Science

# Apprentice Gardener (Plants)

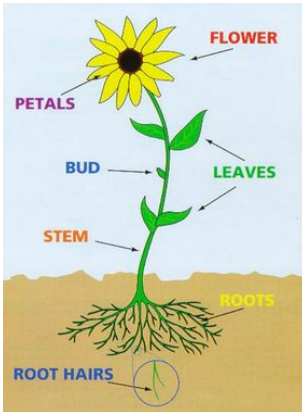
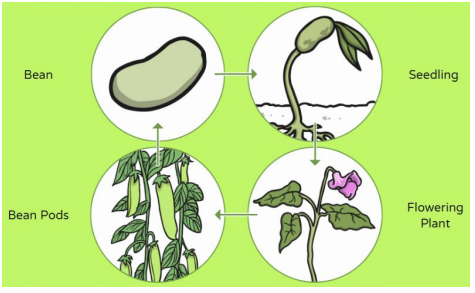
Atlantic Academy Portland
an Aspirations Academy

Year 2 - Spring 2

Name:_____

Class:_____

# Year 2 Science Knowledge Organiser - Spring 2 - Plants

| | | |
|---|---|---|
| 1 | **Roots** | Anchor the plant in the ground and absorb water and nutrients from the soil. |
| 2 | **Stem** | Transports water and nutrients to different parts of the plant. |
| 3 | **Leaves** | The place where photosynthesis takes place. |
| 4 | **Petal** | The separate leaves that form the outside part of a flower head and usually attract insects. |
| 5 | **Flower** | The part of a plant which allows it to reproduce. |
| 6 | **Seed** | Produced the fertilisation ovule, seeds allow a plant to reproduce. |
| 7 | **Parts of a flowering plant** |  |
| 8 | **Pollen** | The product of a male part of a plant which allows it to produce seeds. |
| 9 | **Ovule** | The egg cell which joins with pollen to produce seeds and allows plants to reproduce. |
| 10 | **Stamen** | The male part of a plant. Consists of the **anther** (produces pollen) and the **filament** (which holds the anther up). |
| 11 | **Pistil** | The female part of a plant. Made up of the **stigma**, **style** and **ovary** (which contains the egg cells called **ovules**). |
| 12 | **Nutrient** | A substance that provides nourishment for growth. All living things need nutrition. |
| 13 | **Pollination** | The process by which pollen is transferred to the female parts of the plant which means the plants can make seeds and reproduce. |
| 14 | **Fertilisation** | When pollen joins with the ovule (egg), a new seed is created |
| 15 | **Seed dispersal** | The movement or transport of seeds away from the parent plant. |
| 16 | **Life cycle of a bean** |  |
| 17 | **Habitat** | The natural environment in which an animal or plant usually lives. |
| 18 | **Plants** | A large group of living things that use sunlight to make their own food. |
| 19 | **Animals** | A large group of living things that feed themselves by eating plants or other animals. |
| 20 | **Deciduous** | A deciduous plant, bush or tree loses its leaves in autumn and grows new ones in the spring. |
| 21 | **Evergreen** | An evergreen plant, bush or tree has leaves for the whole year. |

Date: _____

# LESSON ONE: Observing plants

**Retrieval Practice**

| What I already know about plants | Questions I still have about plants. |
|---|---|
| • | • |
| • | • |
| • | • |
| • | • |

| **Outcomes** | **Key Vocabulary** |
|---|---|
| To observe closely using simple equipment by recording observations of a variety of plants in the local environment. | Roots, stem, leaves, flower, trunk, branches, observation, diagram. |
| **Knowledge needed** | |
| It will be helpful if children have previous experience of the basic structure of plants and trees. | |

**Talk Task**
Do you know the name of any flowers or plants? Do you have a favourite?

What do you know about the parts of plants and parts of trees?

**Group Task**
In groups of three, you have one minute to put the **plant** back together and label the *parts*.
You have one minute, ready, steady...GO!

How did you do?

Next Task, work in the same group, but this time you are going to put the **tree** back together and label the **parts**.

You have one minute, ready, steady...GO!

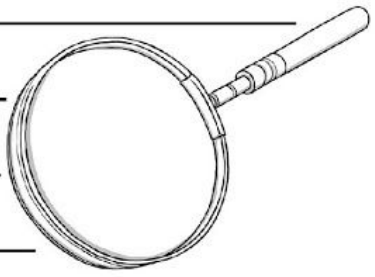
How did you do?

**Pair Task**

Today, we are going to go on an outside walk to see what plants and trees we can find.
Choose an interesting flowering plant. Look at it closely.

Draw the plant and label the different parts.

Write a description of the plant.



**Tree Diagram:** Draw a picture of an interesting tree. Label the main parts.

**Leaf Observational Drawing:** Find a leaf from the tree you have drawn. Look at it carefully with a magnifying glass and draw what you see.

**Bark Rubbing:** On a separate piece of paper, make a bark rubbing from the trunk of the tree.

**Bark Rubbing**
Stick your picture of your bark rubbing in this space.

**Exit Ticket**
What interesting plants and trees did you find?
Tell your partner all about them, and listen carefully while they tell you about theirs.

Date: _____

# LESSON TWO: Seeds and bulbs

**Retrieval Practice (Year 1)**
What are the names of the four seasons?

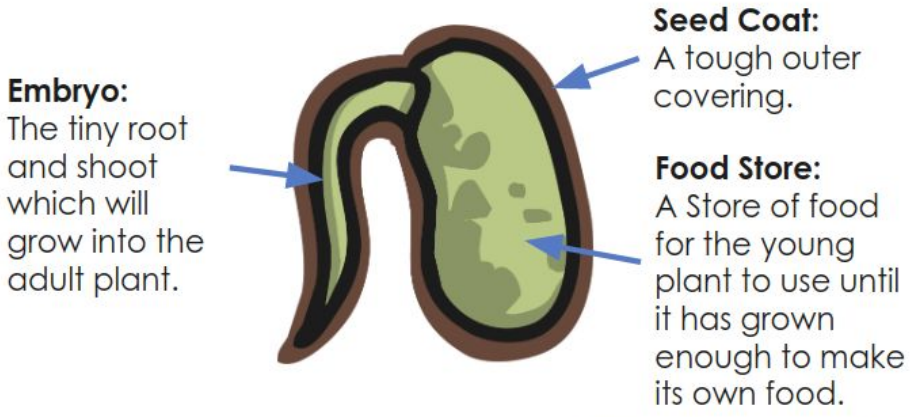
_____ _____

_____ _____

| Outcomes | Key Vocabulary |
|---|---|
| To observe and describe how seeds and bulbs grow into mature plants by planting seeds and bulbs.<br>To perform simple tests by setting up a comparative test to understand what plants need to germinate and grow. | Seed, bulb, germinate, embryo, stem, tunic, scales, bud, sprout, compare, comparative test. |
| **Knowledge needed** | |
| It will be helpful if children have previous experience in identifying some common garden, wild and edible plants. | |

**Everybody Reads**
The first stage in the life cycle of most plants is a seed.
Seeds come in all shapes and sizes. Every plant has a different seed.

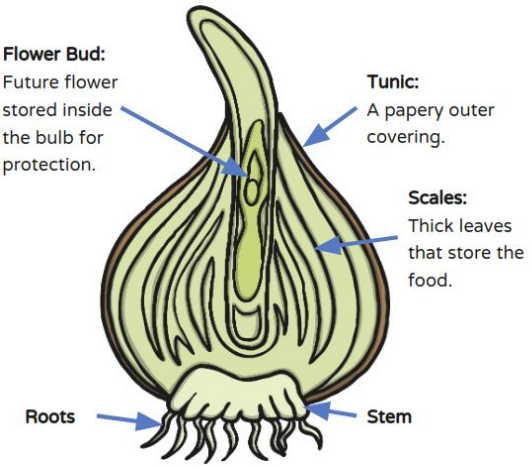
Every single seed has the beginnings of a new plant inside it, along with a little store of food to help it grow.
When the conditions are right, the seed soaks up water and swells, and the tiny new plant bursts out of its shell. This is called **germination**.




**Everybody Watches**
Let's watch this video to find out more about germination and a plant's life cycle.
(https://www.bbc.co.uk/programmes/p00pyhfq)

## Everybody Reads

Some plants grow first from a seed, and then develop a bulb that helps them to grow back year after year.
A bulb lets the plant rest underground over the winter when it is too cold, then grow back later in the year when conditions are right.




## Talk Task

We are going to plant a seed and a bulb each, so we can compare how they grow.
Comparing means looking closely to see what is similar and what is different.
Seeds and bulbs need to wait for conditions to be just right before seeds can germinate and bulbs can sprout new growth.
What do you think that our plants will need so they can sprout and grow well?

Write or draw what you think they need to grow well.

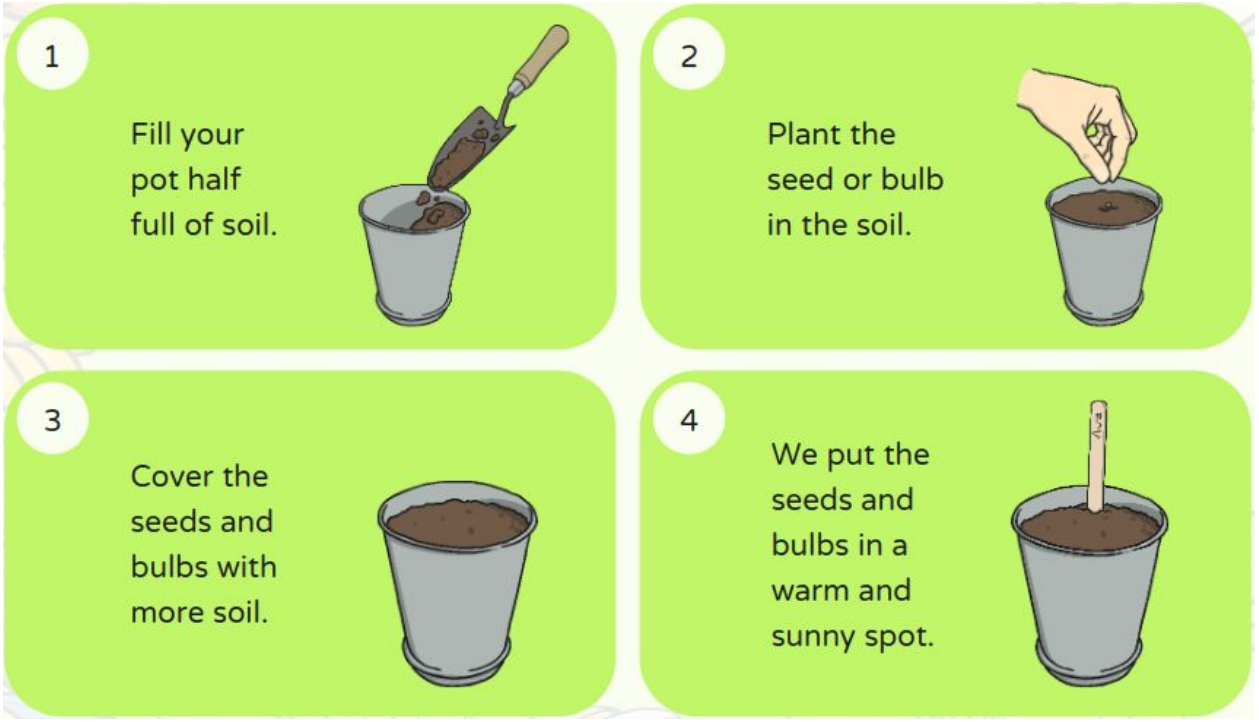
How can we find out if you are right?

## Group Task

As well as our seeds and bulbs, we are going to plant some extra seeds and set up a comparative test.
In our **comparative** test, we are going to plant the same seeds, and **compare** how they grow under different conditions.
This will help us to learn what plants need to grow well.

You will need:

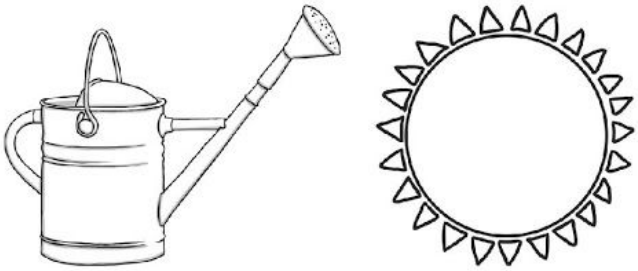
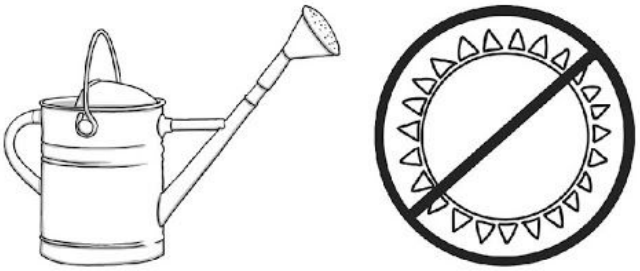
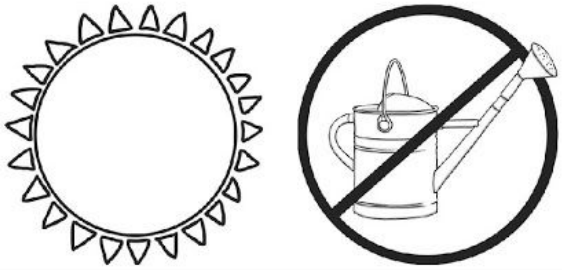
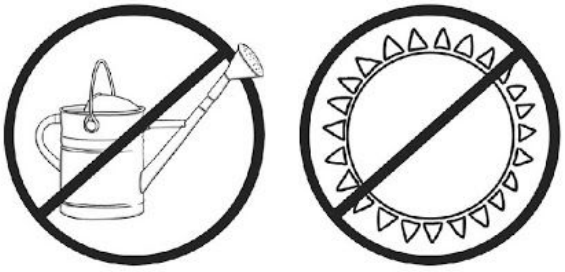
- 1 test seed
- 1 dwarf sunflower seed
- 1 paperwhite narcissus bulb
- 3 plant pots
- Soil




**Comparative Test**
In your group, you are going to compare the growth of your test seeds.
One seed will be given water and sunlight.
One seed will be given water but **no sunlight**.
One seed will be given sunlight and **no water**.
One seed will be given **no sunlight** and **no water**.

**Talk Task**
What do you think will happen to each of the seeds?
What conditions does each plant need? Where should we put them?

**Group Task**
Look at the condition the seed is planted in. Describe how it will grow.

| Growing Conditions<br>How the seed will be planted. | Prediction<br>How the plant will grow. |
|---|---|
| The seed will be given water and sunlight.  | |
| The seed will be given water and no sunlight.  | |
| The seed will be given sunlight and no water.  | |
| The seed will not be given water and sunlight.  | |

**Talk Task**
Which seed did we predict would grow the best?
What conditions should we give our sunflower and narcissus plants so that they grow well?

**Exit Ticket**
Seed or bulb? Quiz
On the next slides are some foods that we eat.
Can you guess if the food is a **seed** or a **bulb**?

Write **seed** or **bulb** on your whiteboard for each slide.

Date: _____

# LESSON THREE: Life cycles

**Do now**
Do you remember planting a sunflower seed and paperwhite narcissus bulb last week?
Shall we see if your plants have started to grow?
If they have grown, measure them with a ruler and write how tall they are in the table.
If they haven't sprouted yet, what should you write?

**Group Task**

Measure your plants with a ruler each week and record their heights in centimetres.

| | Dwarf Sunflower  | Paperwhite Narcissus  |
|---|---|---|
| Week 1 | | |
| Week 2 | | |
| Week 3 | | |
| Week 4 | | |

| **Outcomes** | **Key Vocabulary** |
|---|---|
| To observe and describe how seeds and bulbs grow into mature plants by understanding the life cycle of plants.<br>To use their observations and ideas to suggest answers to questions by giving ways we can tell that plants are living things. | Life cycle, life process, sprout, seedling. |
| **Knowledge needed** | |
| Children will have planted a sunflower seed and a narcissus bulb in lesson 1. It will be helpful if children have an understanding of the parts of flowering plants. | |

**Talk Task**
Plants and trees are alive like humans and other animals.
How can we tell that plants are living things? Write down your answers on a whiteboard.

All living things do certain things to stay alive. These are called life processes.
Animals, including humans, do these things. Plants do too, although they do them in different ways.

**Everybody Watches**
Let's rewatch this video (from lesson) to remind ourselves about germination and a plant's life cycle.
(https://www.bbc.co.uk/programmes/p00pyhfq)

## Everybody Reads

### Life Processes

Plants can **move** and **grow**, and they **sense** changes in their environment.
How is this similar to what humans and other animals do?

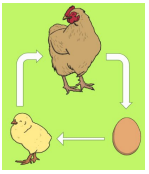
The mimosa plant curls up when you touch it! Click the button below to see the mimosa plant in action. (https://www.youtube.com/watch?v=nPf3FbR6eQE)

Plants need to take in **nutrition** and **air** to survive. They also need to get **rid of waste**.
How do animals, including humans, get what they need to stay alive? How do they get rid of waste?

Plants can **reproduce** to make new plants. How do humans and other animals reproduce?

### Life Cycles

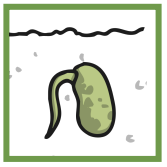
Humans, other animals, plants and all living things have a life cycle.
This is the life cycle of a hen.



### Bean Plant Life Cycle

The bean plant life cycle begins with a bean that has fallen or been picked from a bean plant.
The bean is a seed of the bean plant.

A planted bean seed germinates and, after 2-3 days, a shoot appears.

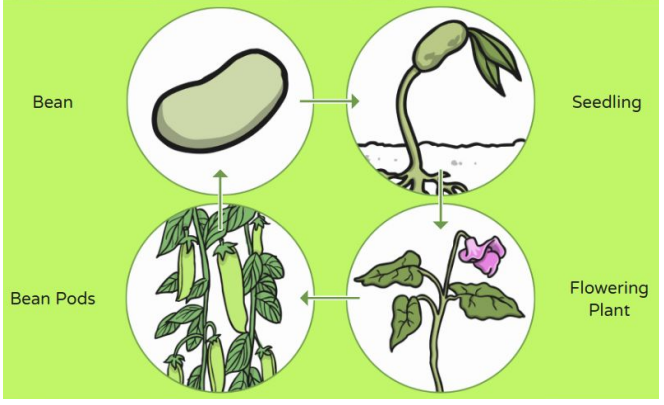


The bean seed will start to take root and a stem will appear.
The bean uses the food in the seed to grow taller.

If the bean plant has water and sunlight, it will grow tall and then it will flower.

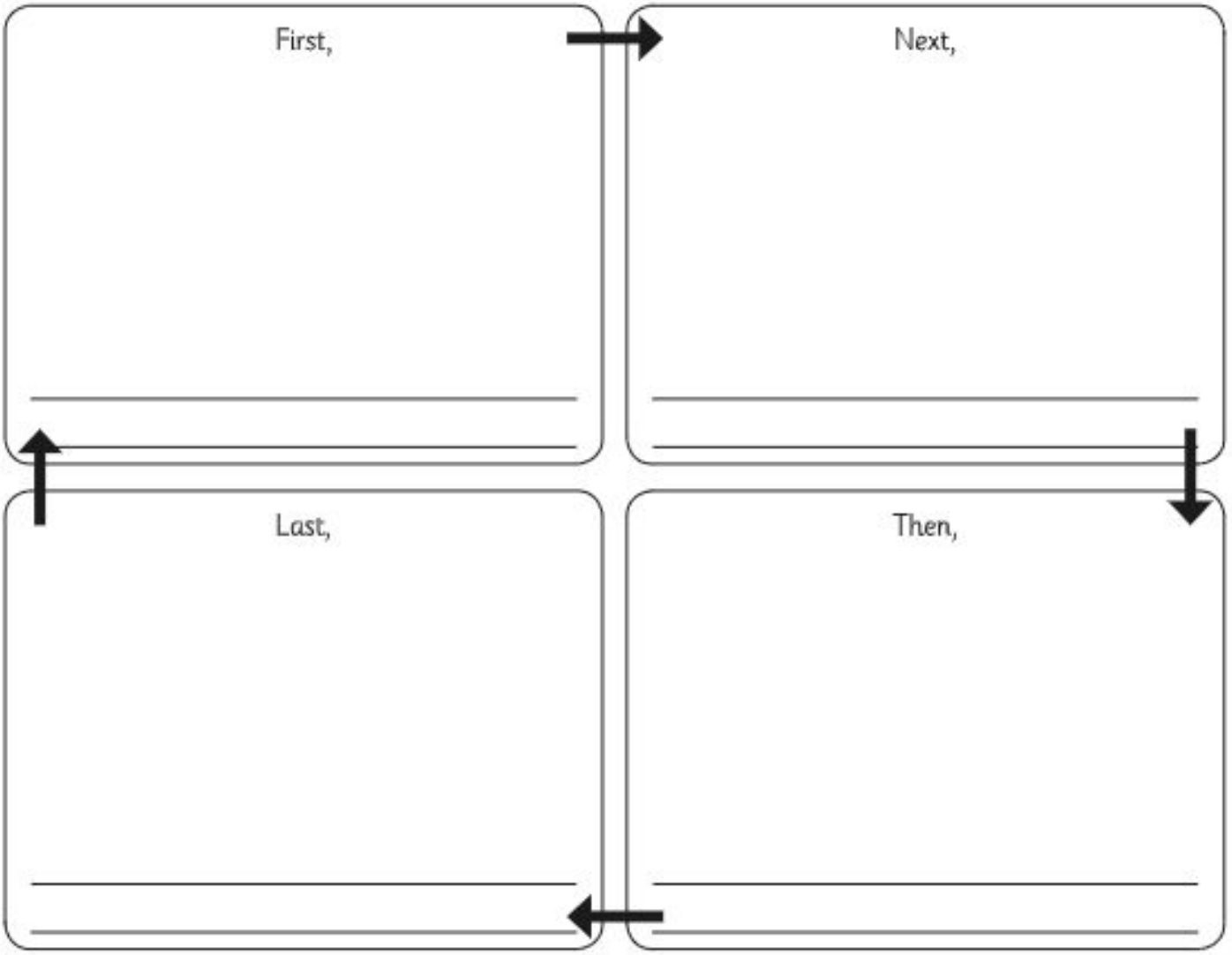
Eventually pods of beans will grow on the bean plant. Each one of these is a seed.

Each seed can fall into the soil and become a new seedling, ready to grow into a whole new bean plant.



**Independent Task**

Cut and stick the life cycle of a sunflower plant in the correct order. Explain what happens at each step.




**Exit Ticket**

Let's pretend! Find a suitable place in the room, we are going to consolidate what we have learnt by performing a dramatic enactment of the life cycle of a plant.

Date: _____

# LESSON FOUR: What do plants need?

**Do now: FEEDBACK**

Look through what you have completed in your booklet so far and complete any blank pages. If you were absent, read the **Everybody reads** sections and write **ABSENT BUT READ** in **purple pen** and sign your name.

If you **complete all** of your feedback, on your whiteboard write 3 questions about plants for another person in the class to answer.

| **Outcomes** | **Key Vocabulary** |
|---|---|
| To find out and describe how plants need water, light and a suitable temperature to grow and stay healthy by comparing the growth of seedlings under different conditions.<br>To gather and record data to help in answering questions by measuring the results of a comparative test. | Comparative test, compare, prediction,<br>germinate, grow. |
| **Knowledge needed** | |
| Children will have set up the comparative test in lesson 2. They will have planted seeds and bulbs in lesson 2 and measured their growth in lesson 3. | |

**Talk Task**

Do you remember when we planted some seeds for our comparative test?
In a comparative test, you look at things closely to see what is the same and what is different.
What conditions have we given our plants?
Tell your partner how you think that each plant will have grown.
This is your **prediction**.

**Independent Task**

Draw a picture of each plant. Write a sentence to describe it and write the height in mm.

| | |
|---|---|
| The plant has had water and sunlight.<br><br>Height _____ mm<br><br>_____<br><br>_____ | The plant has had water but no sunlight.<br><br>Height _____ mm<br><br>_____<br><br>_____ |
| The plant has had sunlight but no water.<br><br>Height _____ mm<br><br>_____<br><br>_____ | The plant has had no water and no sunlight.<br><br>Height _____ mm<br><br>_____<br><br>_____ |

**Everybody Reads -**

**Conclusions**

What have we found out about what plants need to grow well?

- Plants need water to grow well.
- Every plant needs water to survive. All living things do!
- Some plants like a lot of water, some only need a little.
- Plants need sunlight to grow well.

Seeds and bulbs can germinate and sprout under the soil without sunlight, because seeds and bulbs contain a store of food that the plant uses to begin to grow. When this is used up, the plant needs more food so it can keep getting bigger.

Plants use their leaves to absorb the sunlight and use the energy in the sunlight to make their own food.

Were our predictions correct?

Did we choose the right conditions for our seeds and bulbs to make sure they grow up healthy and strong?

## Narcissus

Draw your narcissus plant.

Write a sentence to describe how your narcissus plant has grown so far.

## Sunflower

Draw your sunflower plant.

Write a sentence to describe how your sunflower plant has grown so far.

**Group Task**
This is Week 2 (on our table) of growing our plants.

Measure your plants and write down their heights in the table in Lesson 3.

**Exit Ticket - Growing Cress**

**Temperature**

We know that plants need light and water to grow, but what about the temperature?
Do you think a plant will grow better in the warm or in the cold?

How can we find out?

We are going to plant some cress. Cress is very easy to grow and grows very fast.

Photos courtesy of tillwe (@flickr.com) - granted under creative commons licence – attribution

As a class, we are going to plant 2 trays of cress seeds. One will grow inside in a warm place, one will grow outside where it is cool.

Which one do you think will grow fastest and why?

_____

_____

_____

_____

You will need:

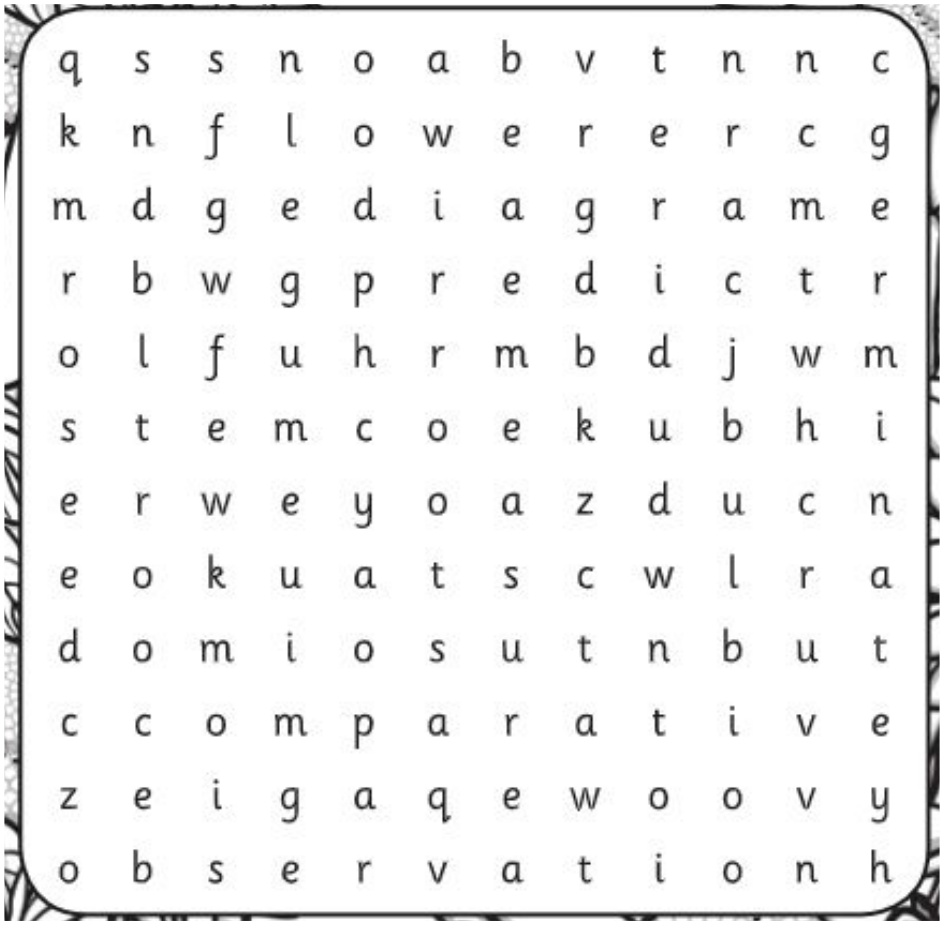
- A shallow tray
- Cotton wool or kitchen towel
- Water
- Cress seeds
- Cling film

Method:

1. Line your tray with cotton wool or kitchen towel.
2. Sprinkle it with water until it is damp.
3. Scatter your cress seeds on top.
4. Wrap the tray in cling film.

Date: _____

## LESSON FIVE: Plants we eat



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| q | s | s | n | o | a | b | v | t | n | n | c |
| k | n | f | l | o | w | e | r | e | r | c | g |
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comparative
observation
germinate
diagram
measure
roots
stem
bulb
seed
predict
flower
legume

| **Outcomes** | **Key Vocabulary** |
|---|---|
| To find out and describe how plants need water, light and a suitable temperature to grow and stay healthy by explaining what conditions plants need to grow well.<br>To use observations and ideas to suggest answers to questions by using the results of tests to suggest good conditions for growing plants for food. | Comparative test, compare, prediction, germinate, grow. |
| **Knowledge needed** | |
| Children will have planted cress to grow in different temperatures in lesson 4. | |

## Narcissus

Draw your narcissus plant.

Write a sentence to describe how your narcissus plant has grown so far.

## Sunflower

Draw your sunflower plant.

Write a sentence to describe how your sunflower plant has grown so far.

**Group Task**

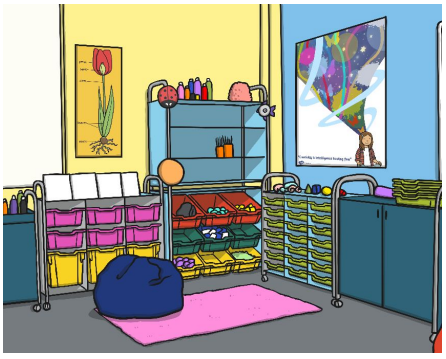
This is Week 3 (on our table) of growing our plants.

Measure your plants and write down their heights in the table in Lesson 3.

**Talk Task**

Do you remember we planted some cress?
Half of the cress has been growing outside where it is cool. The other half has been growing inside in a warm place.

Which one do you think has grown the best? Why?



Inside?

Outside?

**Everybody Reads**

Cress grows best when it is warm.
All plants need the right temperature to grow well.
Here are some plants that like to grow where it is very hot.
These plants do not like to get too cold.


Here are some plants that like to grow where it is cold.
These plants do not grow well where it is warm.


**Talk Task**

We know plants need the right temperature to grow well.
What other things do they need? How do we know?

**Everybody Reads**
Just as some plants prefer the warm and some like to grow where it is cold, plants like different amounts of sunlight and water.

Cress is a plant that we eat.
Lots of the food that we eat is a part of a plant.
Can you think of any?

Many plants have fruit to carry and spread their seeds.
Some of the food we think of as vegetables are actually fruits.

**Vegetables**
Vegetables come from all different parts of plants.

**Root Vegetables**

**Stem Vegetables**

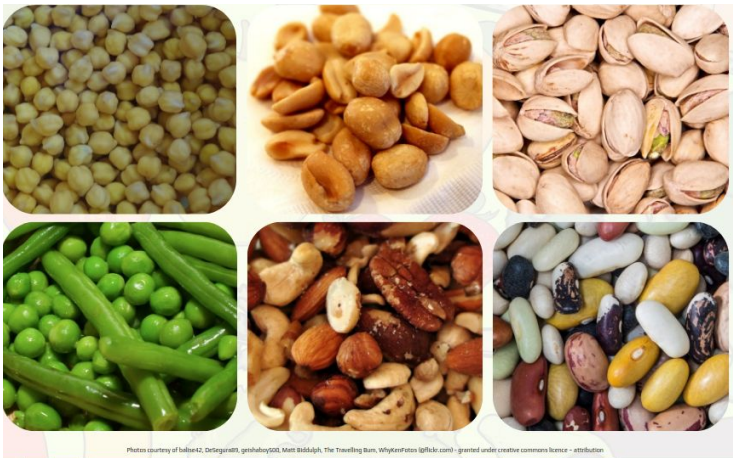
**Leaf Vegetables**

**Flower Vegetables**

**Grains and cereals**

These foods are the seeds of grassy plants. Grains are very important foods around the world.

**Nuts, Seeds and Legumes**



**Whiteboard Task - Close up your booklet!**
You have **1 minute** to remember 5 different foods that we eat that are parts of plants.
Write or draw them on your whiteboard.

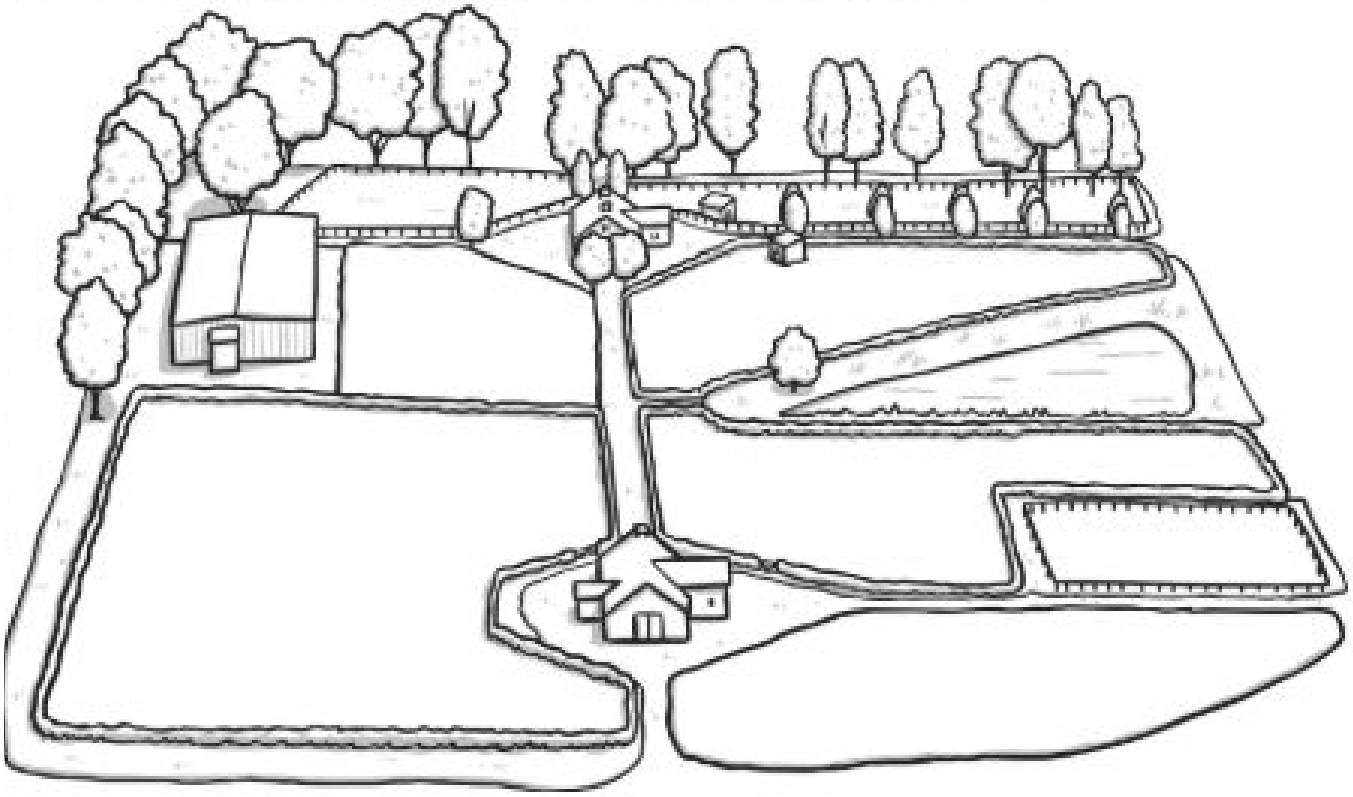
**Everybody Reads**
Most of the plants that we eat are grown by farmers.
Farmers grow plants for food. They call the plants **crops**.

The farmers sell the food to supermarkets and other shops.

We buy the food, take it home and eat it!

Farmers have to look after their plants very carefully so they can grow lots of food for us to eat.

**Independent Task**
Farmers grow the plants that we eat. Draw the plants you would like to grow on your farm.



What do plants need to grow well? Describe what you would do to make sure that the plants on your farm grow healthy and strong.

_____

_____

_____

_____

**Exit Ticket**
Let's taste some of the foods we have been talking about **(be aware of allergies!)**
Think about:

- What parts of plants do these foods come from?
- How do you think farmers help them to grow?

Date: _____

# LESSON SIX: How different plants grow

**Retrieval Practice**
Write down what plants and trees need to grow well.

_____

_____

_____

_____

| **Outcomes** | **Key Vocabulary** |
|---|---|
| To observe and describe how seeds and bulbs grow into mature plants by comparing the growth of seeds and bulbs.<br>To observe closely, using simple equipment by measuring and recording the growth of seeds and bulbs. | Table, bar chart |
| **Knowledge needed** | |
| Children will have planted a seed and a bulb in lesson 2, and recorded their growth on the Plant Growth Table Activity Sheet in lessons 3, 4 and 5. | |

**Everybody Reads**
We planted a dwarf sunflower and a paperwhite narcissus. One was a seed, one was a bulb.
Can you remember which was which?



**Talk Task**
Look carefully at your sunflower and your narcissus plant.
Look closely at the **leaves, the stem, and any buds or flowers**. Think about how they have grown.
Look at the **height, the width, the colour, the shape and the texture** of your plants.
**Describe** your plants to your partner, and listen carefully while they describe their plants to you.

With your partner, think of some ways that the sunflowers are similar to the narcissus plants.
Think of some ways they are different.

## Sunflower

Draw your sunflower plant.

Measure your sunflower plant and fill in the Plant Growth Table.

## Narcissus

Draw your narcissus plant.

Measure your narcissus plant and fill in the Plant Growth Table.

Describe what is similar about your two plants:

Describe what is different about your two plants:

**Everybody Reads**

A bar chart is a way of showing information.

Each week you have measured your plants with a ruler and recorded the height of each plant in a table.

Now we are going to show this information in a bar chart.

Don't worry if they have not grown enough, we have some data that is ready to plot!

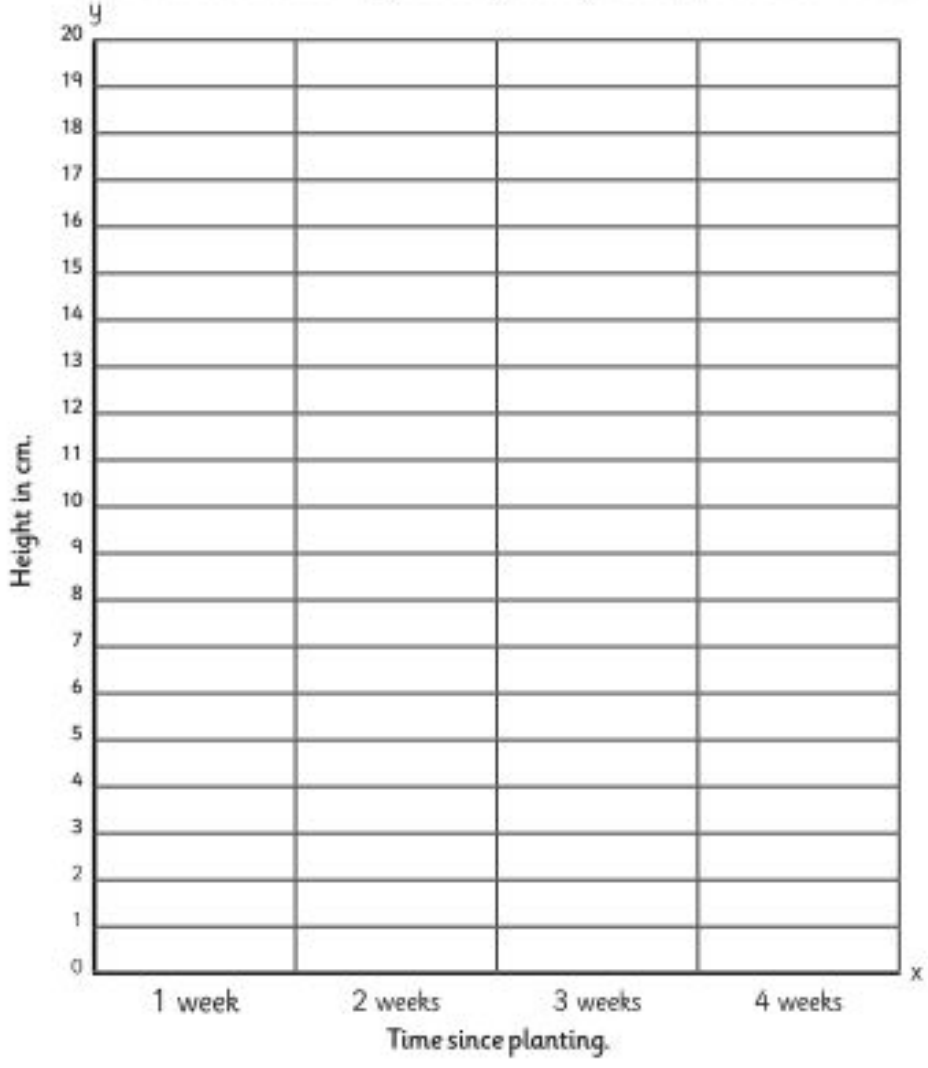
| | Dwarf Sunflower  | Paperwhite Narcissus  |
|---|---|---|
| Week 1 | 0cm | 3cm |
| Week 2 | 3cm | 7cm |
| Week 3 | 5cm | 16cm |
| Week 4 | 9cm | 24cm |

**Independent Task**

**Sunflower Growth Bar Chart**

Using the information in your Plant Growth Table, draw a bar chart to show the height of your sunflower plant each week.

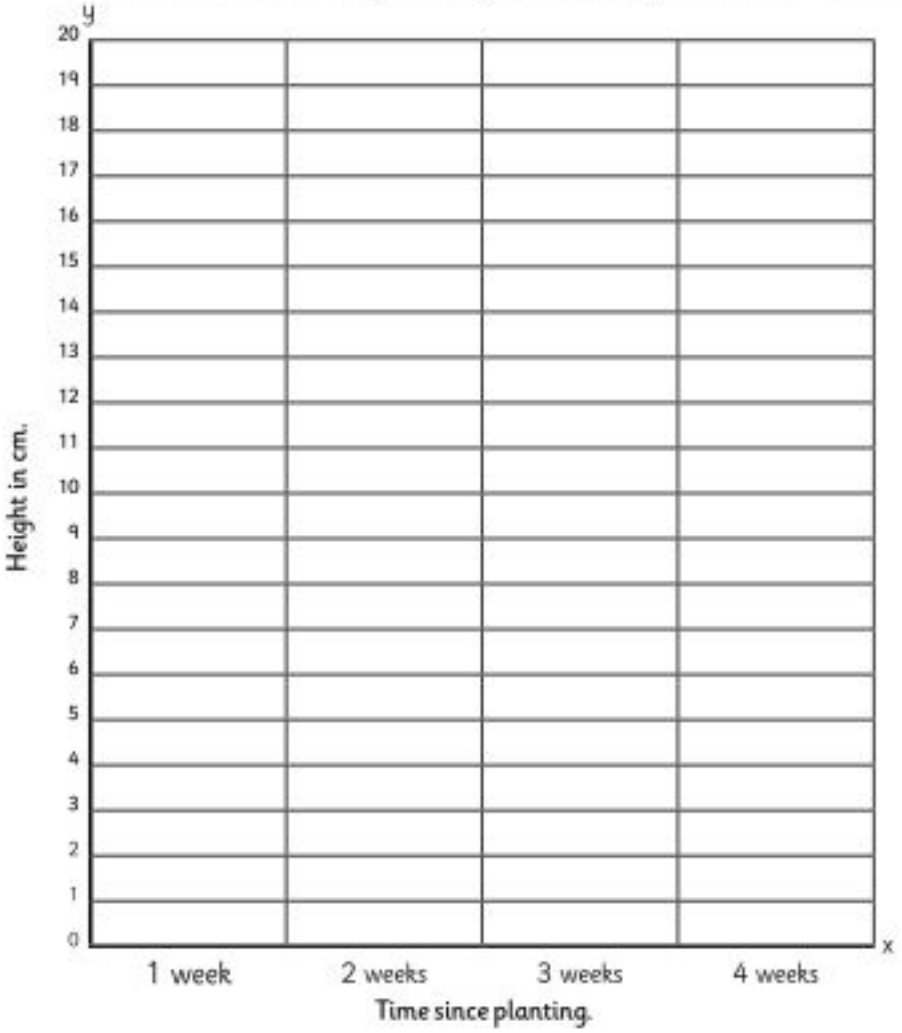
**A bar chart to show the growth of a sunflower plant over 4 weeks.**



**Narcissus Growth Bar Chart**

Using the information in your Plant Growth Table, draw a bar chart to show the height of your narcissus plant each week.

A bar chart to show the growth of a narcissus plant over 4 weeks.




**Exit Ticket**
**Plants Quiz**

As I read out a question, write A, B or C depending on which you think is the correct answer.

Are you an expert Gardner?