

TEACHER NOTES

Firstly, a big THANK YOU for purchasing this product. Please checkout my store for more products and follow me for updates.

A garden is a grand teacher. It teaches patience and careful watchfulness; it teaches industry and thrift; above all it teaches entire trust” Quote by Gertrude Jekyll

Creating a school garden is becoming an increasing popular activity school activity. Instead of just buying some plants and getting your students to plant them why not involve your students in the planning process and get some real learning happening. That's what this resource will help you do with a mix of science and math based activities. It is up to you which activities you do first, I prefer mixing them up a bit.

When are ready have the students work in pairs or small groups to plan their section of the garden and complete the plan your garden sheets. Before the students draw their planned garden you may need to explain scale to them and then set the appropriate scale for your garden. How you then plant the garden is up to you – perhaps work with small groups at lunch time or even better get some of your parents into help and increase the home-school link.

The plants and prices used here were gotten from my local plant store, but this powerpoint is editable so you can put in your own plants and prices if required. Perhaps you could even provide some magazines or brochures for your students with different plants and prices. I have found that the more real life data you use the greater your students will gain from projects such as this.

There are countless possibilities for learning with gardens. More Ideas for learning with a garden can be found at the end of this resource.

If you enjoy this product please leave feedback or follow me for future updates.



WATERFALL LEARNING

PLANT NEEDS

READ THROUGH THE FOLLOWING PASSAGES AND THEN COMPLETE THE QUESTIONS AND ACTIVITY

Soil

Soil, dirt, brown stuff, whatever you call it soil is one of the most important things a plant needs to grow. It is where the plants roots grow which help hold the plant in place. These roots can then absorb nutrients and water from the ground to help grow the plant and keep it strong.

Soil is filled with many nutrients such as little bits of nitrogen, potassium, and calcium – and just like we need a variety of food most plants need a variety of nutrients. For the roots to be able to grow through the soil it needs to be not too hard as this makes it difficult for the roots to grow through.



Sunlight

All plants need the energy and heat from the sun to survive. They use this energy and heat to help them grow by making their own food energy in their leaves. The amount of sun a plant gets needs to be just right. Not enough sun will stop a plant growing but too much sun can dry out the a plant and the soil around it.

Air: Carbon Dioxide

The air around us is actually made up of a mix of gases, such as oxygen, carbon dioxide, and nitrogen. Humans breath in oxygen to help us live, we then breath out carbon dioxide. Plants also need the air to live but they take in carbon dioxide turn it into food energy and then give off oxygen. This process of plants turning carbon dioxide into food energy is called PHOTOSYNTHESIS.

Wind is also important for plants as it helps to blow the seeds and pollen of plants which allows for the plants to spread and make more of their own kind.

PLANT NEEDS



Water

Water is just as important to plants as it is to us. It comes to plants from the sky through rain and snow, from rivers, streams and lakes, or from deep underground. Water is absorbed by the plants through the plants roots. Mixed in with the water are all the nutrients that help make a plant grow. Water also helps to keep the plant flexible and moist.

When taking care of a garden or plant you need to make sure it gets the right amount of water. If it hasn't rained for a while or the ground feels dry you might need to water the plant, however you also need to be careful because too much water all the time can also hurt plants by not giving the plants roots enough air.

QUESTIONS

1. Name three nutrients found in soil _____

2. What happens to a plant if there is not enough sunlight? _____

To much sunlight? _____

3. What happens in PHOTOSYNTHESIS? _____

4. Why is wind also important for plants? _____

5. What is mixed in with the water that plants absorb through their roots? _____

6. When should you water a plant? _____

PREVIEW
THANKS FOR LOOKING

PLANT NEEDS



Water

Water is just as important to plants as it is to us. It comes to plants from the sky through rain and snow, from rivers, streams and lakes, or from deep underground. Water is absorbed by the plants through the plants roots. Mixed in with the water are all the nutrients that help make a plant grow. Water also helps to keep the plant flexible and moist.

When taking care of a garden or plant you need to make sure it gets the right amount of water. If it hasn't rained for a while or the ground feels dry you might need to water the plant, however you also need to be careful because too much water all the time can also hurt plants by not giving the plants roots enough air.

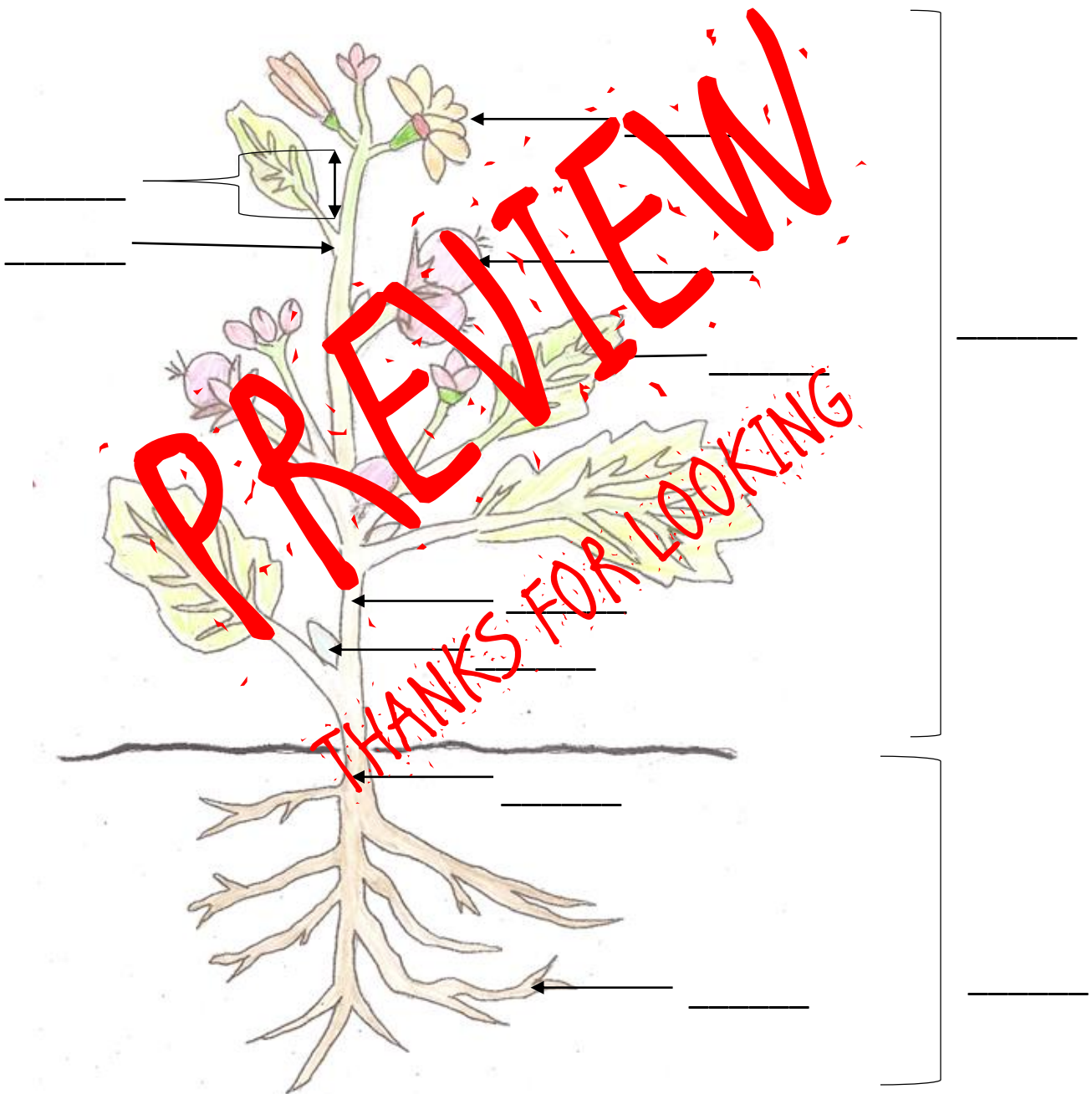
QUESTIONS

1. Name three nutrients found in soil: **nitrogen, potassium, and calcium**
2. What happens to a plant if there is not enough sunlight? **Not enough sun will stop a plant growing.**
Too much sunlight? **Too much sun can dry out the a plant and the soil around it**
3. What happens in PHOTOSYNTHESIS? **Carbon dioxide is turned into food energy – oxygen is given off.**
4. Why is wind also important for plants? **It helps to blow the seeds and pollen of plants which allows for the plants to spread and make more of their own kind.**
5. What is mixed in with the water that plants absorb through their roots? **Nutrients**
6. When should you water a plant? **If it hasn't rained for a while or the ground feels dry.**

PLANT PARTS

Use the description of each of the parts below to label the diagram

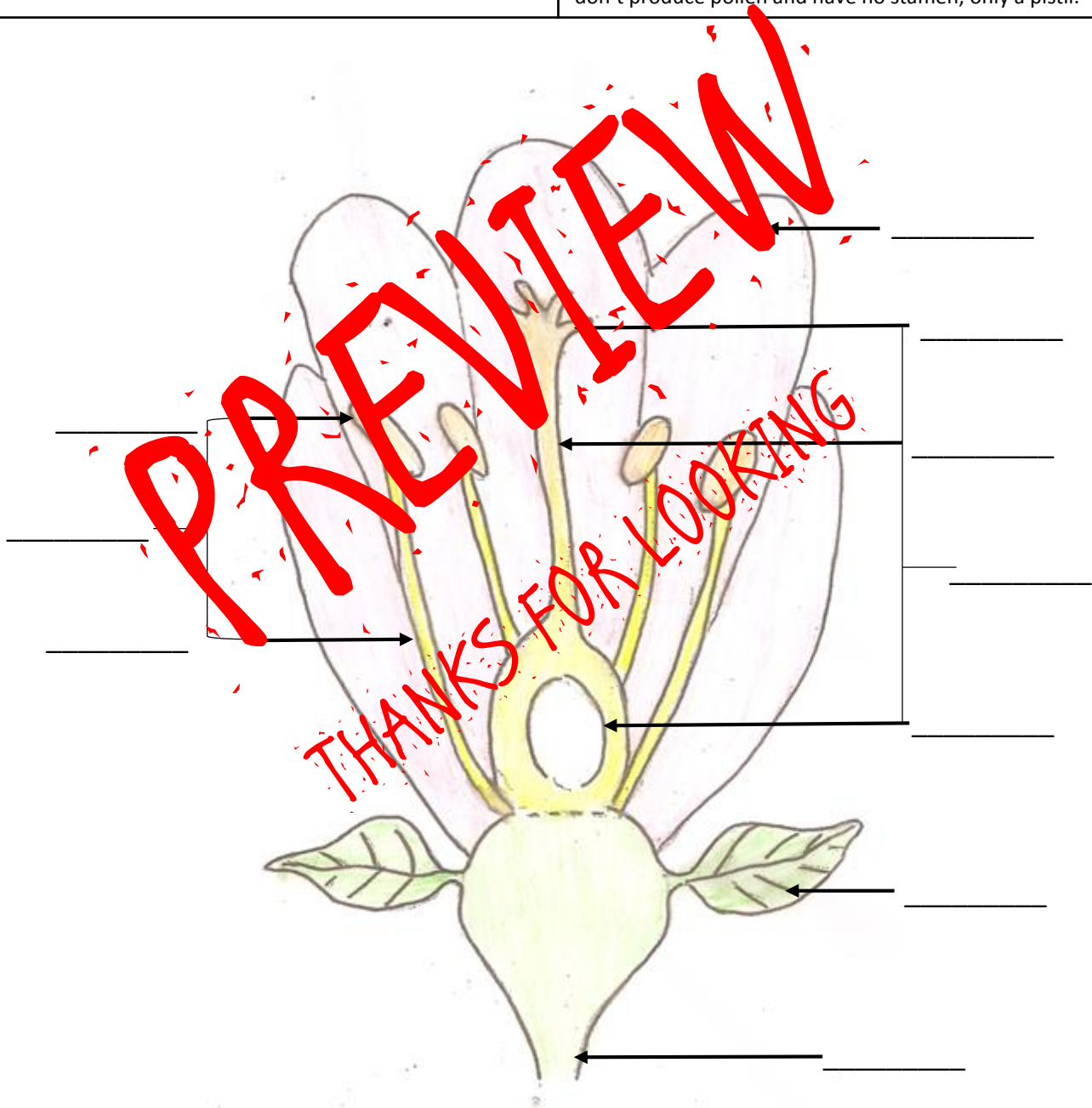
Flower: Flowers are used to help attract pollinators such as bees to the plant – they are where the seeds get made.	Primary Root: This is the main biggest root which the other roots come off.
Bud: A bump or small ball from which plant parts such as leaves or flowers can grow.	Leaf: Leaves turn carbon dioxide and sunlight into oxygen and food energy in a process called photosynthesis.
Node: The base or start of where a leaf or branch starts to grow off the stem. Plants have many nodes.	Stem: The main support of the plant. Stems also allow water, food and nutrients to travel around the plant.
Secondary Root: These roots come off the main primary root and help absorb water and nutrients from the soil.	Fruit: Once a flower has been pollinated the petals fall off and a fruit develops. The fruit hold the seeds.
Shoot System: This is all parts of the plant that is above the soil such as the stem, leaves and flowers.	Root System: This is all parts of the plant that is in the soil such as the roots.
Internode: Part of the stem and the distance between one node from another node.	



FLOWER POWER

Use the description of each of the parts below to label the diagram

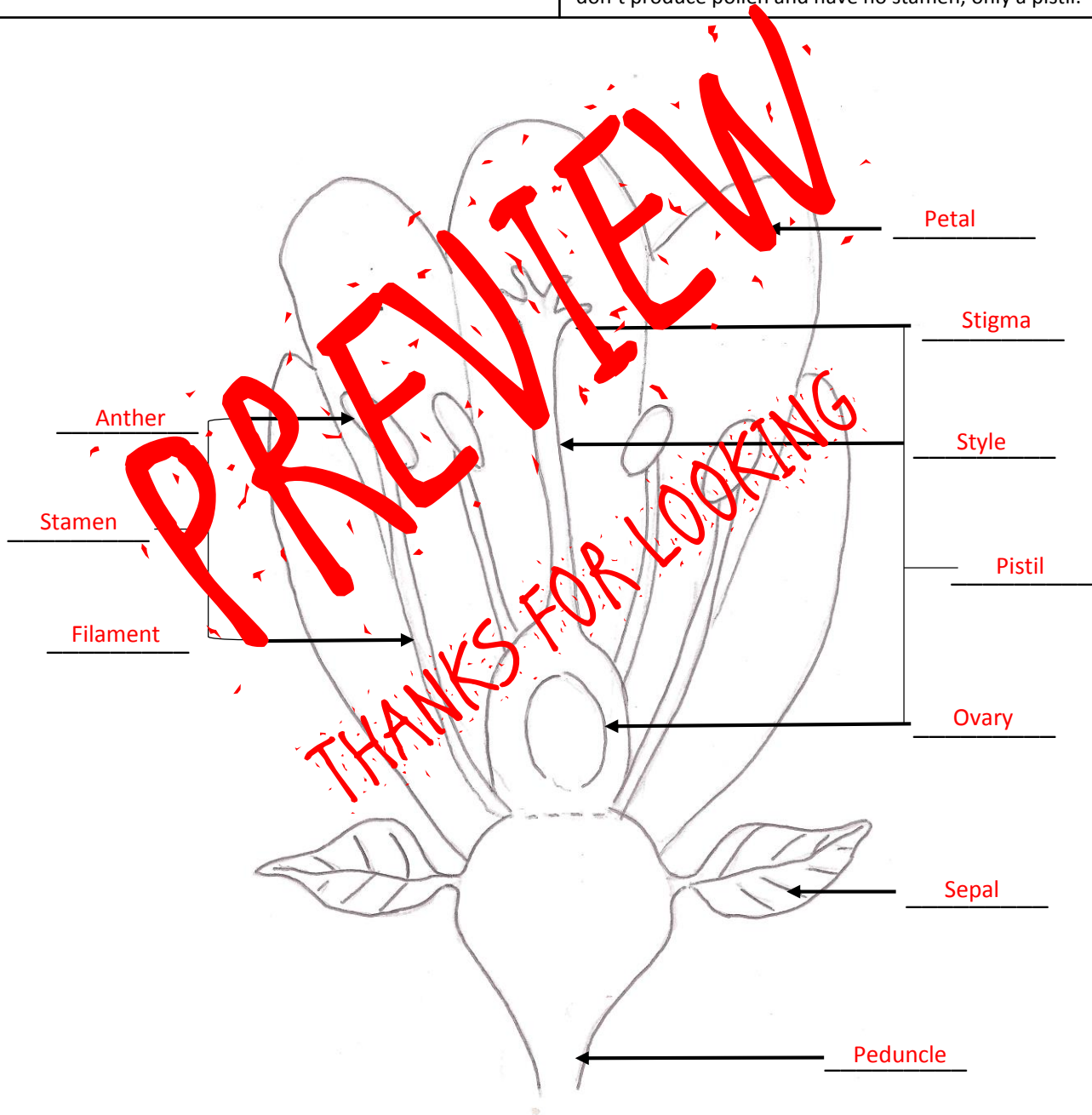
Peduncle: Connects the flower to the rest of the plant – the stalk of the flower.	Petal: These are usually brightly coloured to attract pollinators such as bees and insects to the flower.
Ovary: The enlarged middle part of a flower which usually develops into a fruit after the flower is pollinated.	Style: Part of the pistil. The long bit in the middle which connects the stigma with the ovary.
Sepal: These can be leaf like and are the outer part of flower (usually at bottom). They wrap around a flower or bud before it is fully developed and opened up.	Pistil: Contains the ovary the style and the stigma. This is the female part of the flower used for capturing pollen from other flowers and using it to produce seeds.
Stigma: This is the top part of the pistil and is used to receive the pollen from other plants.	Filament: The narrow part of the stamen which holds up the anther.
Anther: This is at the top of a filament and is the part of the stigma where pollen is produced.	Stamen: Contains the filaments and anthers. This is the male part of the plant and is used for making pollen to spread to other flowers. Some flowers are only female so don't produce pollen and have no stamen, only a pistil.



FLOWER POWER

Use the description of each of the parts below to label and then colour in the diagram

Peduncle: Connects the flower to the rest of the plant – the stalk of the flower.	Petal: These are usually brightly coloured to attract pollinators such as bees and insects to the flower.
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SEED TRANSPORTATION

Seeds need to get away or disperse from their parent plants to stop overcrowding of trees and to create new colonies. Some main ways seeds disperse from their parent tree are listed below;

Wind: Some seeds have 'wings' or other features which help the wind to blow the seed into a new area.

Water: Some plants, such as a water lily, use water to disperse their seeds. Some fruit is water proof and can float holding the seeds inside.

Animals: Many seeds are dispersed by animals. Some seeds are dispersed by animals taking them for food. Other seeds are sticky or have hooks, this allows them to stick to animals and be carried away.

FIND AND EXAMINE THREE SEEDS

Seed 1 - Draw

How do you think this seed is dispersed? _____

What features of the seed make you think that? (e.g. wings? hooks?)

Seed 2 - Draw

How do you think this seed is dispersed? _____

What features of the seed make you think that?

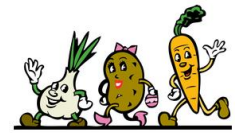
Seed 3 - Draw

How do you think this seed is dispersed? _____

What features of the seed make you think that?

PREVIEW
THANKS FOR LOOKING

Area Questions



Before we can plan and plant our garden we need to make sure we need to make sure our garden is divided up evenly between the groups and that we can fit all the plants in the space available. To do this we need to have a good understanding of how to calculate area.

Area is the space that something covers over a flat ground.

Perimeter is distance around the outside of something

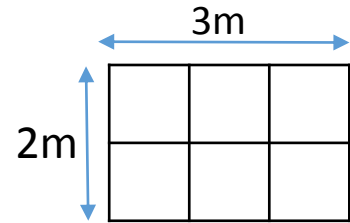
Area can be calculated by multiplying length by width.

Perimeter can be calculated by adding up the length of all the sides.

For example; this shape has an **area** of 6m.

$$2\text{m} \times 3\text{m} = 6\text{m}$$

(width) x (length)



It has a **perimeter** of: $3\text{m} + 2\text{m} + 3\text{m} + 2\text{m} = 10\text{m}$

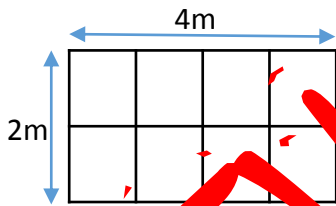
Hint to check if you have got the right amount of area count the number of the squares in the shape, – e.g. there are 6 squares in the shape above.

Farmer Fred had 6 empty garden boxes and wanted to plant some vegetables in them, but first he needs to work out the size (area) and perimeter of his garden and he needs your awesome help.

Garden box 1.
length x width = area

___ x ___ = ___

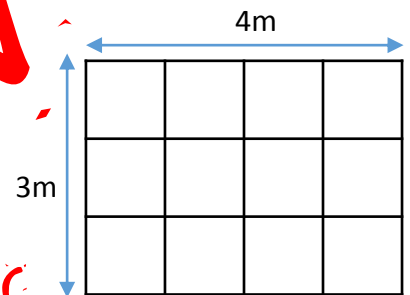
Perimeter: _____



Garden box 2.
length x width = area

___ x ___ = ___

Perimeter: _____



Garden box 3.

Area:

___ x ___ = ___

Perimeter: _____

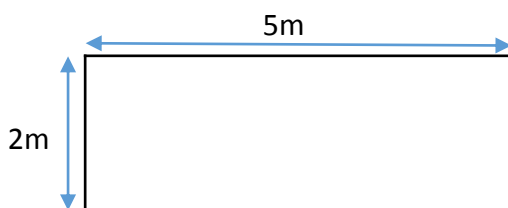
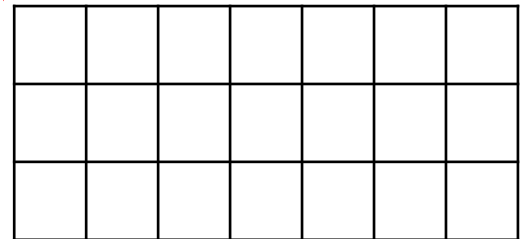


Garden box 4:

Area:

___ x ___ = ___

Perimeter: _____



Garden box 5. Area: ___ x ___ = ___
Perimeter: _____

Garden box 6.

Area:

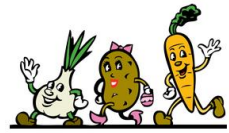
___ x ___ = ___ 3m

Perimeter: _____



PREVIEW
THANKS FOR LOOKING

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Perimeter is distance around the outside of something

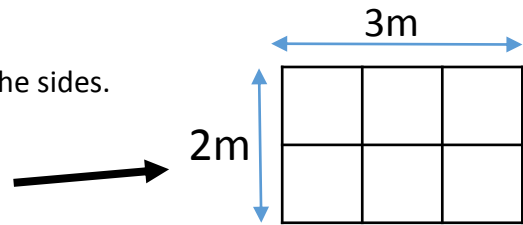
Area can be calculated by multiplying length by width.

Perimeter can be calculated by adding up the length of all the sides.

For example; this shape has an area of 6m.

$$2\text{m} \times 3\text{m} = 6\text{m}$$

(width) x (length)



It has a perimeter of: $3\text{m} + 2\text{m} + 3\text{m} + 2\text{m} = 10\text{m}$

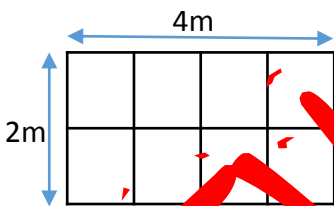
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Farmer Fred had 6 empty garden boxes and wanted to plant some vegetables in them, but first he needs to work out the size (area) of his garden and he needs your awesome help.

Garden box 1.
length x width = area

$$4\text{m} \times 2\text{m} = 8\text{m}^2$$

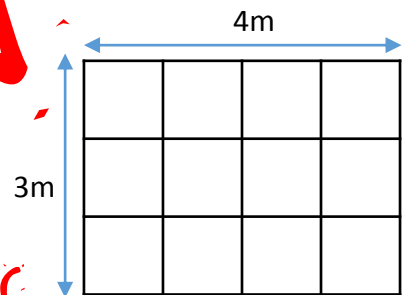
Perimeter: 12m



Garden box 2.
length x width = area

$$3\text{m} \times 3\text{m} = 12\text{m}^2$$

Perimeter: 14m



Garden box 3.

$$4\text{m} \times 5\text{m} = 20\text{m}^2$$

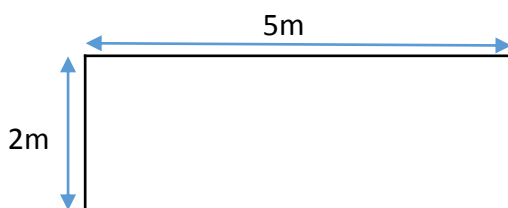
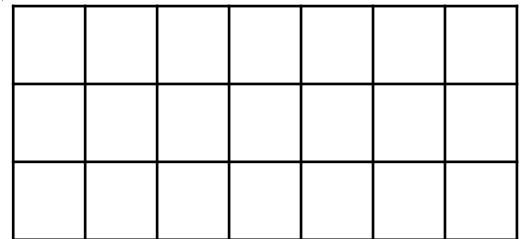
Perimeter: 18m



Garden box 4.

$$7\text{m} \times 3\text{m} = 21\text{m}^2$$

Perimeter: 20m

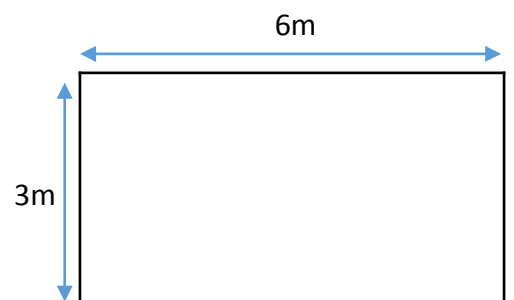


Garden box 5. $5\text{m} \times 2\text{m} = 10\text{m}^2$
Perimeter: 14m

Garden box 6.

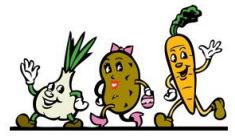
$$6\text{m} \times 3\text{m} = 18\text{m}^2$$

Perimeter: 18m



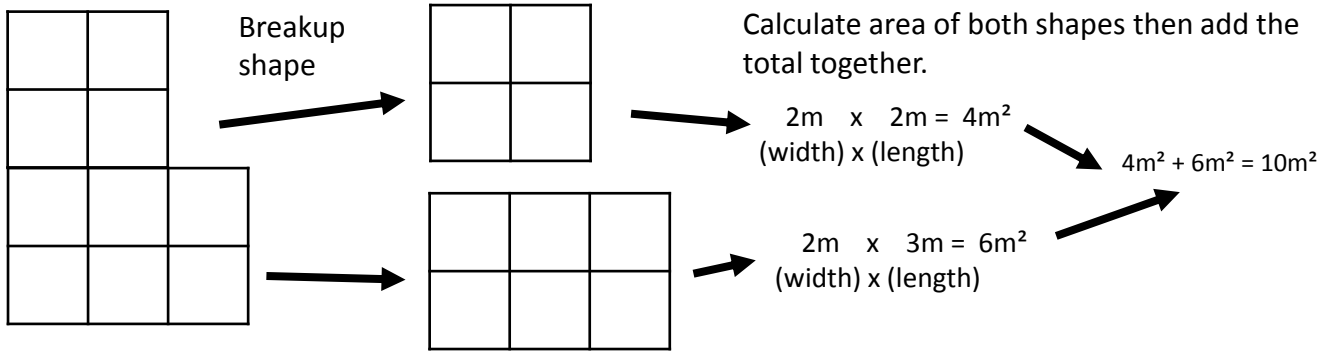
PREVIEW
THANKS FOR LOOKING

Irregular Shape Area



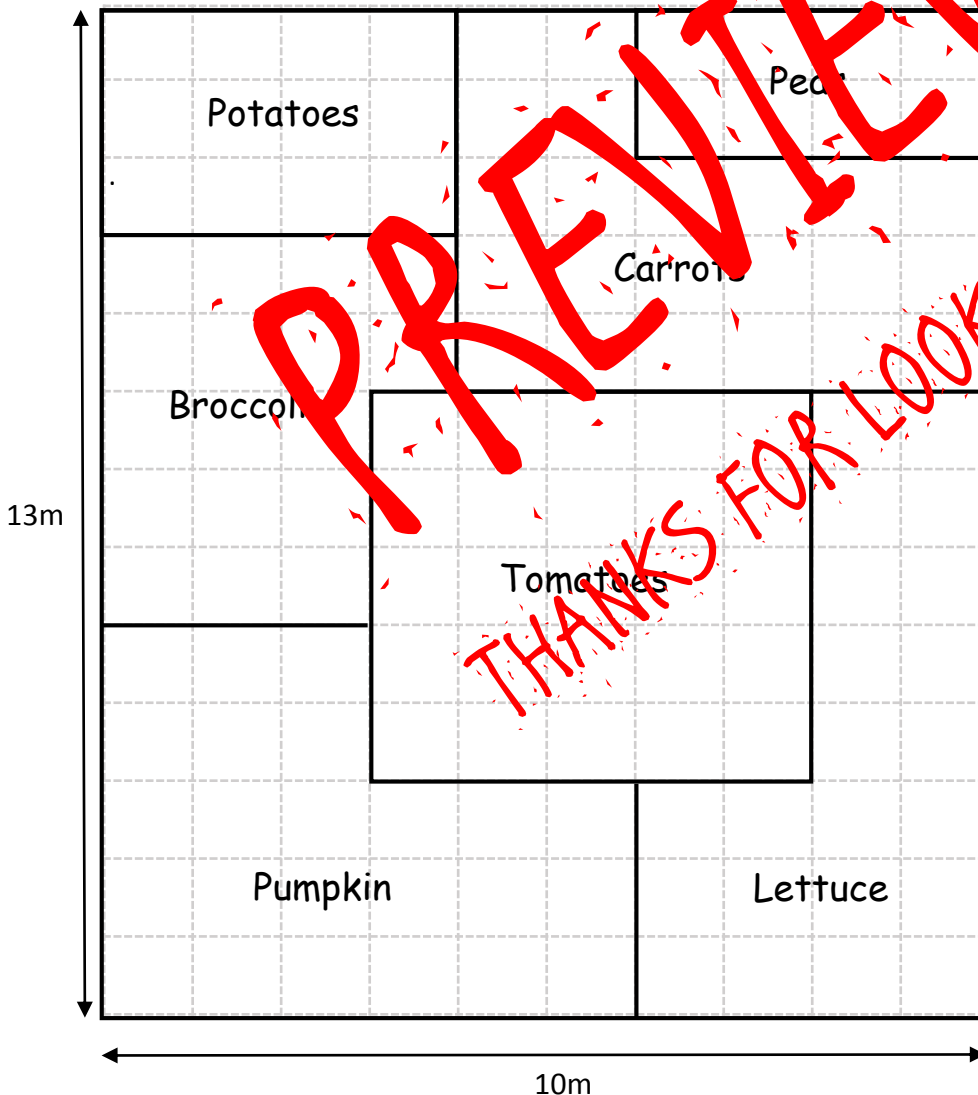
Sometimes we have to calculate the area of shapes that aren't a square or rectangle. To do this try breaking up the shape up into bits so they are easier to calculate, like in the example bellow.

This shape can be broken up into two parts to make calculating the area easier.



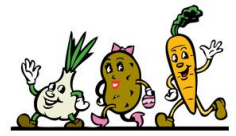
Hint to check if you have got the right answer count the number of the squares in the shape.

Farmer Fred planted his garden box with the following vegetables below. Work out the area that each of the vegetable took up.



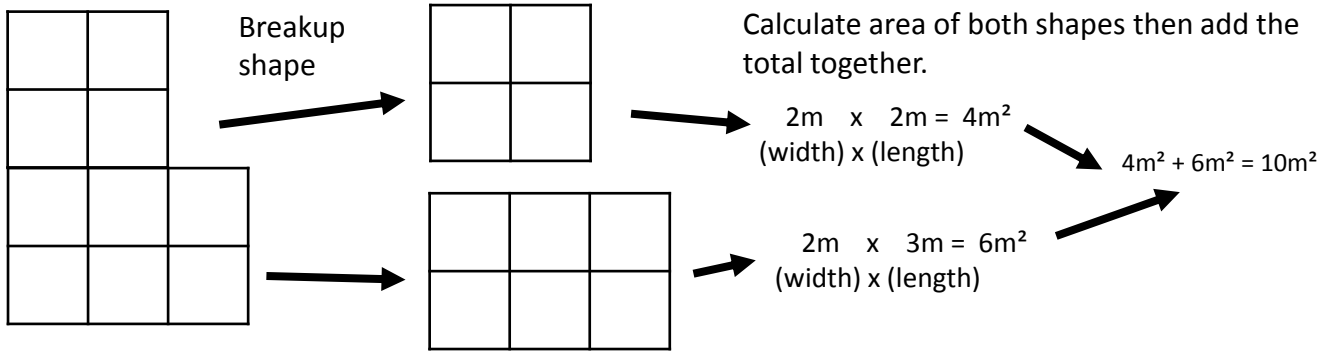
Potatoes:
Carrots:
Peas:
Tomatoes:
Lettuce:
Pumpkin:
Broccoli:

Irregular Shape Area



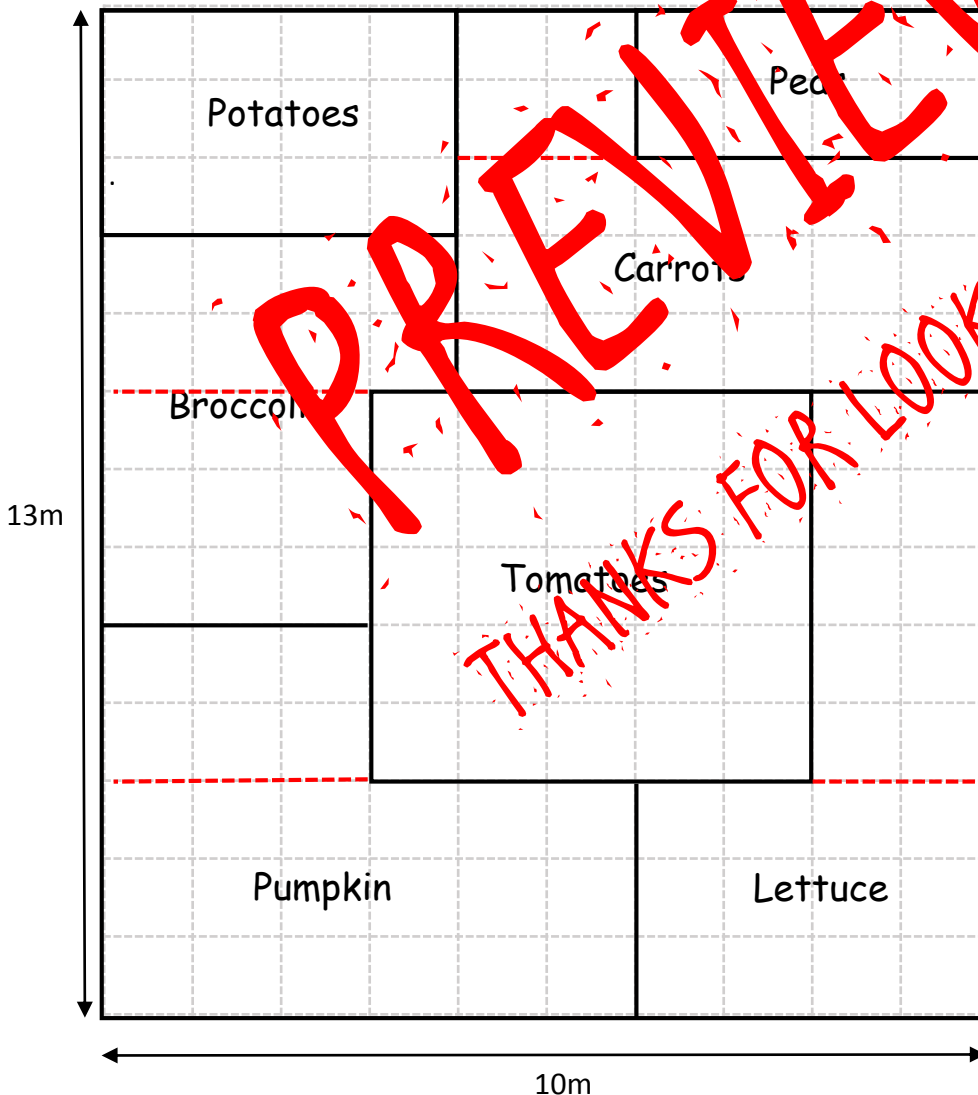
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Farmer Fred planted his garden box with the following vegetables below. Work out the area that each of the vegetable took up.



Potatoes: $4\text{m} \times 3\text{m} = 12\text{m}^2$
Carrots: $2\text{m} \times 2\text{m} = 4\text{m}^2$ $3\text{m} \times 6\text{m} = 18\text{m}^2$ $18\text{m}^2 + 4\text{m}^2 = 22\text{m}^2$
Peas: $2\text{m} \times 4\text{m} = 8\text{m}^2$
Tomatoes: $5\text{m} \times 5\text{m} = 25\text{m}^2$
Lettuce: $2\text{m} \times 5\text{m} = 10\text{m}^2$ $3\text{m} \times 4\text{m} = 12\text{m}^2$ $10\text{m}^2 + 12\text{m}^2 = 22\text{m}^2$
Pumpkin: $2\text{m} \times 3\text{m} = 6\text{m}^2$ $3\text{m} \times 6\text{m} = 18\text{m}^2$ $18\text{m}^2 + 6\text{m}^2 = 24\text{m}^2$
Broccoli: $2\text{m} \times 4\text{m} = 8\text{m}^2$ $3\text{m} \times 3\text{m} = 9\text{m}^2$ $8\text{m}^2 + 9\text{m}^2 = 17\text{m}^2$

PREVIEW

THANKS FOR LOOKING

AN AWESOME YARD

Every good garden needs to be in an awesome backyard. Design your own backyard with anything you want in it – you just need to work out the area of everything you put in. Draw it below and then work out the areas of each feature you put in. What's going to be in your yard? A bench? A mini football pitch? A spa pool? – It's up to you!



PREVIEW
THANKS FOR LOOKING

Feature 1: _____ Area:	Feature 2: _____ Area:
Feature 2: _____ Area:	Feature 2: _____ Area:
Feature 2: _____ Area:	Feature 2: _____ Area:

A GARDEN TO SHARE??

Gardens are great, but just like many things we sometimes have to share them. To find out how much area each student gets we need to first work out the total area of the garden.

Go and measure the width and length of your garden so you can work out the total area!

Length = _____

Width = _____



Length x width = area

_____ x _____ =



If you had to share the garden between 4 people each person would get a quarter of the area each to work with.
← Draw the box divided into quarters.
How much area would each person get?



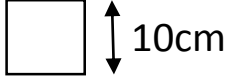
If you had to share the garden between 10 students each person would get a tenth of the area each to work with.
← Draw the box divided into tenths.
How much area would each person get?

How many students are in your class? If everyone got a bit of the garden to work with how much area would each person get? (Your teacher might let you use a calculator – maybe).

Are you working in groups or pairs? If so how many groups are there? How much area of garden will each group get to work with?

PLAN YOUR GARDEN

Use this planning sheet to plan which plants you want in your garden. Use the plant sheets to find out how much area each plant needs to grow. If you don't give your plant enough space or area to grow they may not survive. Make sure you don't go over budget also or you will make your teacher broke! – Fill out the budget sheet as you plan.

1. Draw the outline of your garden. 1 box side = 10cm in real life 
2. Add in the plants you want and fill out the budget sheet – calculate area and cost.









A large grid for drawing the garden outline and adding plants. The grid is 20 squares wide and 20 squares high. A large red watermark is overlaid on the grid, reading "PREVIEW" in a large, bold, sans-serif font, and "THANKS FOR LOOKING" in a smaller, bold, sans-serif font below it. The watermark is tilted diagonally from the bottom-left towards the top-right.

PLAN YOUR GARDEN

(Plant Sheet Vegetables)

Vegetables: Option 1: (6 in a small pack for: \$3)

Option 2: (Four 6 pack plants for \$13)

Cauliflower (40cm by 40cm) 	Beetroot (25cm by 30cm) 	Broccoli (40cm by 40cm) 
Beans/Peas (20cm by 50cm) 	Lettuce (20cm by 30cm) 	Silverbeet (40cm by 30cm) 



Single Larger Vegetable plants: \$2.50 single or four for \$8.

Courgette (50cm by 60cm) 	Capsicum Peppers (40cm by 70cm) 	Tomato (60cm by 60cm) 
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Herbs: \$4 on three for \$10
(All 30cm by 30cm)

Sage 	Mint 	Parsley 	Chives 
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Other: \$2 Single plant

Pumpkin (70cm by 50cm) 	Potato (30cm by 40cm) 
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PLAN YOUR GARDEN

(Plant Sheet Flowers)


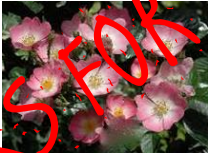

Potted Colour: \$2 each or 6 for \$8.50 (spacing 30cm by 20cm)

<p>Pansies</p> 	<p>Marigolds</p> 	<p>Premulas</p> 
<p>Dianthus</p> 	<p>Flowering Kale</p> 	

Super packs of 6 plants: \$7 per pack of 6 (spacing 20cm by 20cm per plant)

<p>6 Begonias</p> 	<p>Circaea Silverdust</p> 
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Bigger Flowers: \$4.50 each or 4 for \$16 (spacing 40cm by 40cm per plant)

<p>Perennial</p> 	<p>Rose-Pink Ballerina</p> 	<p>Lavender</p> 
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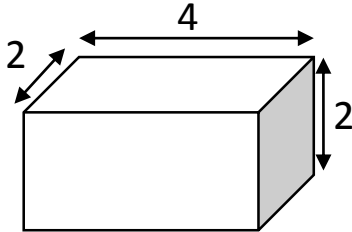
What other flowers can you find? How do they cost and how much space do they need? – search online or ask your teacher if you can't find

<p>Flower: _____ Cost: _____ (Draw Below)</p> <p>Area it needs: _____</p>	<p>Flower: _____ Cost: _____ (Draw below)</p> <p>Area it needs: _____</p>
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ADDING THE FERTILIZER

Before we can plan and plant our garden we need to make sure we need to make sure our garden is divided up evenly between the groups and that we can fit all the plants in the space available. To do this we need to have a good understanding of how to calculate area.

Volume is the amount of space that something occupies
It can be calculated by multiplying length by width by height.

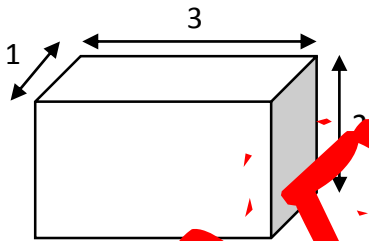


For example; this shape has an area of 16^3 .

$$2 \times 4 = 8 \quad 8 \times 2 = 16$$

(width) x (length) x (height) = volume

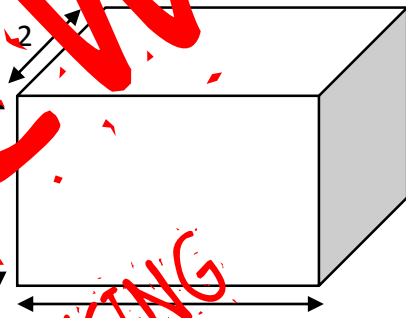
Farmer Fred has some little garden boxes which he wants to find out the volume of soil each has. For each 2cm^3 of soil he wanted to add 1 worm from his worm farm. (Worms help to break up the soil making it easier for his plants to grow.)



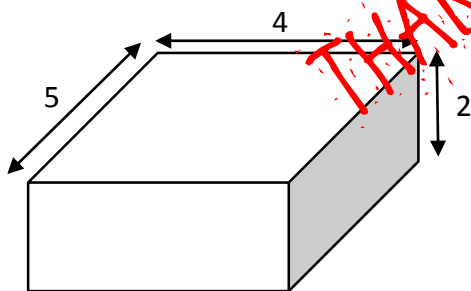
Garden box 1.
length x width = area x height = volume

$$3 \times \underline{\quad} = \underline{\quad} \times 2 = \underline{\quad}$$

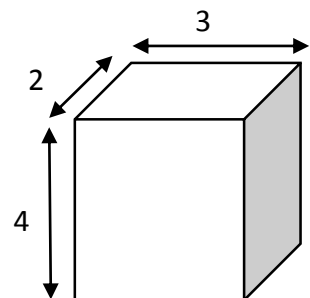
How many worms? _____



Garden box 2.
How many worms? _____



Garden box 3.
How many worms? _____



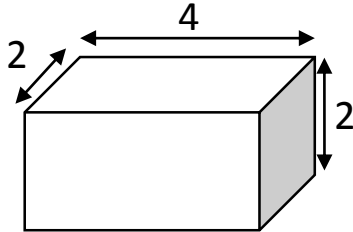
Garden box 4.
How many worms? _____

PREVIEW
THANKS FOR LOOKING

ADDING THE FERTILIZER

Before we can plan and plant our garden we need to make sure we need to make sure our garden is divided up evenly between the groups and that we can fit all the plants in the space available. To do this we need to have a good understanding of how to calculate area.

Volume is the amount of space that something occupies
It can be calculated by multiplying length by width by height.

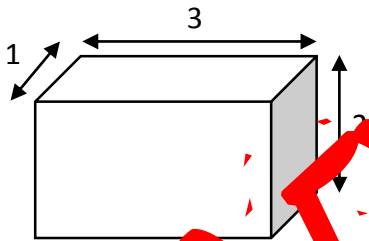


For example; this shape has an area of 16^3 .

$$2 \times 4 = 8 \quad 8 \times 2 = 16$$

$$(\text{width}) \times (\text{length}) \quad \times \quad (\text{height}) = \text{volume}$$

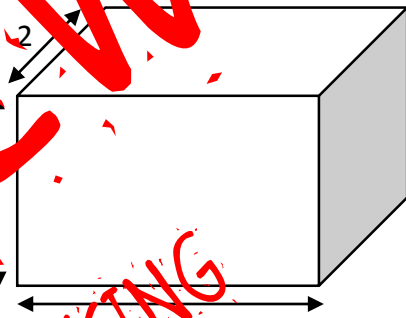
Farmer Fred has some little garden boxes which he wants to find out the volume of soil each has. For each 2cm^3 of soil he wanted to add 1 worm from his worm farm. (Worms help to break up the soil making it easier for his plants to grow.)



Garden box 1.
length x width = area x height = volume

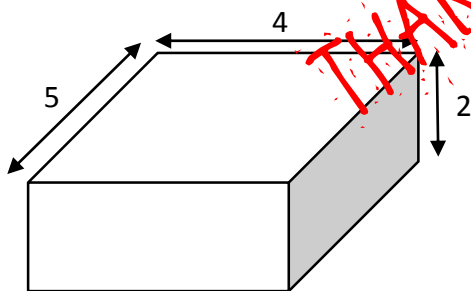
$$3 \times 1 = 3 \quad 3 \times 2 = 12^3$$

How many worms? $12 \div 2 = 6$ worms



Garden box 2.
 $2 \times 4 = 8$
 $8 \times 3 = 24^3$

How many worms? $24 \div 2 = 12$ worms



Garden box 3. $4 \times 5 = 20$
 $20 \times 2 = 40^3$

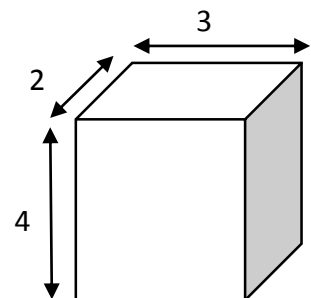
How many worms? $40 \div 2 = 20$ worms

Garden box 4.

$$2 \times 3 = 6$$

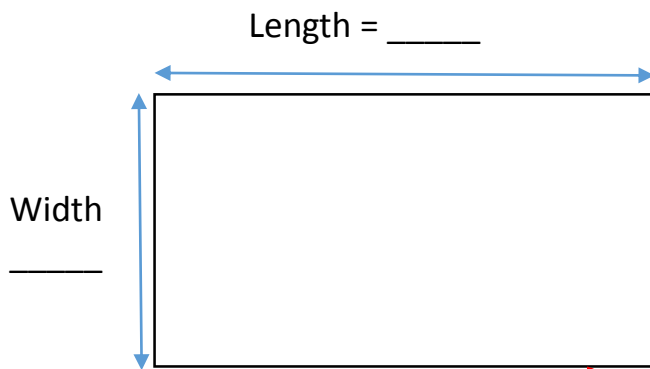
$$6 \times 4 = 24^3$$

How many worms? $24 \div 2 = 12$ worms



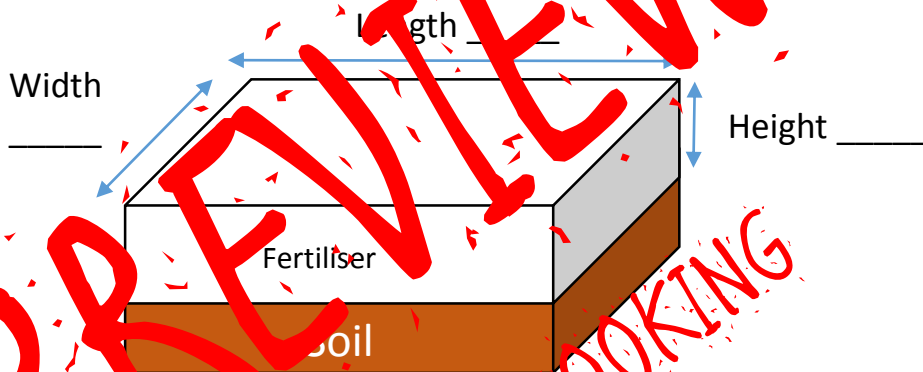
ADDING THE FERTILIZER

Measure your garden to find the area.



What is the surface area of your garden?

$$\frac{\text{Length}}{\text{Length}} \times \frac{\text{Width}}{\text{Width}} =$$



If you were going to put a layer of fertilizer 10cm deep (height) on top of your garden, what is the volume of fertiliser you would need?

Use the measurements from your garden plus a height (depth) of 10cm to work out volume

$$\frac{\text{Width}}{\text{Width}} \times \frac{\text{Length}}{\text{Length}} \times \frac{\text{height}}{\text{height}} = \frac{\text{volume of fertiliser needed.}}{\text{volume of fertiliser needed.}}$$

Now work out how much fertiliser is needed if you were going to put a 5cm deep layer over your garden

$$\frac{\text{Width}}{\text{Width}} \times \frac{\text{length}}{\text{length}} \times \frac{\text{height}}{\text{height}} = \frac{\text{volume of fertiliser needed.}}{\text{volume of fertiliser needed.}}$$

Now read the fertiliser pack and see the depth (height) of the fertiliser that you should put on your garden

$$\frac{\text{Width}}{\text{Width}} \times \frac{\text{length}}{\text{length}} \times \frac{\text{height}}{\text{height}} = \frac{\text{volume of fertiliser needed.}}{\text{volume of fertiliser needed.}}$$

GRAPHING THE GROWTH

It's amazing how plants grow over time, reaching up to try and get as much light as possible. Some plants grow quicker than others. Choose a plant to measure at regular intervals - maybe once every 2 days, once a week, or once every 2 weeks. Record the plants height and draw a graph of how the plant grows over time. Remember to tittle and label your graph.

DATE									
HEIGHT									



GARDEN POEM

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PREVIEW
THANKS FOR LOOKING