouts of insects (A4 or A5) – 1 picture for each student (can also use any other biological topic for images)
- Books with natural history illustrations in them e.g. encyclopedias, animal and plant identification books, etc.

Safety Advice

Remind students of classroom norms and the need to be respectful to each other. The purpose of these tasks is not to be perfect but to be more accurate when we draw using on observations.

Objectives

Students will develop skills to draw a leaf using what they observe, not what they think it looks like
Student will develop skills in providing productive criticism and making detailed observations.
Students familiarise themselves with observing the shapes that make up an object/creature.

Introduction

Ask all students to draw a leaf from memory – this can be used as a record of where they are at to start with.

Hand out the leaf templates to every student.

Watch <https://www.youtube.com/watch?v=DWhvme66zRg> up until 5:30mins, pause and let students draw their leaves.

- Allow for students to discuss the ideas in the video so far while they work.
- If some students finish quickly let them draw from a steeper more forward angle to see what happens to their two shapes
- Remind students its ok to give the same image several attempts instead of erasing it draw next to or start a new page, don't destroy or throw away the first attempts as its all practice.

Watch <https://www.youtube.com/watch?v=DWhvme66zRg> from 5:30mins to 6:55mins, pause and let students draw their leaves top side from the new position.

Watch <https://www.youtube.com/watch?v=DWhvme66zRg> from 6:55mins to end, let students draw their leaves top side from the new position.

Watch https://www.youtube.com/watch?v=p_BGUZ3VjZE up until 2:35mins, pause and let students draw their leaves and mid veins.

Watch https://www.youtube.com/watch?v=p_BGUZ3VjZE from 2:35mins to 3:38mins, pause and let students bolden their leaves.

Watch https://www.youtube.com/watch?v=p_BGUZ3VjZE from 3:38mins to 7:25mins, pause and let students practice foreshortening and adding a curve to the mid veins.

Watch https://www.youtube.com/watch?v=p_BGUZ3VjZE from 7:25mins to end

Core

Send students into the school yard in pairs to collect 10 different leaves. Encourage them to look for different types of leaves with different shapes, sizes, lengths and curves, or leaves that look different to a 'normal leaf' e.g. damaged, eaten by insects or has a weird growth on it.

After students have collected their leaves, they need to bring them back and try drawing three or four of them. Then they share with their partner and compare each drawing to the original leaf. Partners can then use post it notes to write feedback for each other.

Provide each student with a picture of an insect (if time you may get students to select and print their own picture to print). Students then consider what they have learnt about drawing leaves to draw the insect they have.

Watch Austin's Butterfly <https://www.youtube.com/watch?v=hqh1MRWZjms>

Discuss as a class what made the critiques useful and the importance of persistence.

In small groups work to critique their drawings and then create draft 2 of the insects. Then have groups repeat the critique process to make a total of 3 or 4 drafts. If time students can photocopy their final draft to add patterns to it and then photocopy the patterned copy to color.

Conclusion

Display the drafts as well as the original image. Get students to compare their original drawing to the improved versions.

Do a gallery walk where everyone is provided the chance to look at each other's drawing and the process they took to get to their final image

Homework

Take a photo of nature for your final piece of work. Take several photos of the same thing so that you have the choice when it comes to your assignment. You may want to take different angles to add to what you can consider for your final piece.

Resources

Drawing Videos by John Muir Laws

1. Website: <https://johnmuirlaws.com/>

2. YouTube Videos

o How to draw plants: Curling leaves.1 <https://www.youtube.com/watch?v=DWhvme66zRg>

- o How to draw plants: Curling leaves.2 https://www.youtube.com/watch?v=p_BGUZ3VjZE
- o Nature Drawing: <https://www.youtube.com/playlist?list=PLpcRk9AaBeWgsQNAdYBS37KL31e93vPjr>

Austin's Butterfly: <https://www.youtube.com/watch?v=hqh1MRWZjms>

Lesson 5,6 & 7-: Final Illustration

Context

This lesson revising our scientific illustrations so far. Then students will be required to complete their own choice illustration. Students will be required finalise their folio and add to it with their drafts and planning for the final piece.

Materials and equipment

- Paper (or small artbook pers student) Pencils, sharpener, and eraser.
- Access to school yard to collect further photos if needed
- A3 & A4 Paper
- A3 Colored card
- Books with natural history illustrations in them e.g. encyclopedias, animal and plant identification books, etc.

Safety Advice

- Reminder that when outside looking at nature there is a risk of finding dangerous or aggressive wildlife (snakes, kangaroos, spiders, scorpions – depending on location), respect the wildlife, we are intruding on their homes.
- Sun safety if students working outside – hats, sunscreen, supervision etc.

Objectives

Students demonstrate an understanding of observing things critically and apply this to nature illustrations.

Students can identify uses of scientific knowledge in STEAM Careers.

Students can describe the use of evidence to support conclusions.

Students will communicate scientific concepts and use appropriate representations.

Introduction

Discuss the work from the previous lesson and the importance of observation.

Introduce the Natural History Illustration Assignment to the class and have students look over their portfolios to consider the work they have done so far.

- Make notes on the key things they have learnt or any ideas and add these to their folio
- Consider what piece of nature they wish to draw for their final piece

- Show students examples of scientific drawings that have been done in different ways:
 1. Drawings on one thing from many angles
 2. Animals and plants combined e.g. a bird in a tree
 3. Drawings of similar species with their key differences shown
 4. Illustrations of animals and their bones
 5. Landscapes that show multiple species.
 6. Single large images that show detail

Core

Students choose their subject for to do as their scientific illustration.

Work in pairs or small groups share their photos and their options for the main assignment – they may wish to use a peers photograph (if the peer agrees and is not using it themselves).

The bulk of these lessons will be spent drawing their chosen subject to create an A3 Natural History Illustration. Students may to choose to draw one large picture of their subject or several smaller images that take up the A3 page.

Encourage students to make notes for their folio as well as quick drafts.

Conclusion

Run a Natural History Illustration display in the school.

Resources

Natural History Illustration Assignment Task Sheet & Rubric (Attached)

Natural History Illustration Assignment Task Sheet

Context

You have been asked to develop a poster for a Natural History Museum in your area.

Safety Advice

Reminder that when you are outside looking at nature there is a risk of finding dangerous or aggressive wild-life (snakes, kangaroos, spiders, scorpions), respect the wildlife, we are intruding on their homes.

Also remember sun safety if outside both in and out of school time – hats, sunscreen, sunglasses.

Objectives

This is your chance to show your

- understanding of observing things critically and apply this to nature illustrations;
- ability to identify uses of scientific knowledge in STEAM Careers;
- ability to describe the use of evidence to support conclusions;
- that you can communicate scientific concepts and use appropriate representations.

Requirements

You must choose a subject for a Nature Illustration. You can choose your subject from one or several photos that you or a peer have taken (if the peer agrees). You may decide to draw

- * One thing from many angles
- * Animals and plants combined e.g. a bird in a tree
- * Similar species with their key differences shown
- * Illustrations of animals and their bones
- * Landscapes that show multiple species.
- * Single large images that show detail
- * Other by negotiation

Once you have chosen your subject you will create an **A3 Natural History Illustration Poster**. you may to choose to draw one large picture of their subject or several smaller images that take up the A3 page. You may choose to draw on different paper then cut it out as stick it on the A3 poster (especially if you are doing multiple pictures).

You must:

1. make notes in your folio – including copies of your photos (photos are your raw data)
2. do some quick drafts that show planning
3. Present a final A3 poster with a drawing and some information (description, labels, key species, etc.)
4. Write a 200-300 word summary about the importance/use of scientific illustration

Natural History Illustration Assignment Rubric

	A	B	C	D	E
Uses of scientific knowledge in STEAM Careers	Describes in detail where scientific knowledge is used in STEAM careers and explains the implications the impact on society.	Describes where scientific knowledge is used in several STEAM careers and explains the implications the impact on society.	Describes where scientific knowledge is used in limited STEAM careers and identifies the implications for society	Attempts to describes where scientific knowledge is used in STEAM careers and identifies few implications for society	Does not meet the requirements of a D grade.
Use of evidence to support conclusions	Clearly and concisely explains their choices when displaying scientific knowledge through illustrations and uses evidence to support conclusions.	Explains their choices when displaying scientific knowledge through illustrations and uses evidence to support conclusions	Describes their choices when displaying scientific knowledge through illustrations and uses evidence to support conclusions.	Identifies some choices through illustrations draws general conclusions using some evidence.	Does not meet the requirements of a D grade.
Using, describing and improving illustrations as Data	Refers to the quality of their illustrations when suggesting specific and detailed improvements to their method.	Refers to the quality of their illustrations when suggesting specific improvements to their method.	Refers to the quality of their illustrations when suggesting improvements to their method.	Identifies some improvements to make to their illustration.	Does not meet the requirements of a D grade.
Communication and Representations	Comprehensively communicates their ideas, methods and findings in detail using scientific language and appropriate representations.	Communicates their ideas, methods and findings in detail using scientific language and appropriate representations.	Communicates their ideas, methods and findings using some scientific language and appropriate representations.	Communicates their ideas, methods and findings using everyday language and simple representations. Responses are often incomplete or irrelevant.	Does not meet the requirements of a D grade