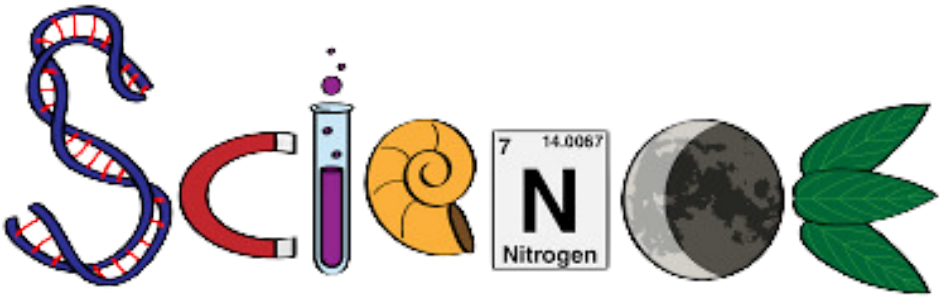
Meopham School



HOMEWORK BOOKLET

Year 7 Term 3

pH Scale **Match and Draw**

Homework 1

Draw **one** line from each substance to its pH.

Substance	pH
vinegar	0
toothpaste	1
lemon juice	2
handwash	3
orange juice	4
water	5
bleach	6
	7
	8
	9
	10
	11
	12
	13
	14

Acids, Alkalis and the pH Scale

Homework 1

1. What does the pH of a substance tell you?

_____

2. Which of the statements correctly describe a concentrated and a dilute acid and alkali? Tick **two** boxes.

- ☐ A concentrated solution is one in which the acid or alkali is mixed with a small volume of water.
- ☐ A concentrated solution is one in which the acid or alkali is mixed with a large volume of water.
- ☐ A dilute solution is one in which the acid or alkali is mixed with a small volume of water.
- ☐ A dilute solution is one in which the acid or alkali is mixed with a large volume of water.

3. Concentrated acids and alkalis are corrosive, whereas dilute acids and alkalis are often irritants.

Describe the harm that these two types of solutions could do..

concentrated solutions: _____

dilute solutions: _____

4. Indicators change colour to show whether a substance is an acid or an alkali.

Describe how universal indicator is different to litmus paper.

_____

_____

5. Match the substances to their pH by drawing a line between the name of the substance and the correct number on the pH scale.

water	hydrochloric acid	indigestion tablets

6. Complete the sentences below using the key words from the box:

Key Words			
salt	neutral	neutralisation	water

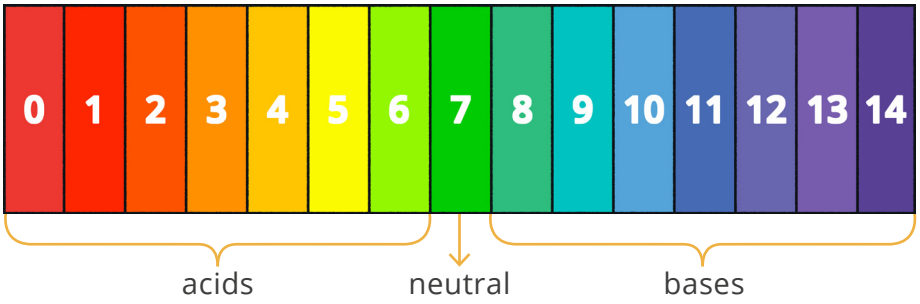
When an acid and alkali react together, the solution formed is _____.

This is called a _____ reaction. The products of this type of reaction are always a _____ and _____.

Uses of Neutralisation

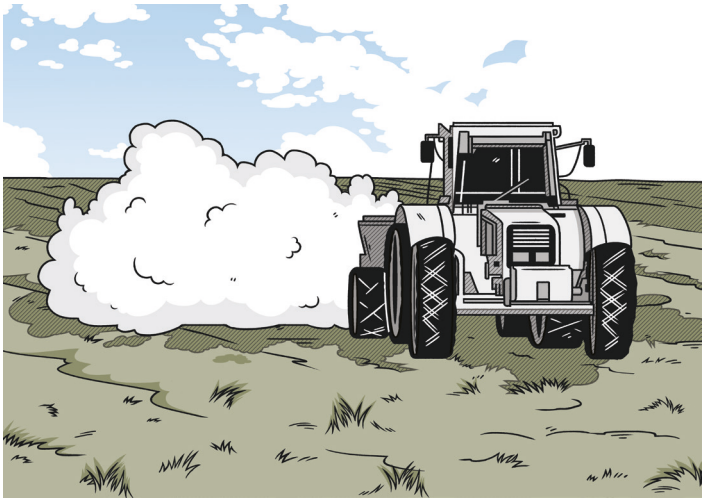
Homework 2

Neutralisation is a chemical reaction between an **acid** and a **base** that produces a salt and water. An acid is a substance with a pH value lower than 7. A base is a substance that has a pH value higher than 7 and can neutralise an acid. A base that is soluble in water is called an **alkali**. Saltwater solutions are **neutral** and have a pH value of 7, they are neither acids nor bases.



Neutralisation reactions have many useful applications in everyday life.

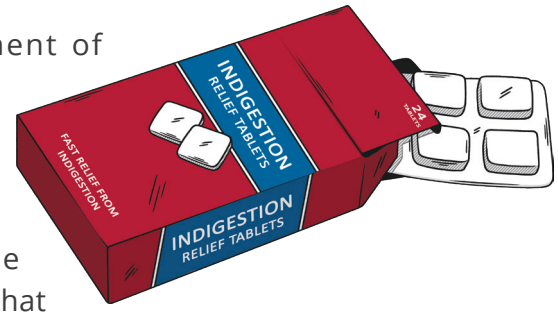
Acidic Soil and Lakes



Acid rain forms when acidic gases in the atmosphere, such as sulfur dioxide and nitrogen dioxide, dissolve in rainwater to form an acidic solution. These gases are released when fossil fuels containing impurities are burned. When acid rain falls, it may be absorbed into the soil, lowering its pH. This may lead to a decrease in the availability of nutrients, making it more difficult for plants to grow there. Useful bacteria and organisms that live in the soil also find it difficult to survive in these conditions. To solve these problems, gardeners and farmers may add slaked lime (calcium hydroxide) to the soil. Calcium hydroxide is an alkaline substance that reacts with the acid in the soil and increases its pH. This is an example of a neutralisation reaction.

Acid rain may also fall in lakes and areas of open water, making the water more acidic. This can affect the survival of plants and animals living there. This problem can also be resolved by the addition of slaked lime by boat, or from the air by being dropped from an aeroplane or helicopter.

Indigestion Tablets



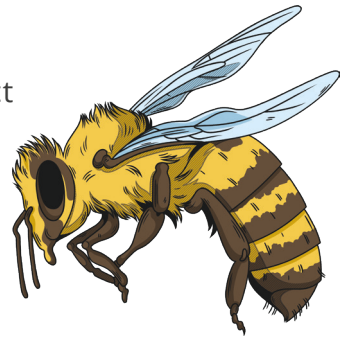
Neutralisation can also be useful in the treatment of heartburn and acid reflux. This occurs when excess stomach acid (hydrochloric acid) irritates the stomach lining or travels up towards the throat, causing a burning feeling in the chest. Stomach acid has a pH value between 1 and 2 and is corrosive. Usually, the stomach tissue is protected by a thick layer of mucus that is produced by specialised epithelial cells. However, the acid may affect the stomach if there is damage to this layer because of a bacterial infection or taking anti-inflammatory medicines. In these situations, indigestion tablets containing bases such as magnesium hydroxide and magnesium carbonate can be taken. They react with the acid in the stomach, neutralising it to form a salt and water, leading to a decrease in symptoms.

Toothpaste

The normal pH of saliva in the mouth is around 6.9. However, many of the foods and drinks that we consume contain weak acids and can change this pH value to as low as 5.5. An acidic environment can lead to tooth enamel (the strong outer layer that protects the teeth) becoming weakened and eroded. Toothpaste contains alkalis, such as sodium hydrogen carbonate (sodium bicarbonate), which can neutralise the acid, preventing tooth decay from occurring. Toothpaste also contains fluoride which strengthens enamel, making it more resistant to acid erosion. The effects of acidic food on teeth can also be reduced by drinking water during and after eating; this dilutes the acid, making it less corrosive.

Treating Stings

Neutralisation reactions are also useful in the treatment of insect stings. Bee stings are slightly acidic, with a pH value between 4.5 and 5.5. They can be neutralised using baking soda containing sodium hydrogen carbonate, which is alkaline. Wasp stings, on the other hand, are slightly alkaline and can be neutralised using vinegar which contains ethanoic acid.



Uses of Neutralisation

Homework 2

Neutralisation reactions have many useful applications in everyday life.

1. What is a neutralisation reaction?

   Tick **one** box.

   - ☐ a chemical reaction between an acid and a base
   - ☐ a chemical reaction that forms an acid
   - ☐ a chemical reaction between two neutral substances

2. Give **one** way in which slaked lime can be used to combat the effects of acid rain.

   _____

   _____

3. Indigestion tablets can be used to treat the symptoms of heartburn and acid reflux.

   a) Describe what causes heartburn and acid reflux.

   _____

   _____

   b) Describe how indigestion tablets can be used to treat the symptoms of heartburn and acid reflux.

   _____

   _____

4. Calculate the difference in pH between saliva in the mouth normally, and the pH it can drop to following consumption of acidic food and drink.

   _____

   _____

   difference in pH = _____

5. a) Describe the effect that a decrease in mouth pH can have.

   _____

   b) Complete the sentence to explain one way that toothpaste helps to protect teeth.

   Toothpaste contains _____ which _____ acids in the mouth, _____ tooth decay from occurring.

6. Describe how neutralisation reactions can be used to treat bee stings.

   _____

   _____

Naming Salts **Match and Draw**

Homework 3

Draw a line to match the reactants to the products, correctly naming the salt.

Magnesium oxide + sulfuric acid →	Silver nitrate
Calcium carbonate + hydrochloric acid →	Calcium chloride
Sodium carbonate + hydrochloric acid →	Iron sulfate
Iron oxide + sulfuric acid →	Magnesium sulfate
Silver + nitric acid →	Sodium chloride

Making Soluble Salts **Storyboard**

Number the pictures showing the stages of a method to produce pure copper sulfate crystals. Then, Number above the statements to correctly order the method.

Use a measuring cylinder to pour dilute sulfuric acid into a beaker. Gently warm the sulfuric acid using a Bunsen burner. Do not allow the acid to boil.	Add one spatula of copper oxide or copper carbonate powder to the warmed sulfuric acid. Use a glass rod to stir the powder until it dissolves. Continue heating the solution. Do not allow it to boil.	Continue adding copper oxide or copper carbonate powder and stir until no more dissolves. This means that the copper oxide or copper carbonate is in excess and the solution is saturated. Carefully remove the glass beaker from the heat.	Pour the solution through a funnel lined with filter paper to remove the undissolved copper oxide or copper carbonate powder. Collect the solution in a conical flask.

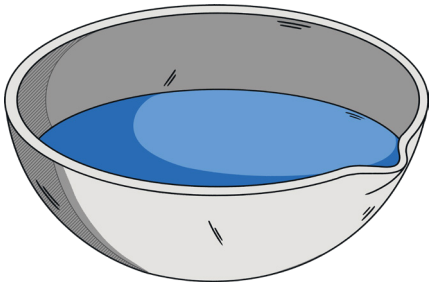
Homework 3

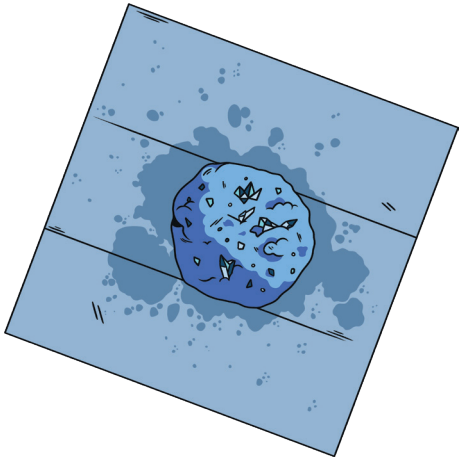
Making Soluble Salts **Storyboard**

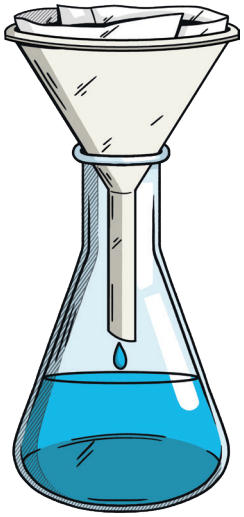
Pour the filtrate into an evaporating basin. Gently warm the solution using a Bunsen burner. Do not allow it to boil. Continue heating the solution until half of it has evaporated.	Leave the evaporating basin in a warm room overnight to allow it to crystallise. You could use an electric heater or a water bath to keep the solution warm.	Carefully pat the crystals dry using filter paper or paper towels to remove excess moisture.

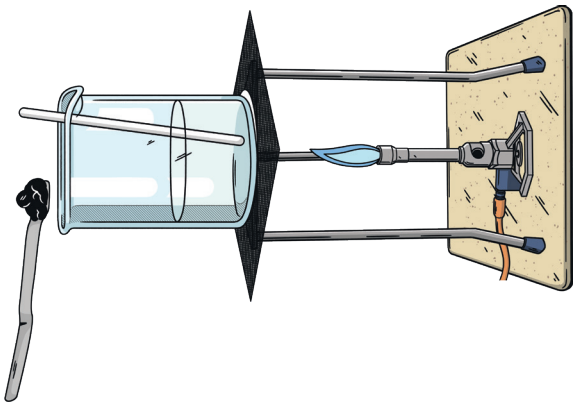
Homework 3

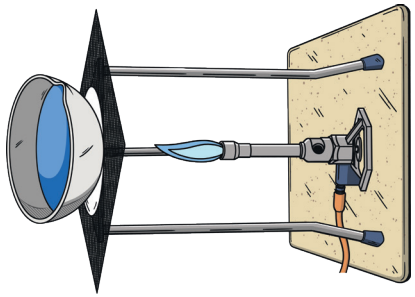
Making Soluble Salts **Storyboard**

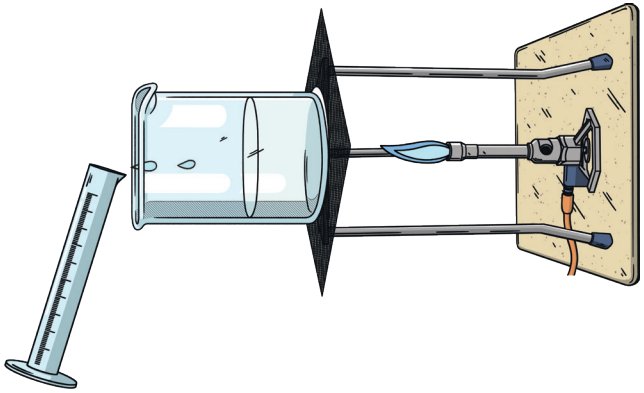










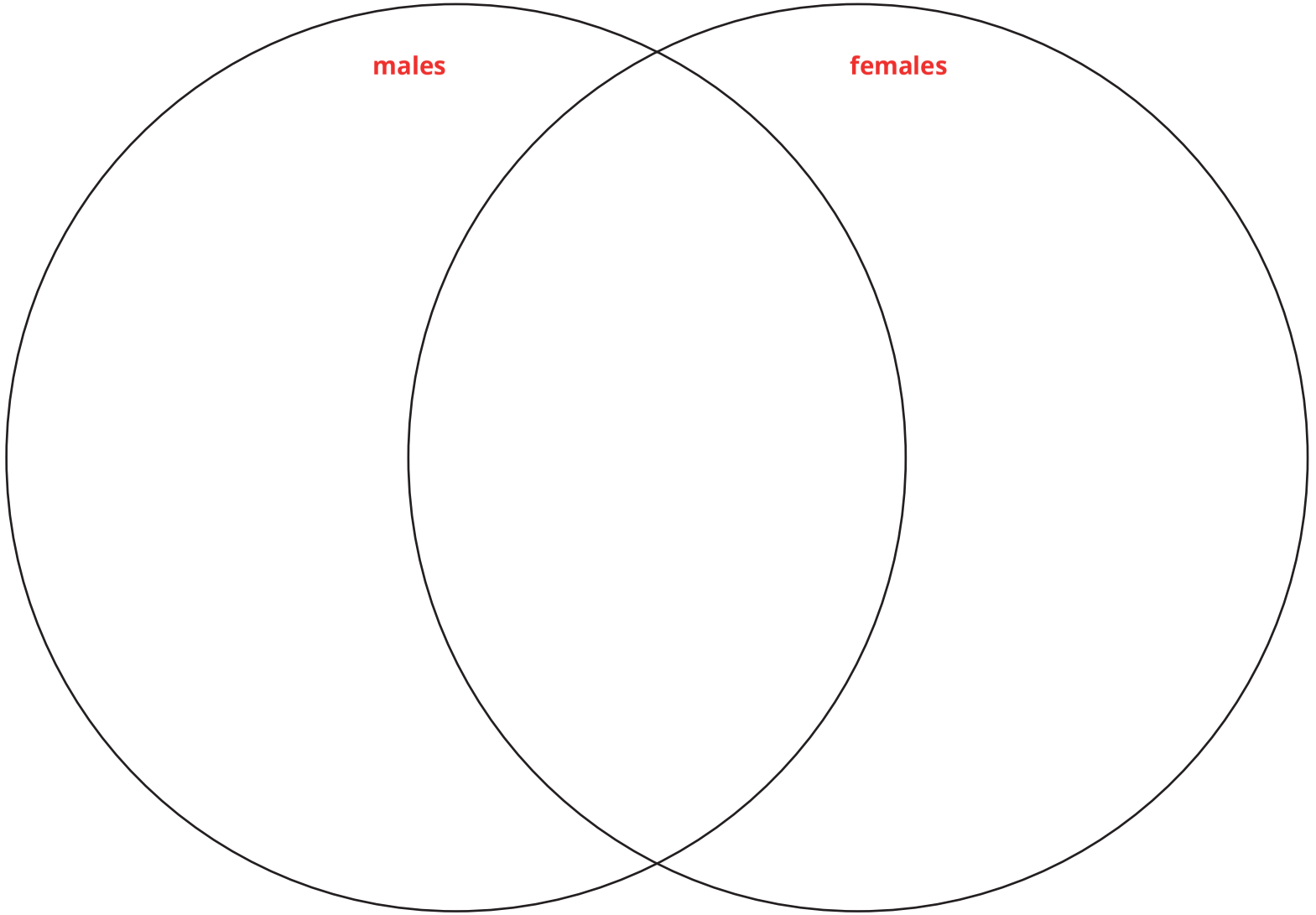


Homework 4

Puberty Changes

Sort the cards into the Venn diagram to show changes that take place in males, changes that take place in females and changes that take place in both.

- body odour becomes stronger
- breasts develop
- facial hair grows
- growth spurts
- hips widen
- increased muscle growth
- menstrual cycle starts
- mood changes
- pimples or acne
- pubic hair grows
- testes and penis get bigger
- testes start to produce sperm cells
- underarm hair grows
- vaginal discharge is produced
- voice deepens

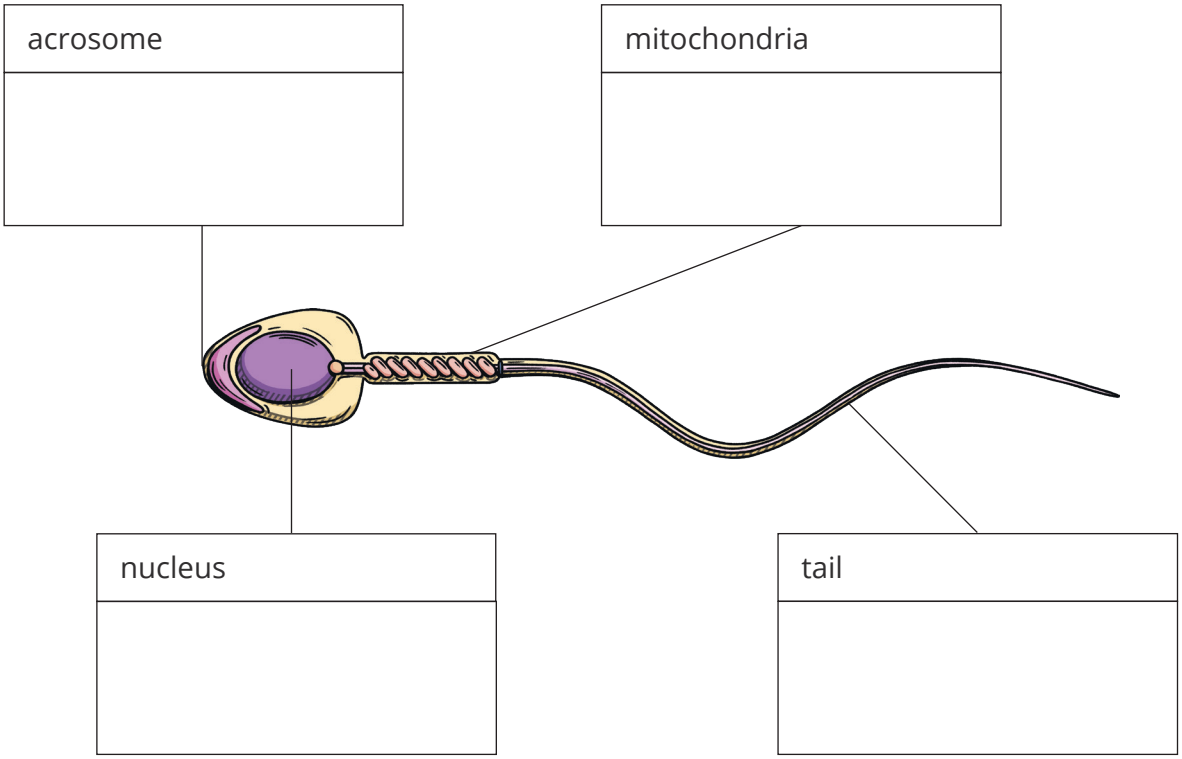


Homework 4

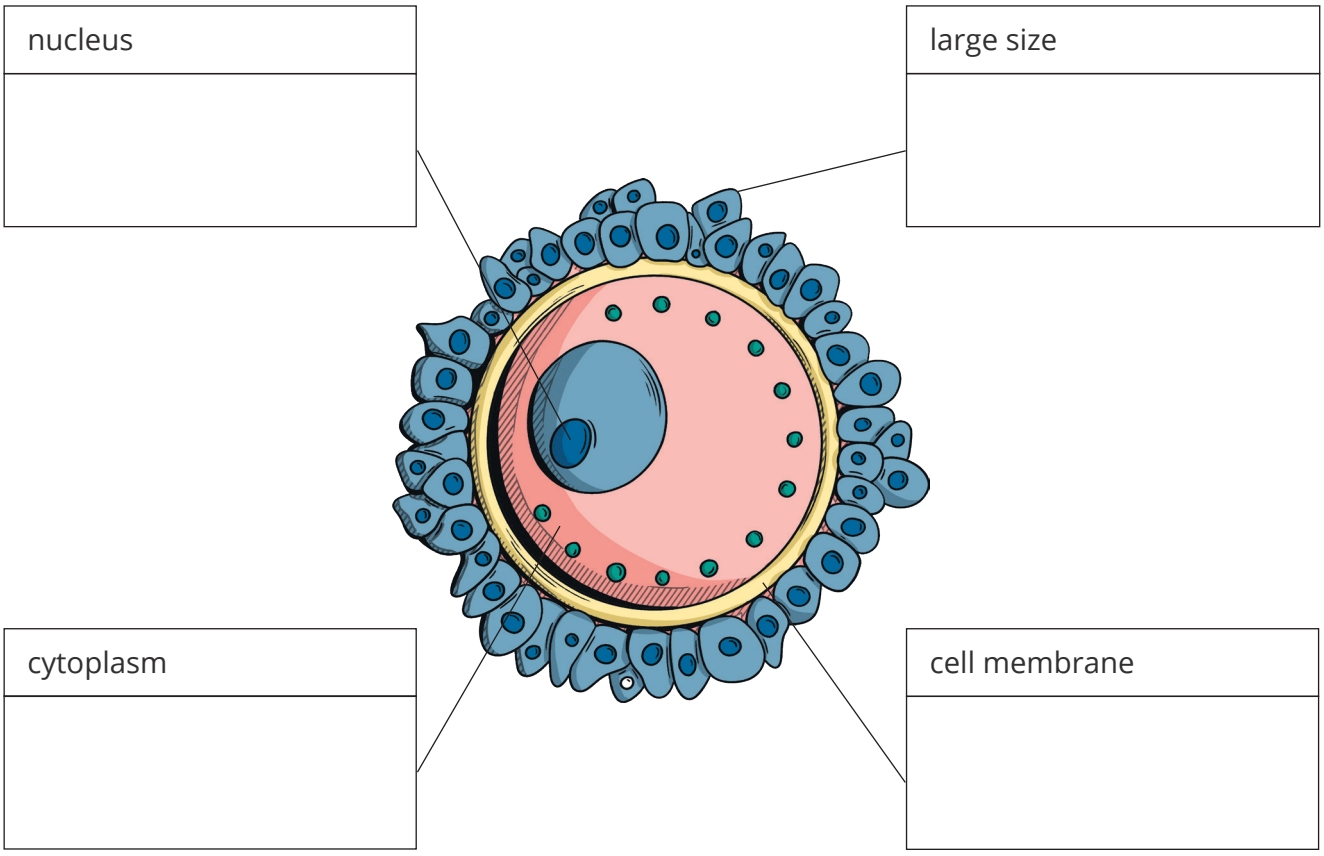
Human Sex Cells

Copy the labels in the correct positions to explain the adaptations of a sperm cell and an egg cell.

Sperm Cell



Egg Cell



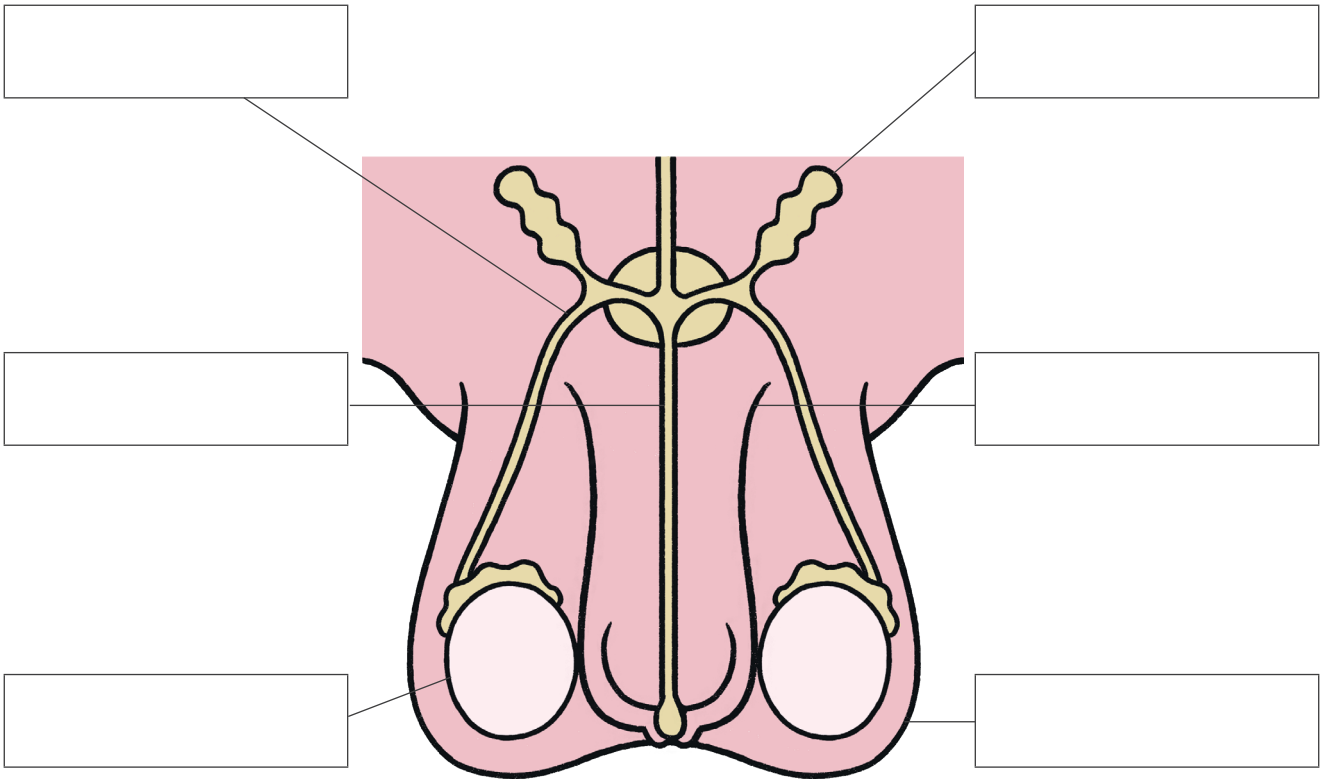
Homework 4

This part contains enzymes to digest the egg cell membrane.	This allows more space for nutrients to be stored inside the cell.
This contains nutrients to support the developing embryo.	There are many of these to release energy for movement.
This part contains genetic information from the mother.	This part contains genetic information from the father.
This allows the cell to move towards the egg cell.	This changes after fertilisation so no more sperm can enter the egg.

Male Reproductive System

Homework 5

1. Label the diagram of the male reproductive system.



2. Complete the table to show the function of each part of the male reproductive system.

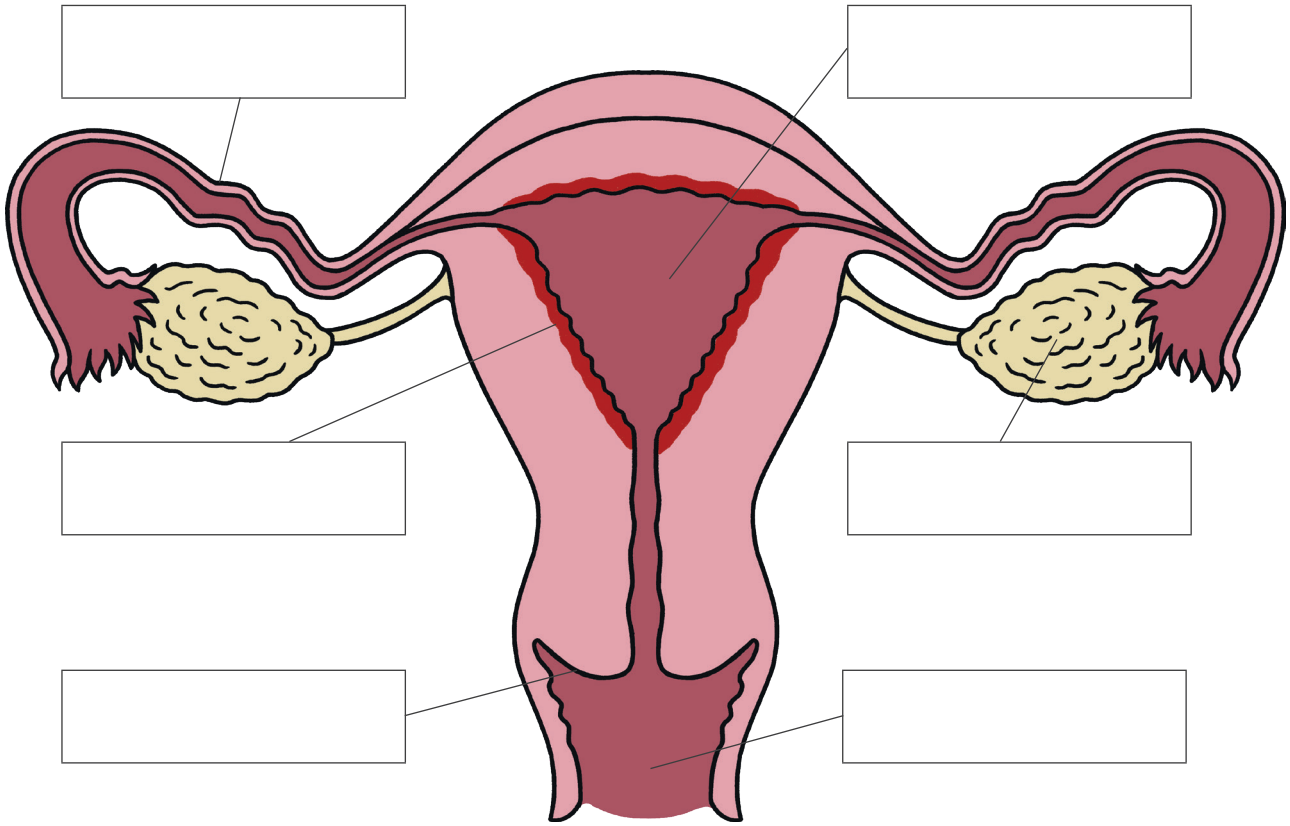
Part	Function
penis	
testis	
urethra	
scrotum	
gland	
sperm duct	

Female Reproductive System

Homework 5

1. Label the diagram of the female reproductive system using the key words in the box below.

oviduct	ovary	uterus	uterus lining	cervix	vagina



2. Complete the table to show the function of each part of the female reproductive system.

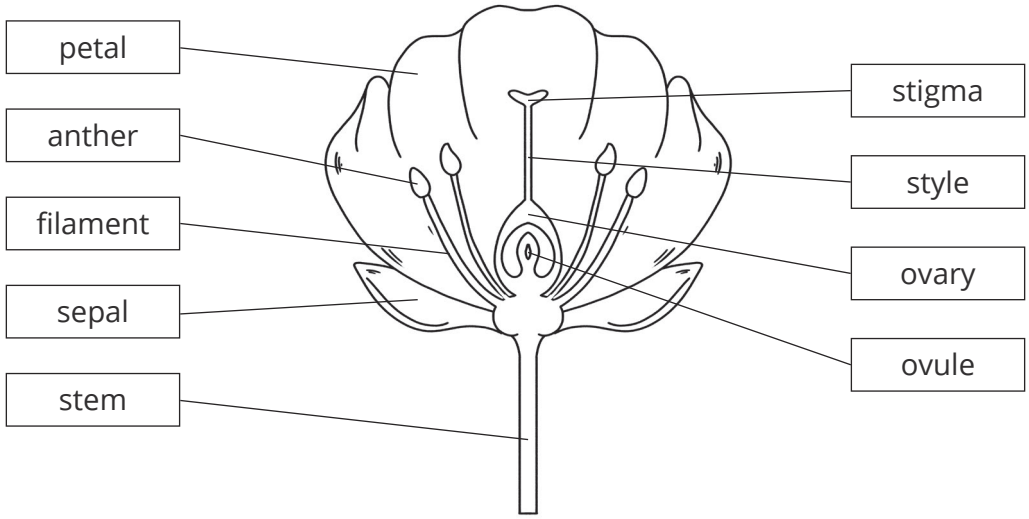
Part	Function
	A muscular tube that leads from the cervix to the outside of the body.
	A ring of muscle at the lower end of the uterus. This keeps the baby in place during pregnancy.
	Contains hundreds of undeveloped egg cells. Every month, an egg cell matures and is released.
	Where the baby develops during pregnancy.
	Carries egg cells from the ovaries to the uterus.
	A blood-rich layer of tissue in which an embryo implants. This tissue is lost each month during menstruation.

Plant Reproduction

Homework 6

Plants are living organisms. All living organisms demonstrate the seven life processes including respiration, nutrition, and excretion. Often a mnemonic is used to remember them; MRS GREN.

The diagram below shows the cross-section of a flower.



Different parts of the plant make up the male or female reproductive organs. The stamen is the collective name of the male reproductive parts and is made up of the filament and anther. The female part is named the pistil and is made up of the stigma, style, and ovary. The ovule is inside the ovary.

1. Read the description of each life process and write the name of the one being described.

_____ All living things require a source of nutrition.

_____ All living things excrete waste products.

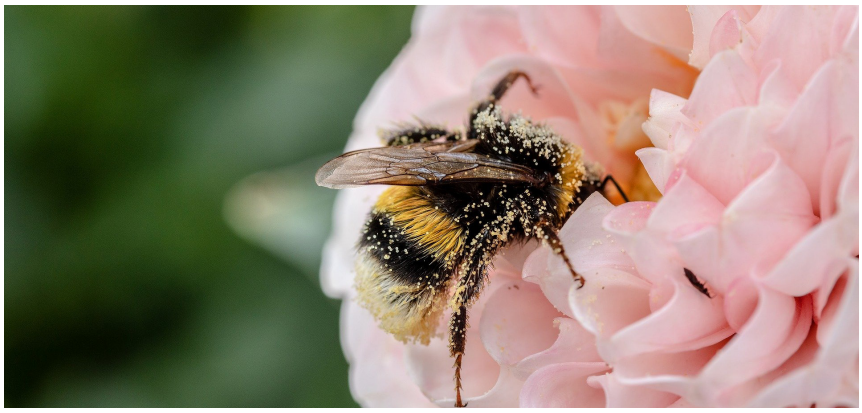
_____ All living things produce offspring.

_____ All living things grow over time.

Pollination is the process of transferring pollen grains from the male sex organ of the plant to the female sex organ, to allow fertilisation to occur. When fertilisation occurs, the ovule develops into seeds and the ovary becomes the fruit.

2. Match each part of the flower to the function, by drawing a straight line.

anther	Covered in a sticky substance to trap pollen grains.
stigma	Contains the female sex cells and develops into a seed after fertilisation.
ovary	Contains pollen grains which carry the male sex cells.
ovule	Large female organ of the plant. It develops into the fruit surrounding the seed after fertilisation.



3. Describe how pollination occurs naturally.

Seeds must move away from the parent plant so that they have enough space and nutrients to develop into new plants. This is called dispersal. Seeds are dispersed in different ways and have special features and adaptations which make them more efficient at certain methods of seed dispersal. Once they have been successfully dispersed away from the parent plant, seeds grow and develop into new plants.

4. Read the statements below about fertilisation. Tick all the statements which are **true**.

- ☐ The ovule develops into a seed.
- ☐ The ovary develops into a seed.
- ☐ The ovule develops into a fruit.
- ☐ The ovary develops into a fruit.
- ☐ A pollen tube grows from the pollen grain, down the style.
- ☐ A pollen tube grows from the pollen grain, down the stem.
- ☐ Pollen becomes attached to the stigma.
- ☐ Pollen becomes attached to the ovary.

5. Look at each seed below. Tick one box for each seed to say which dispersal method it is adapted to.

		
dandelion	avocado	maple seed
☐ animal fur	☐ animal fur	☐ animal fur
☐ explosion	☐ explosion	☐ explosion
☐ ingestion (eating)	☐ ingestion (eating)	☐ ingestion (eating)
☐ wind	☐ wind	☐ wind