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US 18986

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US 18988

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US 21611

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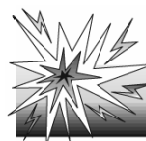
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US 18973

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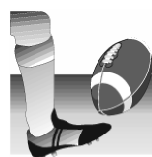


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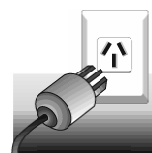
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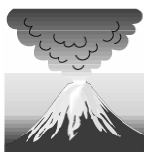


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US 18982

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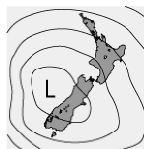
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US 18969

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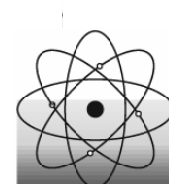
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US 18973 Demonstrate knowledge of matter

PURPOSE People credited with this Unit Standard are able to: describe types of matter; describe methods used to separate the substances in a mixture; describe a simple model of an atom; and describe metals and non-metals.

Level: 1
Credit: 2
Version: 2

- ELEMENT 1** Describe types of matter.
Range: two of – element, compound, mixture.
1.1 The description identifies one significant characteristic for each of the matter types.
- ELEMENT 2** Describe methods used to separate substances in a mixture.
Range: three methods which may include but are not limited to – filtering, sieving, evaporating, simple distillation, magnetism, chromatography.
2.1 The description identifies how the stated method works to separate the substances in the mixture.
- ELEMENT 3** Describe a simple model of an atom.
3.1 The description identifies parts of an atom.
Range: protons, electrons, neutrons.
3.2 The description outlines characteristics of an atom.
Range: characteristics which may include but are not limited to: location of parts in nucleus, electron cloud (shell or valence), number of protons compared with number of electrons.
- ELEMENT 4** Describe metals and non-metals.
Range: two of each group – metals (iron, aluminium, magnesium, copper, zinc); non-metals (sulfur, carbon, oxygen, nitrogen, chlorine).
4.1 Identify metals and non-metals by their location on the periodic table.
Range: one of – name, symbol, atomic number.
4.2 The description outlines the physical properties of metals and non-metals.
Range: two properties which may include but are not limited to – lustre, colour, conductivity, malleability, state magnetism.

SPECIFIC LEARNING OUTCOMES

To pass this Standard you need to be able to:

- 1 a** Identify the special features of elements, compounds and mixtures.
- b** Give examples of elements, compounds and mixtures.
- 2 a** Identify methods of separating substances.
- b** Describe how separation methods work to separate substances in the mixture.
- 3 a** Draw or label a diagram showing the structure of an atom.
- b** State the number of protons in an atom given the number of protons
- c** State the number of electrons in an atom given the number of protons.
- 4 a** Use the periodic table to identify metals and non-metals.
- b** List the physical properties of metals and non-metals.
- c** State whether an element is a metal or non-metal given a description of its physical properties.



4.07 Atoms and elements

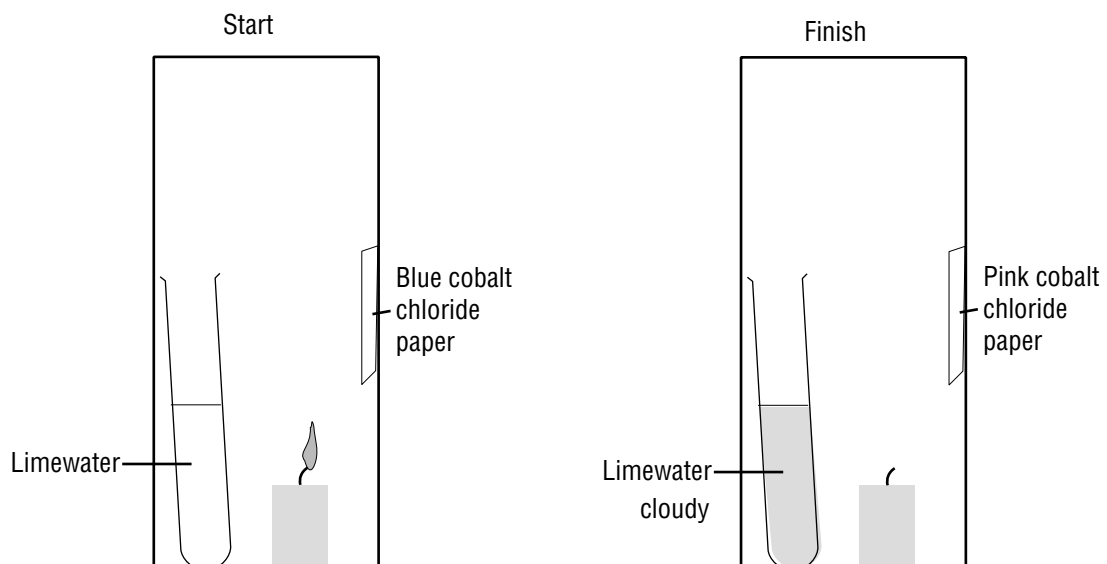
1 Match these words with the phrase that best fits. The first one has been done for you.

a	Atom	5	A positively-charged particle.	1
b	Mass number		A particle with charge but almost no mass.	2
c	Neutron		Substance composed of only one kind of atom.	3
d	Nucleus		Equal to the number of protons in the atom.	4
e	Element		Particle whose volume is almost entirely empty space.	5
f	Proton		Neutral, sub-atomic particle.	6
g	Atomic number		Place inside an atom where the mass is concentrated.	7
h	Electron		Tells the total number of particles in the nucleus.	8

2 Use the periodic table on the inside back cover to complete the following table.

Name	Symbol	Atomic number	Number of protons	Number of electrons	Metal/ non-metal	Two important physical properties eg colour, state, conductivity...
	Fe					
			16			
		6				
Aluminium						
				8		
					Metal	Brown, good conductor of electricity
Chlorine						

5.05 The burning candle (US 21611: practical activity)



Nathan was investigating what happens when a candle burns. He drew the pictures above to show what happened.

- 1 List three difference between the 'start' and 'finish' drawings.

2 What gas is needed for candles to burn? _____

3 What gas makes limewater turn cloudy? _____

4 What makes cobalt chloride turn pink? _____

5 Complete this equation for a candle burning:

candle + _____ → _____ + _____

6 Nathan noticed a little black powder on the inside of the jar after the experiment that hadn't been there at the start. What could this black substance be? _____

7 Why did the candle go out? _____

6.01 Outcomes of exercise

- 1 Crystal ran around the netball courts twice. She noticed some changes in her body after this exercise.
- a Her **p** _____ rate increased because her heart was **b** _____ faster.
 - b Her **b** _____ rate increased to get more **O** _____ into her body.
 - c Her body **t** _____ rose and she felt **h** _____.
 - d She started to **S** _____ to help her body **C** _____ down.

Regular exercise has some important long-term outcomes on the body.

- 2 Match these exercise outcomes to their definitions.

speed stamina skill suppleness pulse recovery rate base pulse rate strength

- a _____: the ability to keep going for a long time before getting tired.
- b _____: the amount of force a muscle can produce.
- c _____: the ability to bend and twist into different positions.
- d _____: how fast you can move.
- e _____: how quickly the heart returns to its normal beating rate.
- f _____: special abilities needed for each sport (like goal shooting).
- g _____: the speed the heart beats when you are sitting quietly.

- 3 Match these types of activities to the specific long-term outcome they develop best.

speed stamina skill suppleness strength

- a _____: Swim for an hour every day before school.
- b _____: Practicing goal shooting every lunch-hour.
- c _____: Regular stretching exercises and warm-ups.
- d _____: Weight lifting.
- e _____: Sprint training – running short distances as fast as possible.

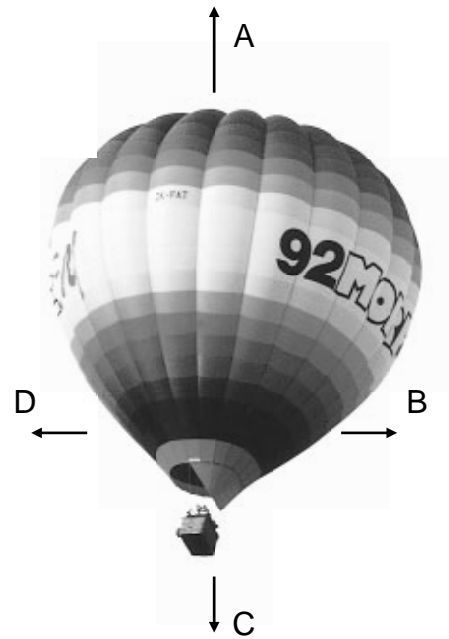
3 This hot air balloon is rising vertically. The lengths of the arrows indicate the size of the forces.

a Which two forces are balanced?

b Which two forces are unbalanced?

c Consider the **strength** of forces A and C and describe the vertical motion of the balloon.

d Consider the **strength** of forces D and B and describe the horizontal motion of the balloon.



6.07 Calculating work and energy

Lifting weights above your head is hard work. Scientists define work using this equation:

$$\text{work} = \text{force} \times \text{distance}$$

This same formula is used to calculate the amount of energy the weight gains as you lift it.

$$\text{energy gain} = \text{force} \times \text{distance}$$

Both work and energy are measured in joules (J).

1 A weight-lifter lifts a weight of 800 N a height of 2 m.

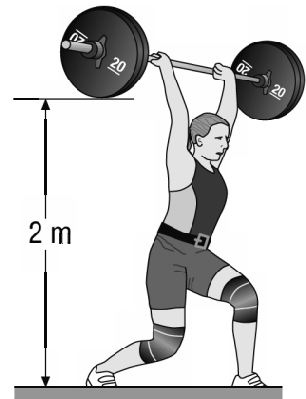
a How much work does she do?

$$\text{work} = \text{force} \times \text{distance}$$

$$= \text{ ______ } \text{ N} \times \text{ ______ } \text{ m}$$

$$= \text{ ______ } \text{ J}$$

b How much energy has the weight gained?

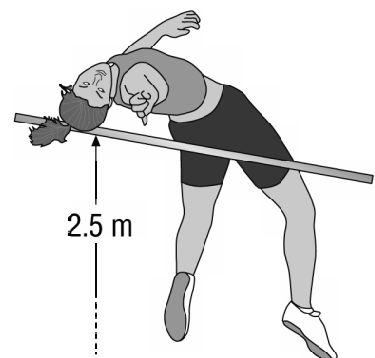


2 A high jumper jumps 2.5 m. She has a weight of 650 N. How much work does she do in the jump?

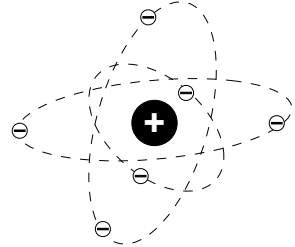
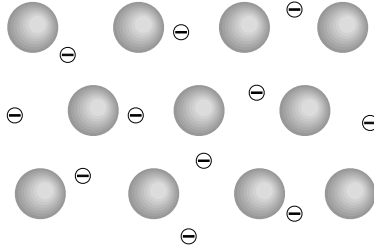
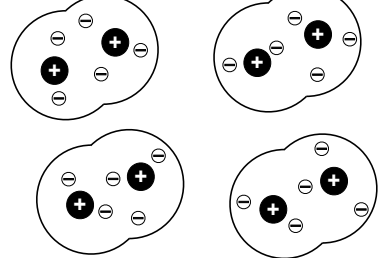
$$\text{work} = \text{ ______ } \times \text{ ______ }$$

$$= \text{ ______ } \text{ N} \times \text{ ______ } \text{ m}$$

$$= \text{ ______ } \text{ J}$$



7.01 Conductors and insulators

		
<p>Atoms contain a small, positively-charged nucleus which is surrounded by negatively-charged electrons.</p>	<p>In metals, electrons are free to move between the atoms and conduct electricity.</p>	<p>In non-metals, electrons are locked up inside molecules and are not free to move and conduct electricity.</p>

The information above will help you to match the statements below to their answers. Once you have found each match you'll be able to crack the code and read the message at the bottom of the page.

1	Examples of good conductors.	A	molecule
2	Formed when a group of atoms join together.	C	plastic, rubber, clay
3	The middle part of an atom.	E	atom
4	Word used to describe substances that do not allow electricity to pass through them.	F	copper, aluminium, silver
5	Electrical charge on an electron.	I	move
6	Word used to describe materials that allow electricity to pass through them.	L	insulators
7	Type of matter containing electrons that are free to move.	N	wire
8	Examples of electrical insulators.	O	negative
9	Positively-charged particles inside the nucleus of an atom.	R	conductors
10	A particle containing a nucleus surrounded by electrons.	11	S non-metal
11	Type of matter in which electrons cannot flow	T	metal
12	What electrons can do inside metals.	U	proton
13	A long, thin, conductor, often coated in an insulating substance.	W	nucleus

Message:

S

S

10 4 10 8 7 6 12 8 8 9 6 6 10 13 7 12 11 2 1 4 5 3 5 1 10 4 10 8 7 6 5 13 11



7.07 Electrical safety (1)

Fuses

BECAUSE THEY STOP FIRES ARE IMPORTANT CAUSED BY WIRES OVERHEATING FUSES

1 Assemble the cards above into a sentence.

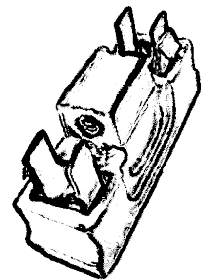
2 The drawings on the right shows a household fuse.

a What size fuse wire should be used with this fuse? _____

b Draw a line on the drawing to show where the fuse wire goes.

3 A group of polytech students living together in an old house find that one fuse in their house keeps blowing.

a Give two reasons why the fuse might be blowing.



b What could happen if they replace the fuse wire in that circuit with thicker wire that does not melt as easily?

Earth wire

4 Complete this table about the three wires used in household appliances.

Name	Colour	Purpose
	Green-yellow stripe	
		Returns current to the substation.

5 Complete the passage below using the following words:

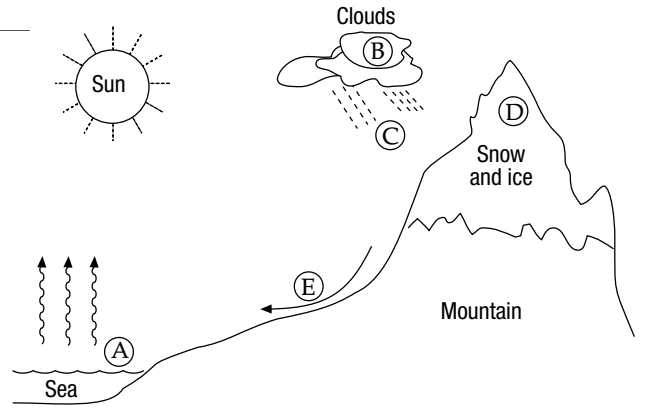
case electrocuted earth path ground wires joins

If one of the _____ inside an appliance happens to connect with the _____ of that appliance, you could get _____ when you touch it. The _____ wire is a safety device which _____ the outside case of the appliance to the _____, providing a better conducting _____ than your body.

10.02 The water cycle

1 Use the diagram on the right to answer the following questions.

- a The process at A, where water changes from _____ to _____, is called _____.
- b The reverse process at B, where it changes from _____ to _____, is called _____.
- c The process at C, where _____ water droplets join together to become _____ droplets which fall is called _____.
- d Water _____ when it gets very cold at the top of a mountain (D).
- e Liquid water in puddles, rivers and streams (E) is called _____.



2 Match the following words with the descriptions below.

run-off condensation melting dew evaporation precipitation water vapour

a		This process uses the Sun's energy.
b		This process occurs when warm air gets cold.
c		This is water which covers exposed surfaces overnight.
d		This is something which falls.
e		This process happens when snow or ice warms up.
f		This is water which is travelling to the sea.
g		This is invisible water in the air.

3 Decide which process from the water cycle is occurring in these situations.

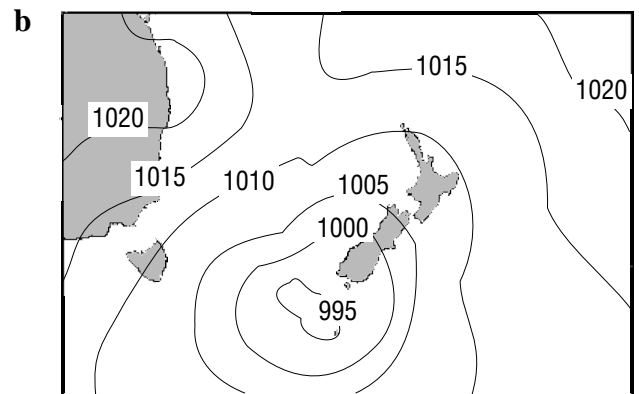
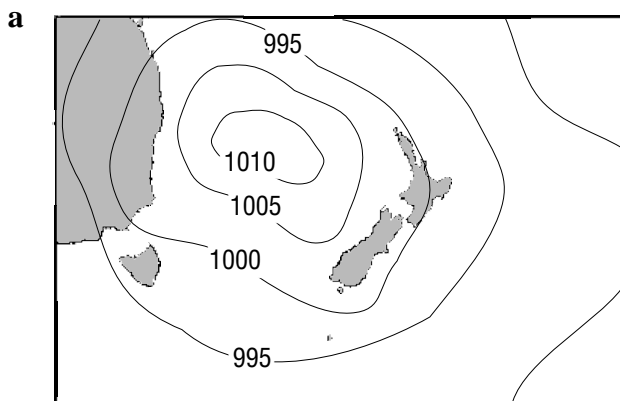
a		The windscreen fogs up when a couple sits in the car late at night talking (about the weather of course).
b		Wet clothes become dry after hanging on the clothes line in the sun.
c		Soon after the sky darkened with clouds, the rain fell.
d		A week after the garden was flooded, the water had drained away.



10.03 Highs and lows

The numbers on weather maps show the air pressure at each location. The lines connect the places where the pressure is the same (**isobar** means **equal pressure**). Once all the isobar lines are drawn, the meteorologist (weather scientist) can mark in the places where the pressure is highest (H) or lowest (L). Centres of high pressure are also called **anticyclones**, while centres of low pressure are called **cyclones** or **depressions**.

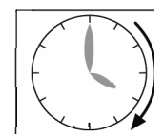
- 1 Each of the maps below shows a centre of high or low pressure. Mark these centre with the appropriate symbols.



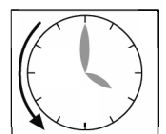
- 2 a What happens to the numbers on the isobar lines as you move towards a 'high'?

- b What happens to the numbers on the isobar lines as you move towards a 'low'?

Air moves **c**lockwise round a **L**ow, and **a**nticlockwise around a **H**igh (**a**nticyclone).



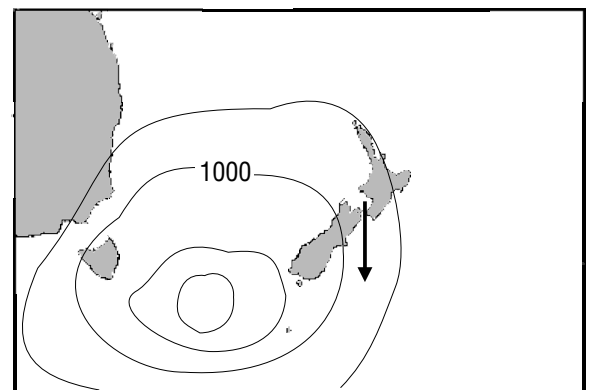
Clockwise



Anticlockwise

- 3 The map below shows the isobars for a system to the south of New Zealand. There is a northerly wind blowing through the centre of the country.

- a Decide whether the centre of this weather system is a high or a low and write the appropriate symbol on the map.
- b Write numbers on the other isobar lines, assuming the lines are 5 hPa apart.

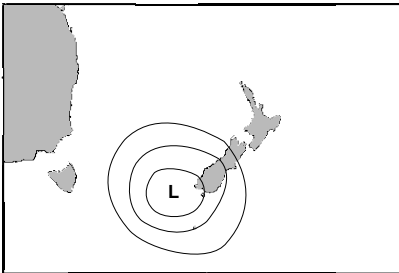


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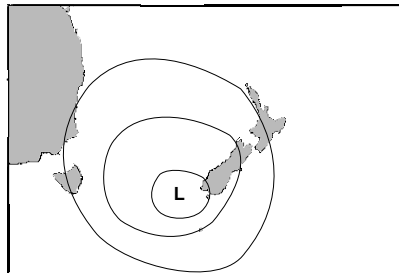
When the isobar lines are close together on a weather map it indicates that the winds are strong. Remember that wind names always describe where the wind is **from**. A northerly wind comes from the north and blows to the south.

4 The maps below both show lows centred to the south of New Zealand.

Weather system A



Weather system B



Use this map to help you locate the cities mentioned on this page.

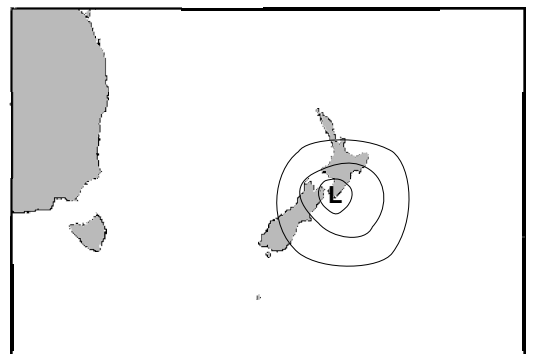
- a Draw a curved arrow on each map to show the direction the wind is moving around the low.
- b What direction is the wind blowing from in Greymouth (for both systems)? _____
- c In which system is the wind blowing more strongly? _____

5 For weather system C on the right:

- a What direction is the wind blowing from in Dunedin?

- b What direction is the wind blowing from in Auckland?

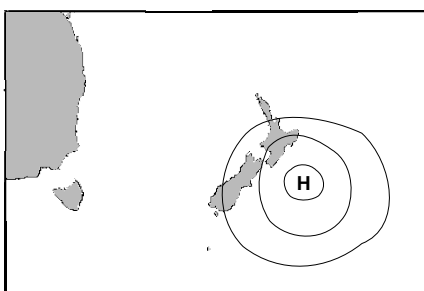
Weather system C



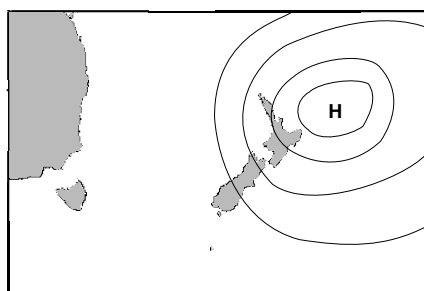
6 Which of the weather systems D, E and F shown below:

- a shows generally north westerly winds over the whole of New Zealand? _____
- b shows southerly winds over the South Island and westerly winds over the North Island? _____
- c shows easterly winds over Gisborne? _____
- d shows the strongest winds? _____

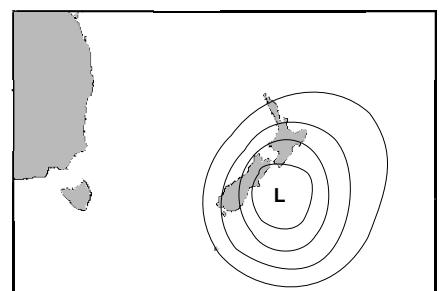
Weather system D



Weather system E



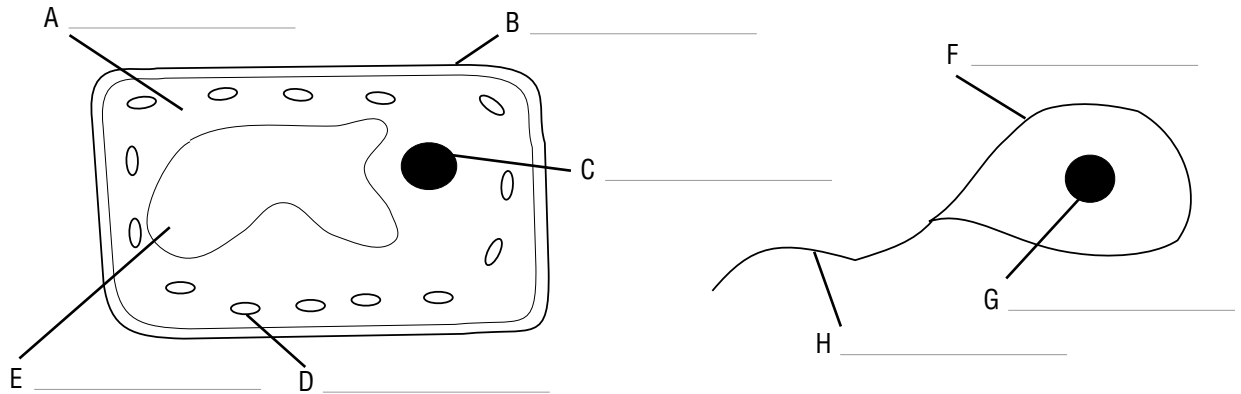
Weather system F





11.14 Unit summary

1 a Complete the labels on the following diagrams.



b Write the **letter** of a part in the diagrams above with the function stated below.

i ____ Holds the genetic material.

ii ____ Gives the cell its shape.

iii ____ Allows the entry and exit of compounds.

iv ____ Allows the cell to move.

v ____ Controls the amount of water in the cell

vii ____ The part where food is made.

vi ____ The area where chemical reactions occur.

2 Classify each of the following items as being associated with **sexual** (S) or **asexual** (A) reproduction.

a Bull's sperm _____

b Bulbs _____

c Seeds _____

d Kittens _____

e Ovary _____

f Tuber _____

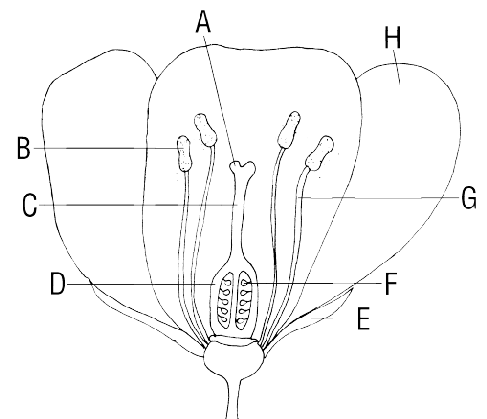
g Runners _____

h Corm _____

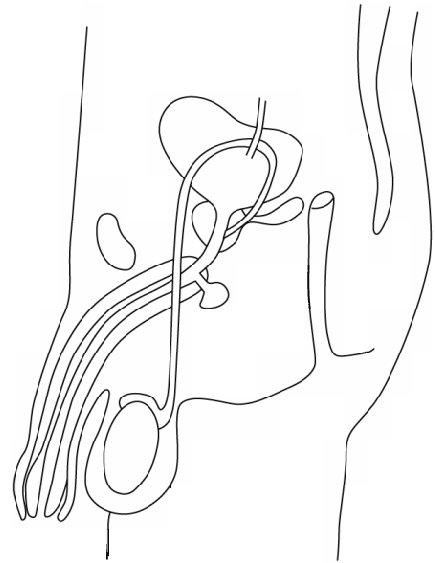
i Pollen _____

3 State the name and function of the parts of the flower on the right.

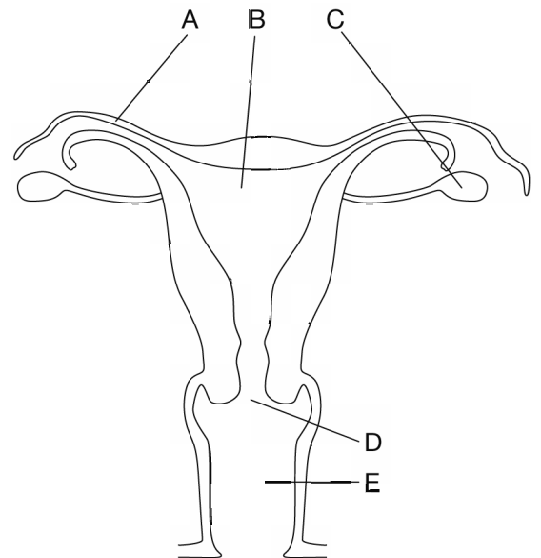
- a _____
- b _____
- c _____
- d _____
- e _____
- f _____
- g _____
- h _____



- 4 The diagram on the right shows a side view of the human male reproductive system.
- Colour in (red or some other bright colour) the tubes that carry sperm from where it is made to outside his body.
 - Name and label the place where sperm is made.
 - Name and label the organ which delivers sperm to the woman.



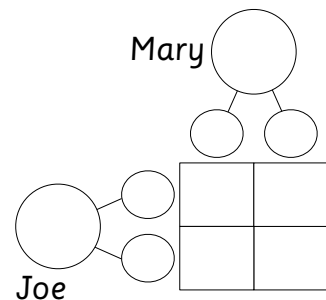
- 5 The diagram below right shows the human female reproductive system. State the name and function of the parts labelled A–E.



- 6 Mary can roll her tongue. Her genotype is Tt. Her husband, Joe, cannot roll his tongue. His genotype is tt.

- Complete the Punnett square on the right to show the possible genotypes of their children.
- What percentage of their children could be expected to be tongue rollers?

_____ % will be tongue rollers.



- 7 Match the terms below with their correct description.

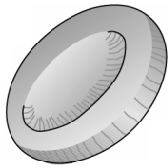
DNA Gene Chromosome

- Gives the instructions for a particular characteristic eg blue eyes. _____
- A complex molecule that is built up of smaller molecules. _____
- Thread-like structures found in the nucleus that contain genetic information. _____

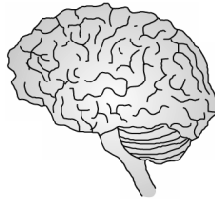


12.02 Building blocks

1 Decide whether each of the structures shown below is:
 an organ a tissue an organism a cell an organ system



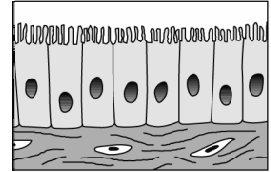
a _____



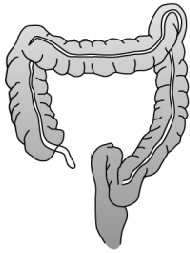
b _____



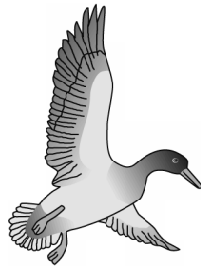
c _____



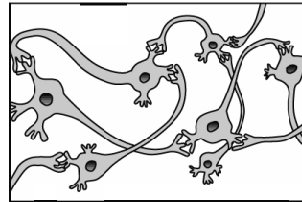
d _____



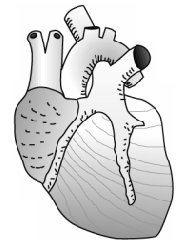
e _____



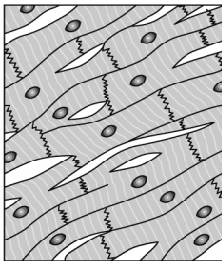
f _____



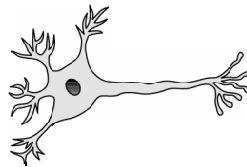
g _____



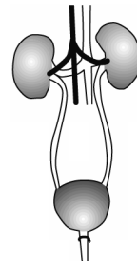
h _____



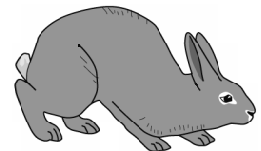
i _____



j _____

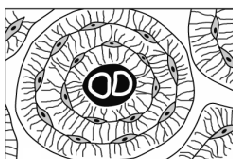


k _____

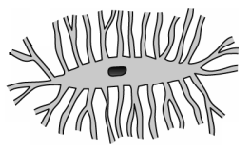


l _____

2 The drawings below are all associated with bones, but each one is drawn to a different scale. Put them in order of real-life size, from the smallest object to the largest.



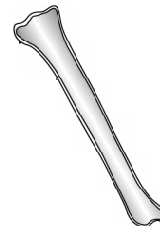
A



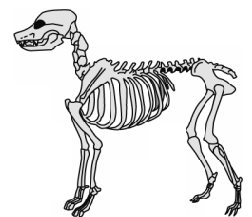
B



C



D

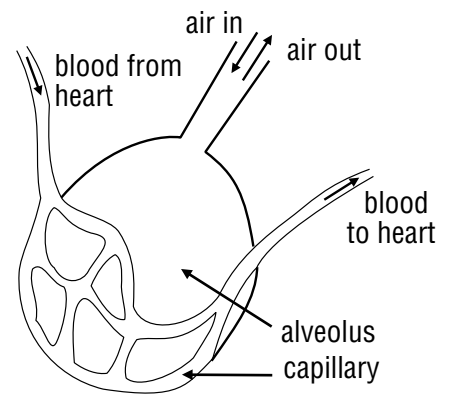
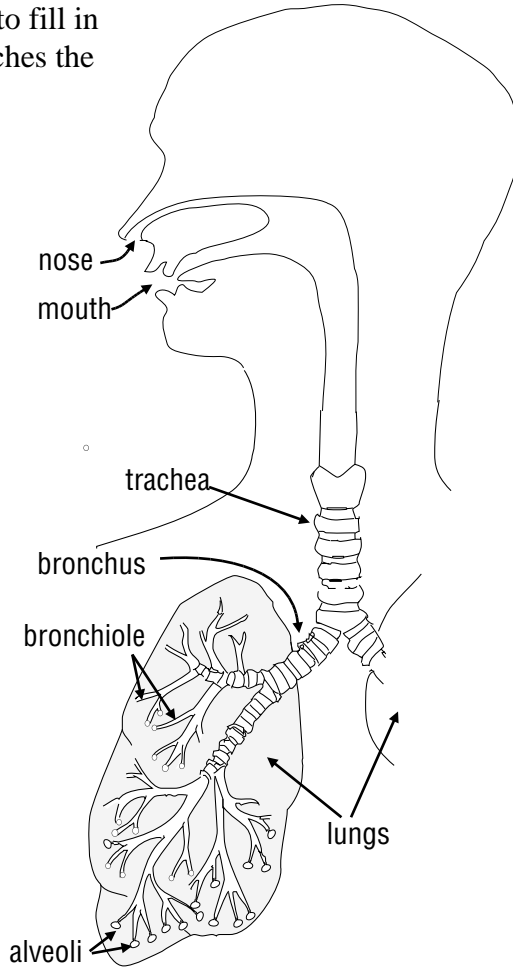
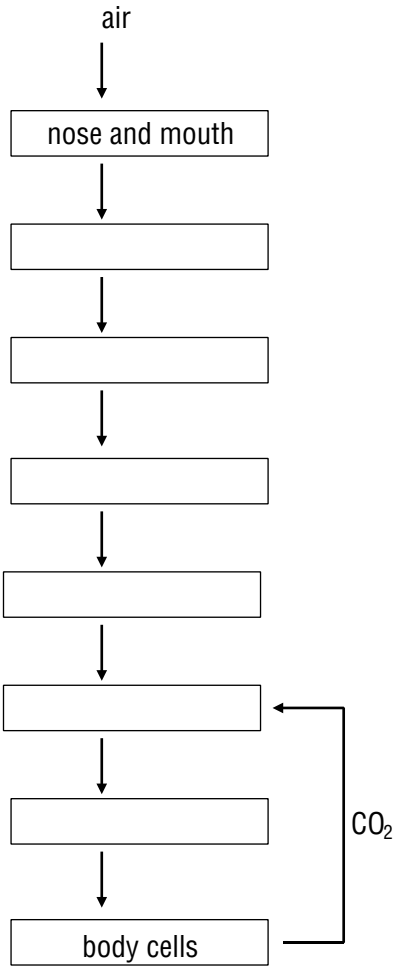


E

Smallest _____ largest

12.06 Gas exchange (US 18988 Interpret data)

1 Use words from the diagrams on the right to fill in the boxes below showing how oxygen reaches the body cells.



2 Complete the flow diagram above by adding arrows to show how CO₂ produced in the body cells leaves the body.

3 Complete this passage explaining how the gas exchange system helps keep the body healthy.
 This system delivers _____ to the _____ cells so that they can do _____ which releases _____ g _____. The system also removes the waste product, _____, which would otherwise poison the body.

