



# Growing Winter Wheat and Summer Sunflowers – Practical Investigation TEACHER GUIDE



FOUNDATION – YEAR 2










This resource has been developed by:



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## LEARNING AREA AND YEAR LEVEL

### Science | Design and Technologies (Foundation – Year 2)

Cover wheat harvest image credit: Ben White

### ATTRIBUTION, CREDIT & SHARING



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## AUSTRALIAN CURRICULUM CONTENT

- Explore how plants and animals are grown for food, clothing and shelter. (**AC9TDE2K03**)
- Identify the basic needs of plants and animals, including air, water, food or shelter, and describe how the places they live meet those needs. (**AC9S1U01**)
- Engage in investigations safely and make observations using their senses. (**AC9SFI02**)
- Suggest and follow safe procedures to investigate questions and test predictions. (**AC9S1I02**)
- Represent observations in provided templates and identify patterns with guidance. (**AC9SFI03**)
- Make and record observations, including informal measurements, using digital tools as appropriate. (**AC9S1I03**)

## LESSON OBJECTIVE

Students observe the characteristics of wheat and sunflower seeds and learn about the importance of soil health for the growth of plants. They conduct an investigation over a period of weeks, enabling them to make predictions, observations, measurements and recordings based on the development of wheat and sunflower seeds into plants. Students will also learn about the various tools, equipment, and machinery associated with grain production now and in the past, while examining examples of how technology is used in agricultural production.

## LESSON OVERVIEW

- **Activity 3.1 – Seeds and Soil** (60 minutes)
- **Activity 3.2 – Planting Wheat and Sunflower Seeds** (30 minutes)
- **Activity 3.3 – Observing and Recording** (20 minutes per observation session)
- **Activity 3.4 – Tools and Technology on the Farm** (60 minutes)

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# Resources and Equipment

## ACTIVITY 3.1 – Seeds and Soil

1. Wheat seeds (one per student)
2. Sunflower seeds (one per student)
3. Ruler (one per group)
4. Magnifying glass (optional)
5. **Worksheet 3.1a – Seed Study** (Observation activity)
6. **Worksheet 3.1b – I Predict...** (Prediction activity)
7. [Kids in the Garden, Ep 1: Soil – healthy dirt makes healthy plants - ABC Education](#) (5:19)
8. **Worksheet 3.1c – Soil Study** (Question and answer activity)

## ACTIVITY 3.2 – Planting Wheat and Sunflower Seeds

1. **Worksheet 3.2a – Planting Seeds** (Practical activity)
2. Wheat seeds (minimum one per student)
3. Sunflower seeds (minimum one per student)
4. Soil (potting mix or garden bed)
5. Plastic cups or containers (minimum one per student, unless using garden bed)
6. Watering can
7. Gardening gloves (minimum one pair per group)
8. Rulers (minimum one per group)
9. Markers (minimum one per group)

## ACTIVITY 3.3 – Observing and Recording

1. **Worksheet 3.3a – Observing and Recording** (Template activity)
2. Rulers (minimum one per group)
3. **Optional: Worksheet 3.3b – Observing and Recording – Extension Activity** (Graphing activity)

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# Resources and Equipment (cont'd)

## ACTIVITY 3.4 – Tools and Technology on the Farm

1. **Worksheet 3.4a – What Is It Used For?** (Matching activity)
2. Scissors, glue
3. [Wheat Harvesting with Reaper and Binder](#) (0:56)
4. [Barooga at Harvest Time](#) (1:52)
5. **Worksheet 3.4b – Tools Over Time** (Comparison activity)
6. [Drones are planting sunflowers on this modern farm in Australia](#) (1:39)
7. **Worksheet 3.4c – Technology on the Sunflower Farm** (Question and answer activity)

## OTHER RESOURCES

1. [Super Seed Kit](#)



**SUPER SEED KIT**  
TEACHER INFORMATION

HOW TO USE THE SUPER SEED KIT IN YOUR CLASSROOM

Grains Research and Development Corporation (GRDC), Australian Grain Technologies (AGT) and Primary Industries Education Foundation Australia (PIEFA) have partnered to create the **Super Seed Kit**.

This kit aims to equip you with hands-on resources and engaging classroom activities to help your students develop an understanding of Australian cropping varieties. Designed with the Science, Design and Technologies and Agricultural student in mind, the kit provides teachers with lessons, resources and information to support experiential learning about grains, oilseeds and pulses.

Curriculum linked lessons will be generated on an ongoing basis to support the **Super Seed Kit** and inspire you with new ideas. Keep up with new lessons by visiting the Primezone website.

**PRIMEZONE WEBSITE:** [primezone.edu.au](https://primezone.edu.au)

**GRAINS EDUCATION – PRIMEZONE WEBSITE:** [primezone.edu.au/grains-education/](https://primezone.edu.au/grains-education/)

**GRAINS RESEARCH AND DEVELOPMENT CORPORATION WEBSITE:** [grdc.com.au](https://grdc.com.au)

**AUSTRALIAN GRAIN TECHNOLOGIES WEBSITE:** [agtbreeding.com.au](https://agtbreeding.com.au)

GRDC  
AGT  
Primary Industries Education Foundation Australia  
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# Lesson Guide

## > ACTIVITY 3.1 – Seeds and Soil (60 minutes)

Students will explore and compare the features of wheat seeds and sunflower seeds. They will make predictions about the changes they expect to see throughout the seed planting investigation. Students will observe video content about the importance of soil for plant growth and provide examples of ways that humans can improve soil health.

1. Allocate students into groups and provide each group with five wheat seeds and five sunflower seeds for investigation. Ask them to measure, describe, and sketch each type of seed, recording their observations on **Worksheet 3.1a – Seed Study** (Observation activity). Allow students to share their observations and comparisons.
2. Explain to students that they will be planting these wheat and sunflower seeds to observe how seeds grow into plants over a period of time. Ask students to make predictions about what they expect to observe throughout this investigation using the checklists and questions provided on **Worksheet 3.1b – I Predict...** (Prediction activity).
3. Project the video [Kids in the Garden, Ep 1: Soil – healthy dirt makes healthy plants - ABC Education](#) (5:19) in a central area.
4. Provide students with **Worksheet 3.1c – Soil Study** (Question and answer activity) to complete during or after the video.

### Answers

5. After viewing, ask students to recall the reasons why healthy soil is important for growing plants and provide an example of how people can improve the health of their soil.

### > ACTIVITY 3.2 – Planting Wheat and Sunflower Seeds (30 minutes)

Students will follow instructions to prepare their seed planting investigation. They will plant wheat and sunflower seeds according to the specifications provided and monitor the growth of the seeds into plants over a number of weeks. The investigation will encourage students to use equipment safely and appropriately while practising key literacy skills (following procedural texts) and numeracy skills (making measurements).

1. Distribute **Worksheet 3.2a – Planting Seeds** (Practical activity) and provide students with the equipment listed.
2. In a suitable working area, assist students in following the procedure to plant the wheat and sunflower seeds in plastic cups or containers. One–five seeds can be planted in a cup with a 5 cm diameter. If planting more than one seed in a cup, ensure students are spacing seeds at least 1 cm apart. Alternatively, seeds may be planted in a garden bed if available within the school grounds.
3. Ensure that both wheat and sunflower seeds are planted in order for students to make comparisons between the growth of different plant types. It is recommended that multiple seeds of both varieties are planted to increase the likelihood of success.
4. Students record progress using the checklist as tasks are completed.
5. Leave seeds in a secure, sunlit area and ensure regular watering to maintain damp soil occurs over the coming weeks. When watering, the soil should be damp to touch, not saturated.



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> **ACTIVITY 3.3 – Observing and Recording** (20 minutes per observation session)

Students will observe the growth and development of the wheat and sunflower seeds into plants over a number of weeks. They will record various data from their observations, including taking measurements of the height of the plants over time. Students will have the opportunity to further extend their investigation by altering the growing conditions of the seeds and making comparisons in the growth rate and health of the plants based on these conditions. They will also have the opportunity to display growth data in graph form.

- Over a five-week period, allocate a weekly lesson for students to observe and record information about the growth and development of the seeds into plants.
- Distribute **Worksheet 3.3a – Observing and Recording** (Template activity) for students to record information in the Plant Growth Chart about:
  - The type of plant being studied (wheat, sunflower)
  - The location of the seed (windowsill, garden)
  - If water is/is not being provided (tick 'Yes' or 'No')
  - The height of the plant (cm)
  - The number of leaves on the plant
  - A sketch of the plant
  - Notes relevant to the investigation
- Students may choose to complete a Plant Growth Chart for both the wheat and the sunflower seeds in order to compare the development of each plant type. Alternatively, allocate half the students in the class to study the wheat seeds and the other half to study the sunflower seeds. Allow students to share and compare observations.
- If the investigation provides scope for extending longer than a five-week period, distribute additional copies of the Plant Growth Chart for students to continue recording observations over a longer timeframe.
- Optional: Extension Activity 1**  
Alter the growing conditions for a number of the planted seeds. Ask students to observe, record, and compare the growth of the plants under various growing conditions. Examples of variations may include:
  - Placing some seeds in a dark, enclosed space away from sunlight
  - Placing some seeds in a refrigerator to simulate winter growing conditions
  - Reducing/eliminating the provision of water to some seeds.
- Optional: Extension Activity 2**  
At the conclusion of the investigation, ask students to reflect on the growth data collected for both the wheat and sunflower seeds. Assist students to graph the growth of their studied plant using **Worksheet 3.3b – Observing and Recording – Extension Activity** (Graphing activity). Students input the graph variables (number of weeks, height of plants) according to the length of time of their investigation and the amount of growth observed.

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## ACTIVITY 3.4 – Tools and Technology on the Farm (60 minutes)

Students will learn about the purpose and use of various tools, equipment and machinery used on farms that produce grains and oilseeds. They will explore the development of farming tools and machinery over time and understand the emerging and essential role of technology on a modern-day farm.

1. Explain to students that farmers who grow crops on a large scale use many different types of tools, equipment, machinery, and technology. These have changed over time as our understanding of technology and machinery has advanced. As a class, brainstorm and list different examples of the tools, equipment, machinery, and technology that might be used on a farm growing wheat or sunflowers.
2. Distribute page 1 of **Worksheet 3.4a – What Is It Used For?** (Matching activity). Students conduct a Think, Pair, Share activity with a partner to answer the following questions about each of the pictures provided:
  - What is being shown in this picture?
  - Did farmers use this item in the past, or is it used in modern times?
  - What do you think it is/was used for?

Allow students time to share ideas and predictions with the class.

2. Ask students to cut along dotted lines on page 1 and attempt to match each picture with their correct description on pages 2–4 of **Worksheet 3.4a – What Is It Used For?** (Matching activity). Assist students in checking their answers before glueing pictures onto the worksheets.

### Answers

3. Explain to students that they will view two videos showing different ways wheat has been harvested over time.
  - **Video 1: [Wheat Harvesting with Reaper and Binder](#)** (0:56) shows footage from 1899 of wheat being harvested with horse-drawn machinery.
  - **Video 2: [Barooga at Harvest Time](#)** (1:52) shows how a modern day harvester works.

Project each video in a central area, asking students to take note of the differences and similarities between the tools, machinery, and methods shown in each video.

4. As a class, discuss the similarities and differences noted. Assist students in recording these observations and answering the questions provided on **Worksheet 3.4b – Tools Over Time** (Comparison activity).

### Answers

5. Today, technology plays an increasingly important role in agriculture, including on sunflower farms. Project the video **[Drones are planting sunflowers on this modern farm in Australia](#)** (1:39) in a central area. Provide students with **Worksheet 3.4c – Technology on the Sunflower Farm** (Question and answer activity) to complete after the video.

### Answers

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# Answers

## ▶ ACTIVITY 3.1 – Seeds and Soil

### WORKSHEET 3.1c – Soil Study

1c. 2d. 3a. 4d.

## ▶ ACTIVITY 3.4 – Tools and Technology on the Farm

### WORKSHEET 3.4a – What Is it Used For?

1a. 2e. 3f. 4i. 5g. 6h. 7d. 8b. 9c.

### WORKSHEET 3.4b – Tools Over Time

- Video 1:** The machine is being pulled by horses.  
**Video 2:** The machine is powered by a motor.
- Video 1:** The farmer is sitting on the outside of the machine.  
**Video 2:** The farmer is sitting inside the cabin of the machine.
- Video 1:** The grain that has been cut is being hand-collected in bundles by people.  
**Video 2:** The grain that has been cut is being collected inside the header.

### WORKSHEET 3.4c – Technology on the Sunflower Farm

- Drones
- Planting sunflower seeds
- Suggested answers:**
  - Saving time
  - Less need for special planting machinery
  - Less money on fuel for machinery
  - Consistent spacing of seed planting.

## References

ABC Education. (2022, July 7). ABC Open: *Barooga at harvest time*. ABC Education. <https://www.abc.net.au/education/abc-open-barooga-at-harvest-time/13963786>

Katanich, D. (2022, February 22). *Drones are planting thousands of sunflowers on this modern farm*. Euronews. <https://www.euronews.com/green/2022/02/22/drones-are-planting-sunflowers-on-this-modern-farm-in-australia>

*Kids in the Garden, Ep 1: Soil – healthy dirt makes healthy plants*. (2021, November 16). ABC Education. <https://www.abc.net.au/education/kids-in-the-garden-ep-1-soil-healthy-dirt-makes-healthy-plants/13633060>

*Wheat Harvesting with Reaper and Binder*. (n.d.). Australianscreen. Retrieved November 30, 2023, from <https://aso.gov.au/titles/historical/wheat-harvesting/clip1/>



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# Seed study

Study a wheat seed and a sunflower seed. Record your observations in the table below.

**You will need:**

- ✓ Wheat seed



- ✓ Sunflower seed





- ✓ Ruler



- ✓ Magnifying glass (Optional)



**Your observations:**

	Wheat seed 	Sunflower seed 
<b>Length and width (mm)</b> (Measure with a ruler)		
<b>Appearance</b> (Colour, shape, markings)		
<b>Sketch</b> (Draw what you see)		

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# I Predict...

Make predictions about your seed planting investigation by answering the questions below.



**1** Which seed do you predict will grow **shoots** the earliest?

(✓ Tick your answer)

Wheat seed

Sunflower seed

**2** Which seed do you predict will grow **leaves** the earliest?

(✓ Tick your answer)

Wheat seed

Sunflower seed

**3** How tall do you predict each plant will have grown after 5 weeks?

(Write your answer)

Wheat: ..... cm

Sunflower: ..... cm

**4** How tall do you predict each plant will have grown after 5 weeks?

(Draw your answer)

**Wheat plant**

**Sunflower plant**



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# Soil Study

Watch the video about soil and circle the correct answers.

▶ Kids in the Garden, Ep 1: Soil – healthy Dirt Makes Healthy Plants – ABC Education (5:19) <https://www.abc.net.au/education/kids-in-the-garden-ep-1-soil-healthy-dirt-makes-healthy-plants/13633060>

**1** Plants get minerals and nutrients from the soil through their:

- a) Shoots
- b) Leaves
- c) Roots
- d) Stem

**3** Compost can be made from:

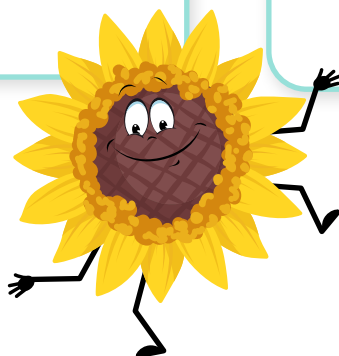
- a) Food scraps, plant cuttings, newspaper
- b) Hoses, shovels, rakes
- c) Plastic, garbage, recycling
- d) Seeds, mulch, shrubs

**2** The best soil for plants to grow in is:

- a) Rocky soil
- b) Sandy soil
- c) Clay soil
- d) A mixture of sandy soil and clay soil

**4** Worms can help keep soil healthy by:

- a) Letting air flow through the soil
- b) Letting water flow through the soil
- c) Adding castings (poo) to feed the soil
- d) All of the above



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# Planting Seeds



Follow the instructions below to plant a wheat seed and a sunflower seed. Tick (✓) each step when completed.

## You will need:




Wheat seed




Sunflower seed




Soil




Plastic cups or containers




Water




Gardening gloves




Ruler




Marker



## Instructions:



### Step 1

Label a plastic cup/container '**Wheat**'. Using the ruler, measure 2 cm from the top of the cup. Draw a line with the marker.

### Step 2

Put on gloves. Tip soil into the cup/container and fill to the marker line.

### Step 3

Using the ruler, measure 3 cm from the top of the soil. Draw a line with a marker.

### Step 4

Make a small hole in the soil with your finger down to the 3 cm marker line. Gently press a wheat seed into the hole and cover with soil. Water lightly.

### Step 5

Repeat Steps 1–4 to plant a sunflower seed in a separate cup/container (labelled '**Sunflower**'). Measure 5 cm below the top of the soil before planting the sunflower seed.


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# Observing and Recording

Observe the growth and development of the seeds over a number of weeks. Record your observations using the Plant Growth Chart.

 **Type of plant:** \_\_\_\_\_

 **Location:** \_\_\_\_\_

 **Water provided? (✓ Tick your answer)**      Yes       No

## Plant Growth Chart



**Week:** \_\_\_\_\_

**Height (cm):** \_\_\_\_\_

**Number of leaves:** \_\_\_\_\_

**Notes:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Sketch:**

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# Observing and Recording (cont'd)

Week:

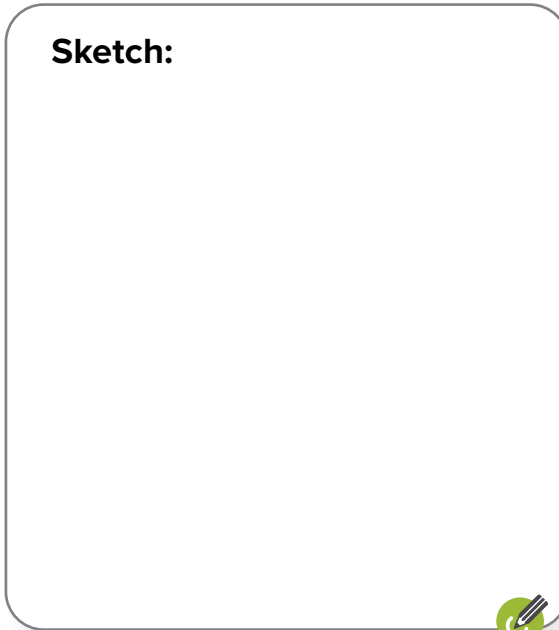
Height (cm): \_\_\_\_\_

Number of leaves: \_\_\_\_\_

Notes:

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Sketch:



Week:


Height (cm): \_\_\_\_\_

Number of leaves: \_\_\_\_\_

Notes:

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Sketch:



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# Observing and Recording (cont'd)

**Week:** \_\_\_\_\_

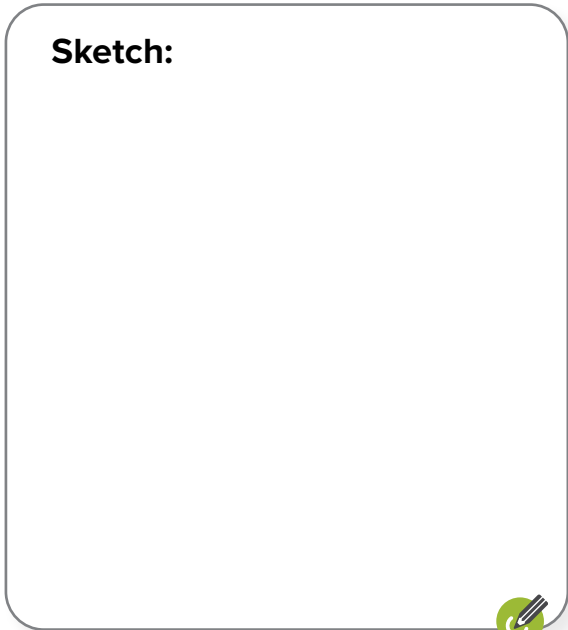
**Height (cm):** \_\_\_\_\_

**Number of leaves:** \_\_\_\_\_

**Notes:**

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**Sketch:**



**Week:** \_\_\_\_\_

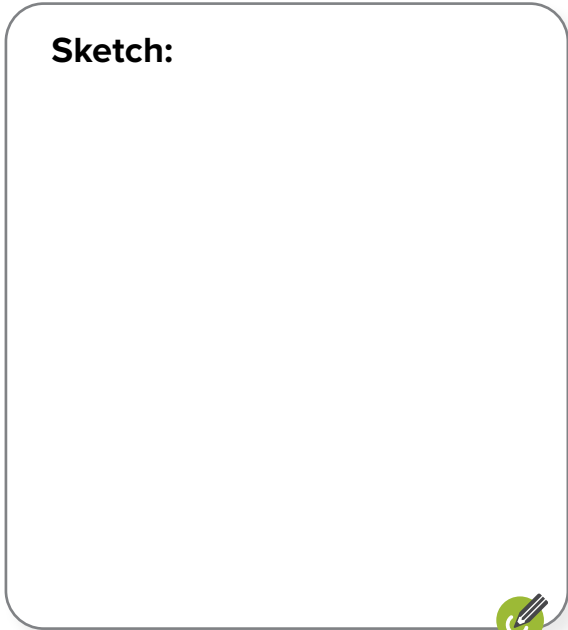
**Height (cm):** \_\_\_\_\_

**Number of leaves:** \_\_\_\_\_

**Notes:**

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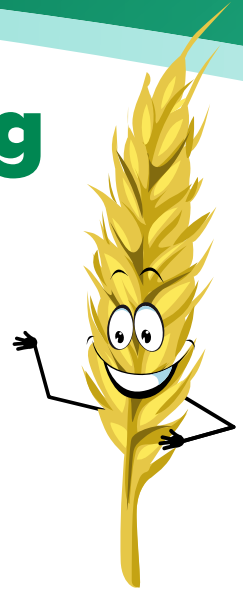
**Sketch:**



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# Observing and Recording

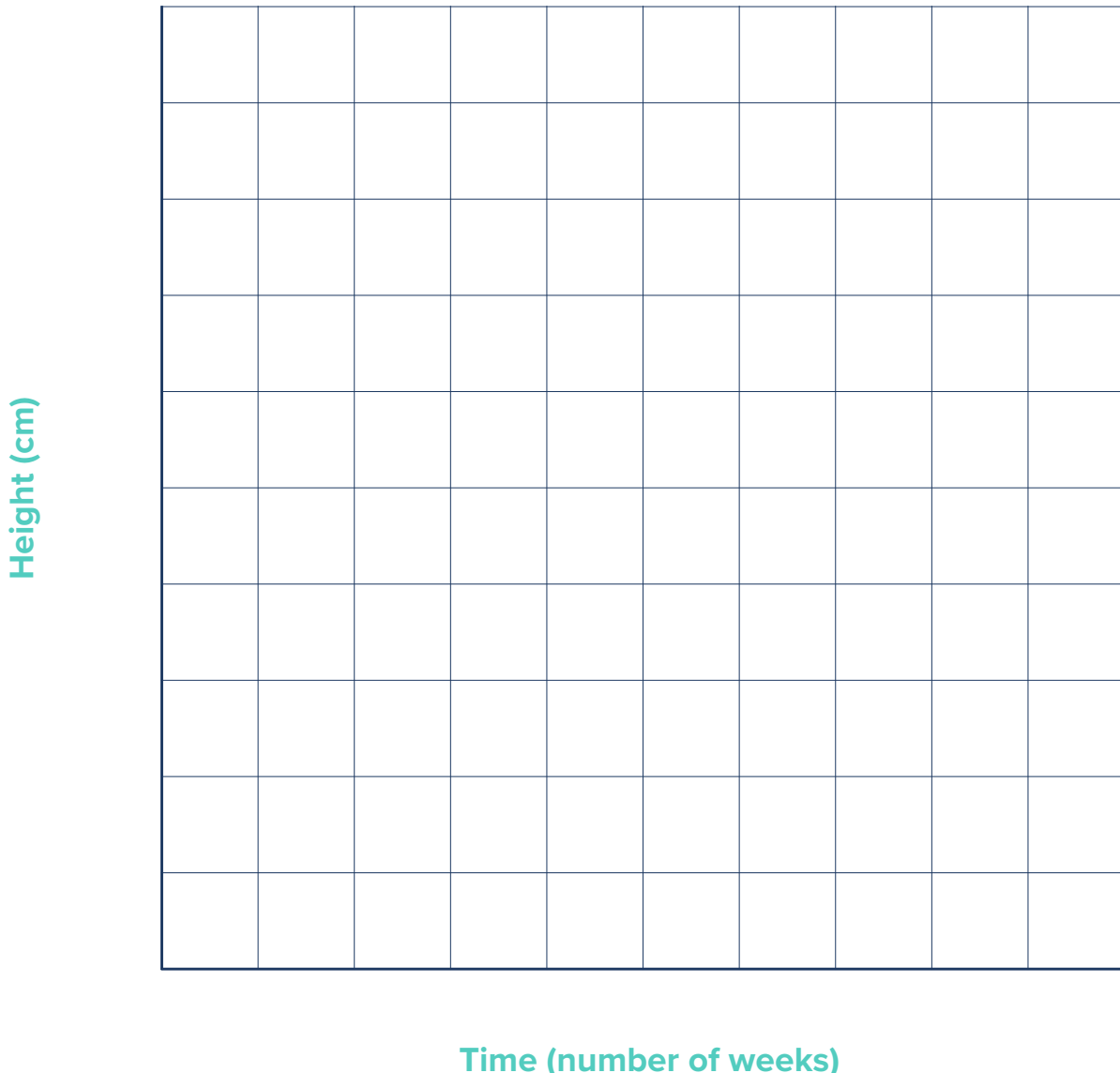
## — Extension Activity



Review your plant height measurements and display your observations using the Plant Growth Graph.

### Plant Growth Graph

 Type of plant: \_\_\_\_\_



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# What Is It Used For?

Cut along the dotted lines to separate each picture.



Image credit: Ben White



Image credit: Ben White



Image credit: Ben White



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## What Is It Used For? (cont'd)

Match each picture of the equipment, machinery, or technology with their correct description.



1

**This is a GPS (Global Positioning System) device.**

It is used in modern times.

This piece of technology gives farmers information about their farm from satellites in space. Farmers can use GPS technology to map their fields and monitor problem areas in crops, such as weeds or diseases.



2

**This is a combine harvester.**

It is used in modern times.

This piece of machinery is used to harvest the grain from crops (such as wheat). It cuts the plant and separates and collects the grain in a special compartment. It shoots the leftover parts of the plant (chaff) back onto the ground.



3

**This is a grain mill.**

It was used in the past.

This piece of equipment was used to grind the harvested grains into flour. The wind would push the large blades around and around. This would turn a heavy stone inside the mill. The grain would be put beneath the stone and ground into flour.

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## What Is It Used For? (cont'd)

Match each picture of the equipment, machinery, or technology with their correct description.



4

**This is an electronic tablet.**

It is used in modern times.

This piece of technology can be used for many different purposes on a farm, including monitoring the growth of crops, operating machinery, finding information, and recording data and images.



5

**This is a scythe.**

It was used in the past.

This piece of equipment was used to harvest grains from crops before the invention of machinery such as combine harvesters. The user would cut the top off the plants with the sharp blade and then collect the cut grain by hand.



6

**This is a grain silo.**

It is used in modern times.

This piece of equipment is used to store grain once it has been harvested. Trucks deliver the grain to the silo. It can be stored here until it is ready to be used by the farmer or sold.

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## What Is It Used For? (cont'd)

Match each picture of the equipment, machinery, or technology with their correct description.



7

**This is a drone.**

It is used in modern times.

This piece of technology can be used for many different purposes on a farm, including planting seeds, spraying crops with fertilisers and pesticides, and monitoring the health of the crop.



8

**This is a hand mill.**

It was used in the past.

This piece of equipment was used to grind grain into flour by hand. Grain was poured through the hole at the top which led to a flat grinding section below. The user turned the wheel around and around, crushing the grains into flour.



9

**This is a horse-drawn harvester.**

It was used in the past.

This piece of equipment was used before modern machinery (such as the combine harvester) was invented. Horses would pull a machine over the crop to cut off the grains from the top of the crop. These were then collected by hand.

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# Tools Over Time

Watch videos showing two different ways that wheat has been harvested (in the past and in modern times). Record observations from each video below — write or draw your responses.

**1**

How is the machine being powered?

 Video 1

 Video 2

**2**

Where is the farmer sitting on the machine?

 Video 1

 Video 2

**3**

How is the grain being collected?

 Video 1

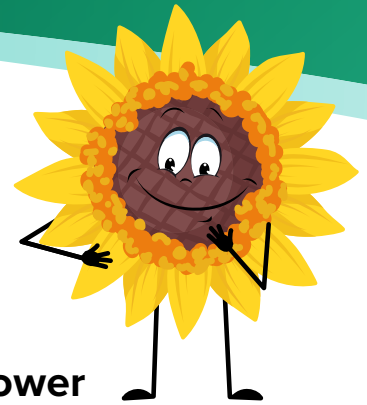
 Video 2



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# Technology on the Sunflower Farm



Watch the video about using technology on sunflower farms and answer the following questions.

▶ Drones are Planting Sunflowers on this Modern Farm in Australia (1:39)  
<https://www.euronews.com/green/2022/02/22/drones-are-planting-sunflowers-on-this-modern-farm-in-australia>

**1** What piece of technology is being used on this sunflower farm?

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**2** What task is being completed?

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**3** How do you think this type of technology might be helpful for farmers?

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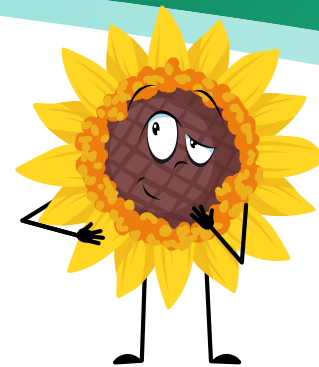
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# Technology on the Sunflower Farm (cont'd)



- 4** Imagine you are viewing an image of a sunflower farm taken from a drone. Draw what you think you would see.

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