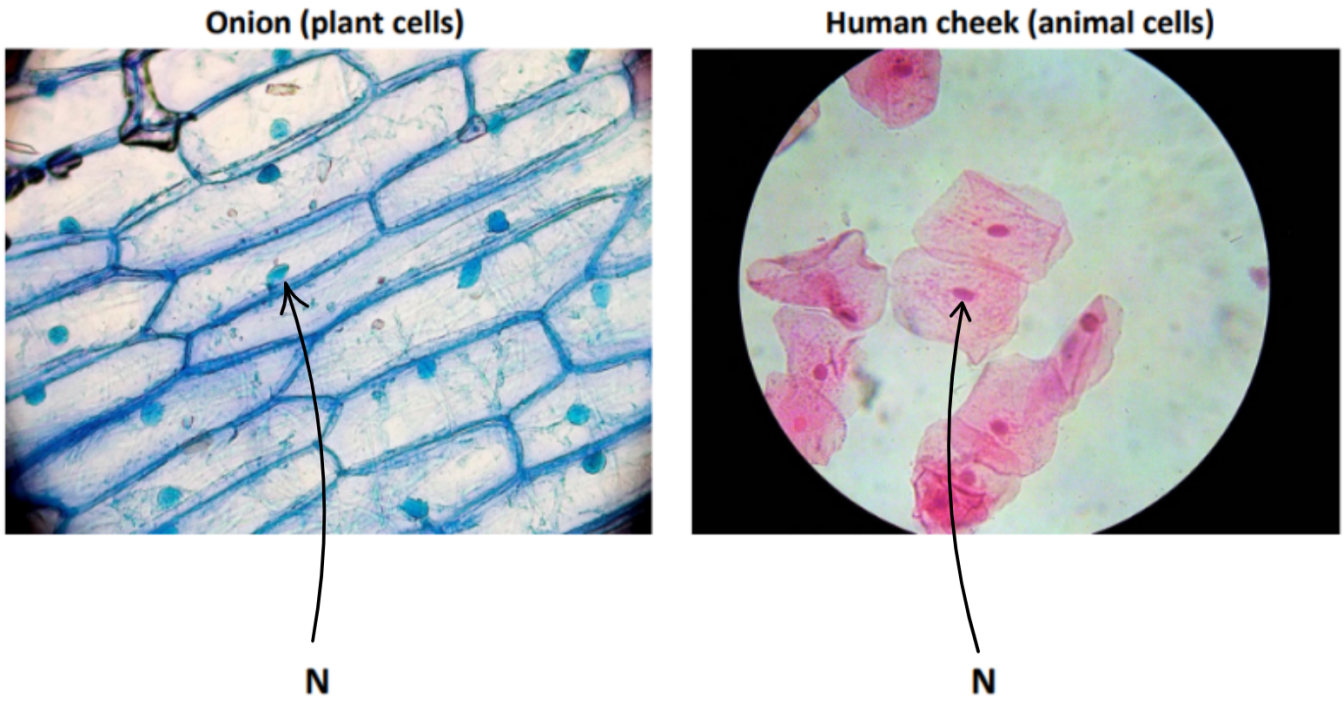
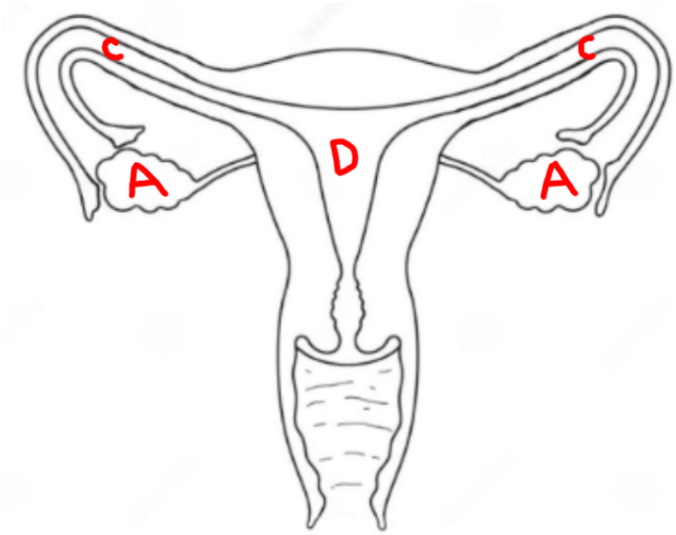
(a)

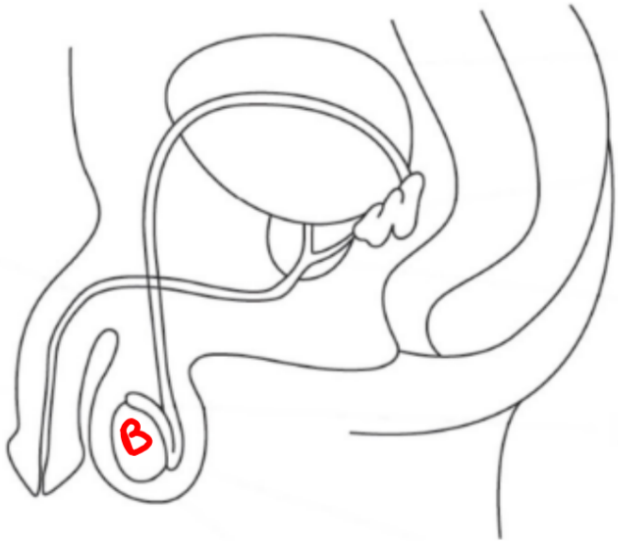


(b)

Description of cell part	**Name**
Controls the movement of substances in and out of cells	Cell membrane
Found in plant cells only	Cell wall
All the material inside a cell, except for the nucleus	Cytoplasm

(a) (b) (c) (d)





(e) the contraceptive pill; a hormonal pill taken daily that prevents pregnancy.

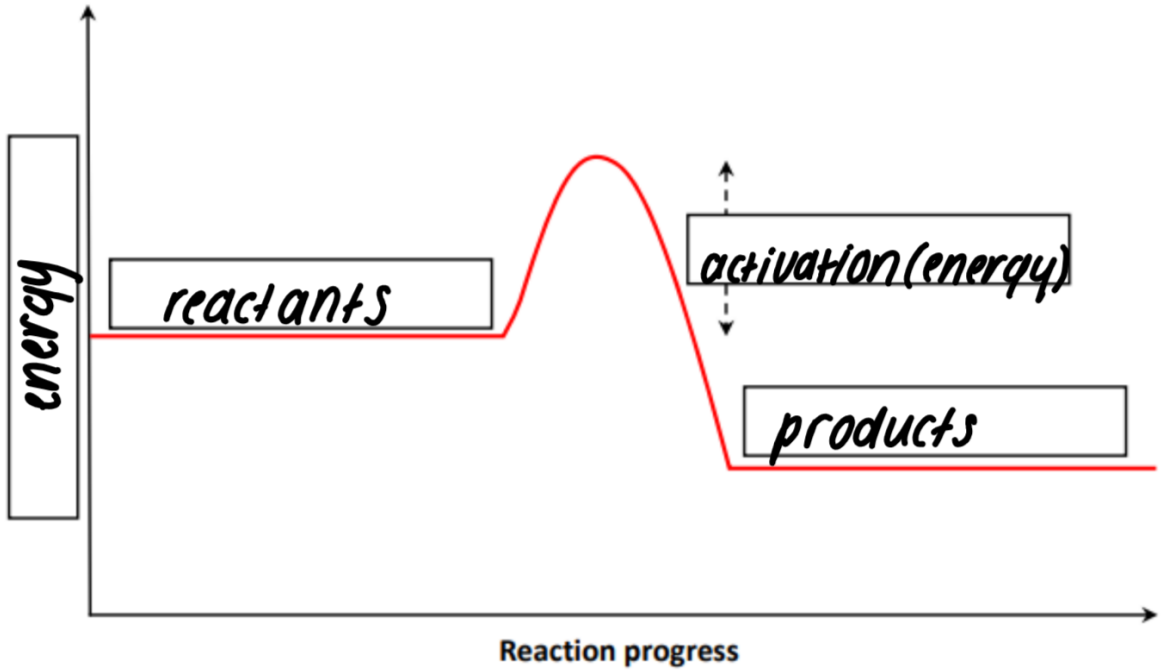
or

The coil (IUD); a small T shaped device that's inserted into the uterus and prevents pregnancy.

or

Abstinence; refraining from partaking in sexual intercourse.

(a)



(b) An endothermic reaction

There are three states of matter: solid, liquid and gas. When a solid is heated it turns into a liquid – this change of state is called melting. When a liquid is heated it turns into a gas – this change of state is called evaporation.

Liquid water freezes to become solid ice; this is an example of a physical change. However, when electricity is passed through liquid water it is converted into its elements, hydrogen and oxygen; this is an example of a chemical change.

When liquid water freezes, the mass of the ice formed is the same as the mass of the liquid water. This is an example of conservation of mass.

(a) Current

(b) Graph Y; the plotted points produces a straight line showing current is proportional to voltage.

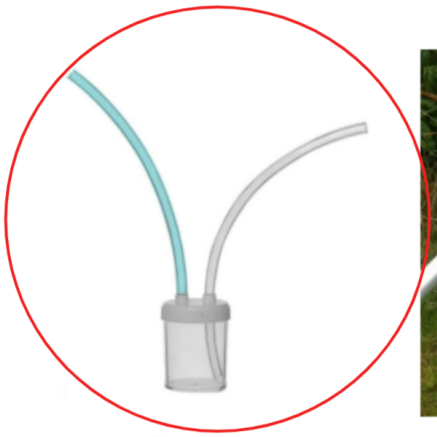
(c)

$$Resistance\ (\Omega) = Voltage\ (V)\ /\ Current\ (A)$$

$$Resistance\ = 12V/6A$$

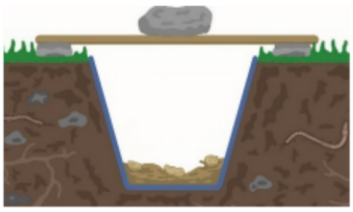
$$Resistance\ = 2\Omega$$

(a)



Pooter

Net



Pitfall trap

Pooter: place the longer tube over the insect you want to capture. By sucking through the tube with the gauze the insect will become trapped in the container.

(b) 1. Sunlight 2. Space

(c) One way we can help to conserve biodiversity is by limiting our pesticide use.

(a) 30 m/s

(b)

$$Acceleration = \frac{Change\ in\ speed}{Change\ in\ time}$$

$$Change\ in\ speed: 30 - 15 = 15m/s$$

$$Change\ in\ time: 120 - 60 = 60s$$

$$Acceleration\ = \frac{15}{60} = 0.25m/s^2$$

(c) Between positions C and D it can be seen that the car is slowing down as the line showing car speed drops from 30m/s down to 0m/s.

(d) Between positions D and E the car is stationary (not moving) as the line is neither increasing or decreasing.

(a) Baking soda **or** toothpaste **or** bleach **or** sodium hydroxide (NaOH)

(b) lemon juice **or** vinegar **or** hydrochloric acid (HCl)

(c) Greater than 7

(d)

i. Methyl orange

ii. Orange

(a)

Compound	First element	Second element	Ratio	Formula
Magnesium chloride	Magnesium (Mg)	Chlorine (Cl)	1:2	$MgCl_2$
Potassium chloride	Potassium (K)	Chlorine (Cl)	1:1	KCl
Hydrogen sulfide	Hydrogen (H)	Sulfur (S)	2:1	H_2S
Aluminium oxide	Aluminium (Al)	Oxygen (O)	2:3	Al_2O_3

(b) Metals

1. Can conduct heat and electricity.
2. Have a high melting point.

Non–metals

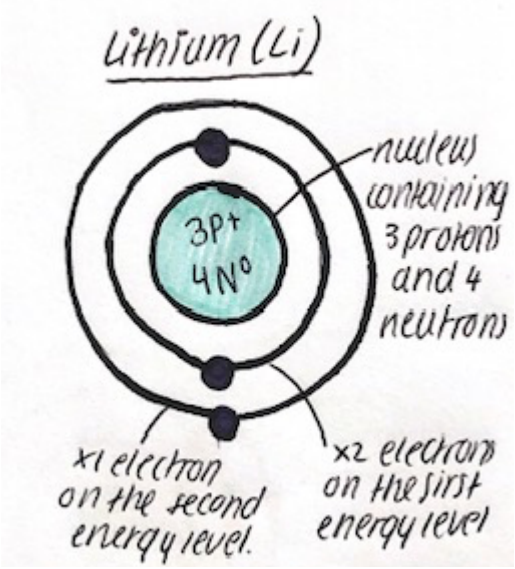
1. Can't conduct heat or electricity.
2. Have a low melting point.

(a)

i. Neutrons

ii. A proton has a positive charge (+1) whereas a neutron has a neutral charge (0).

(b)



(c) An advantage of using nuclear energy to generate electricity is it does not produce any greenhouse gases.

(a) Respiration

(b)

i. Photosynthesis

ii. Carbon dioxide (CO_2) + Water (H_2O) → Glucose ($C_6H_{12}O_6$) + Oxygen (O_2)

iii. Chlorophyll

(c) Plants and animals add carbon into the soil in process C by decay and decomposition. When animals and plants die, overtime they will decompose (decay) adding carbon into the soil.

(d) Coal **or** oil **or** turf **or** methane

(e)

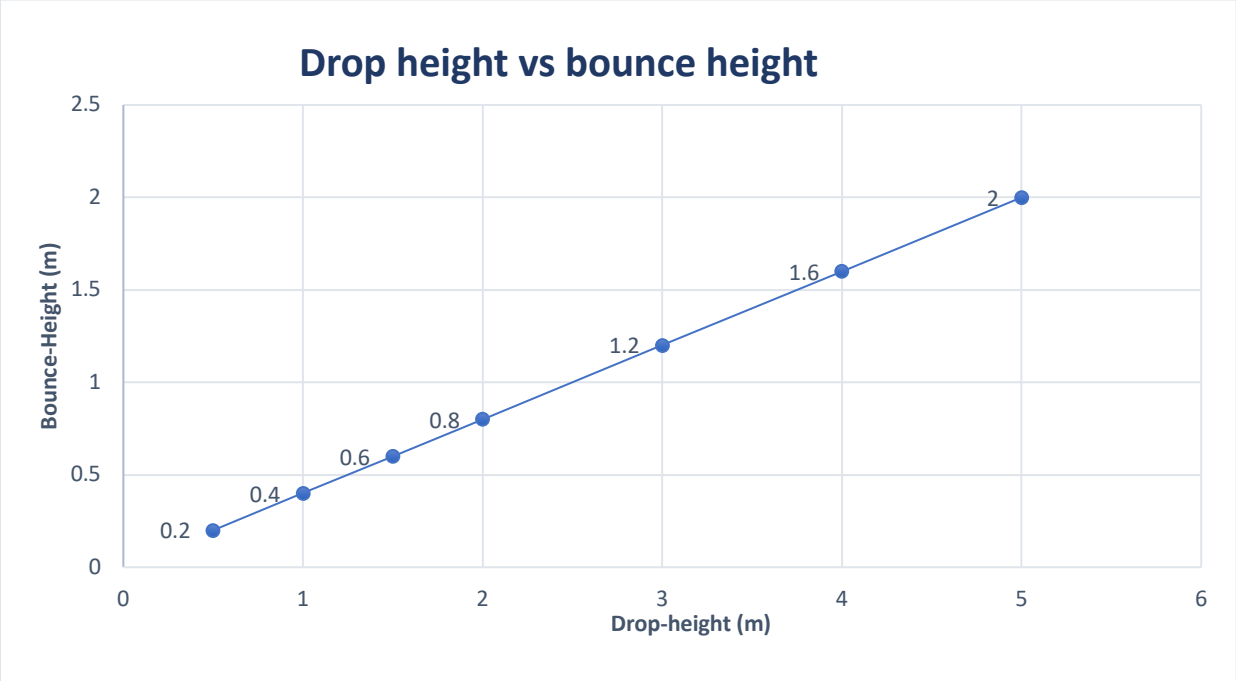
1. Global warming is a huge environmental concern associated with an increase in the level of carbon dioxide in our armosphere. The increasing levels of CO_2 are contributing to the 'greenhouse effect', which is causing the global temperature to intern, rise.

2. The rise in sea levels is a second environmental concern associated with an increase in CO_2 in our atmosphere. The increased CO_2 levels contribute to the harmful levels of greenhouse gasses which is causing the worlds temperature to increase. This increase in temperature causes the water to heat up and expand causing sea levels to rise.

(f) True, plants require carbon dioxide (CO_2) to carry out photosynthesis. One of the products of photosynthesis is oxygen which is crucial for all forms of life on Earth including both humans and animals. Essentially, without CO_2, plants would be unable to produce oxygen which is essential for life on earth. Therefore, without carbon dioxide there would be no life on earth.

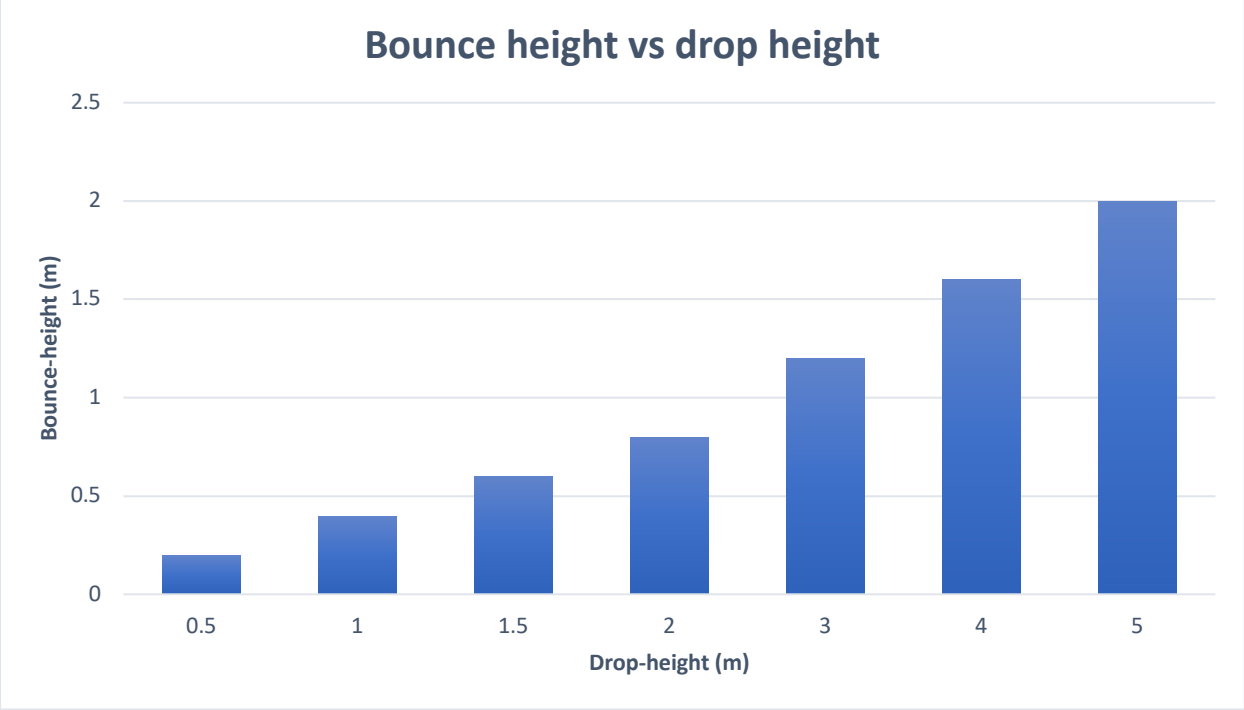
(a)

Line graph:



or

Bar chart:



(b) 4m

(c) The drop-height is easier to measure accurately. We can easily measure the point in which we drop the ball at as it's a static point, whereas it's a lot more difficult to accurately capture the bounce height of the ball while it's in motion.

(d) 1.6m is easier to measure accurately as the corresponding drop height is a whole number.

(e) If an object breaks during the experiment ensure to immediately and carefully clean it up to avoid injury.

(f) Potential energy (stored energy) when the ball is not in motion is converted to kinetic energy when falling through the air as the ball is now in motion.

(g) Yes, this is a testable hypothesis as an experiment can be performed comparing which of the two balls (green/orange) has a larger bounce height at a given drop height.

(a)

i. Solar system = the sun and the eight planet and their moons that orbit it.

ii. Galaxy = a system consisting of millions of stars

(b)

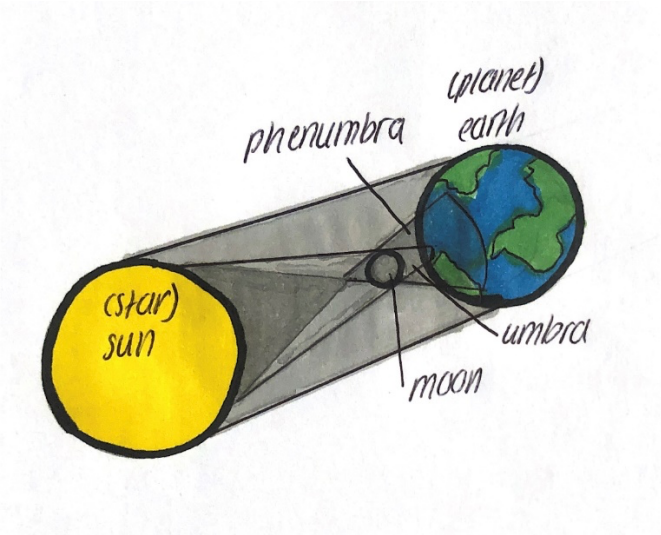
i. Venus

ii. Phobos

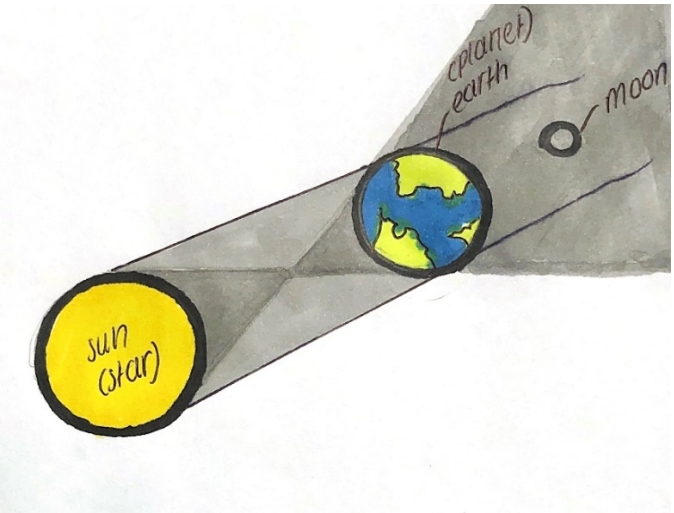
(c) The exposure to the light of an eclipse can damage the retina of the eye, causing 'eclipse blindness'.

(d)

i.



ii.



(e) The sun appears smaller when observed from the gas giant planets as these planets are extremely far away from the sun.

(f) It's difficult for humans to explore mars due to the lack of oxygen on the planet and also the difference in gravity.

(g) Scientists first believed that there was no origin of the universe and that it was simply just everlasting and infinite however, overtime a theory known as the 'Big Bang' was developed by astronomers and is now used to explain how the universe began.

(a) Newton (N)

(b) A ruler

(c)

1. The size/thickness of the bread

2. Temperature

(d)

Conclusion	**✓ or ×**
White bread is easier to compress as it gets older	×
Old white bread is harder to compress than fresh brown bread	✓
Brown bread is healthier for you than white bread	×
White bread becomes harder to compress faster than brown bread	×

(e)

i. Protein

ii. Red meat

iii. It is essential for the growth and repair of cells.

(f)

- The piece of brown bread was firstly taken into the mouth (ingestion)
- Physical digestion then occurred in the mouth due to the chewing and grinding of food.
- Enzyme amylase caused chemical digestion to occur in the mouth also.
- The bread was then brought down the oesophagus into the stomach where further physical and chemical digestion occurred, through churning of the bread and enzyme action by pepsin.
- The digested carbohydrate was then absorbed by the small intestine into the blood.
- Using the absorbed glucose, aerobic respiration using oxygen occurred producing energy which the cells in the boy's body were later able to use.

(a)

i. The Trachea (windpipe)

ii. The Lungs

(b) When the rubber sheet (which is acting as the diaphragm in the case of this experiment) is pulled down, it causes the lungs to take in air causing them to expand in volume (inflate).

(c) One limitation of this model is that the glass jar isn't flexible and can't expand or move in the way the ribcage does. This is a limitation as the model doesn't accurately represent the human breathing system.

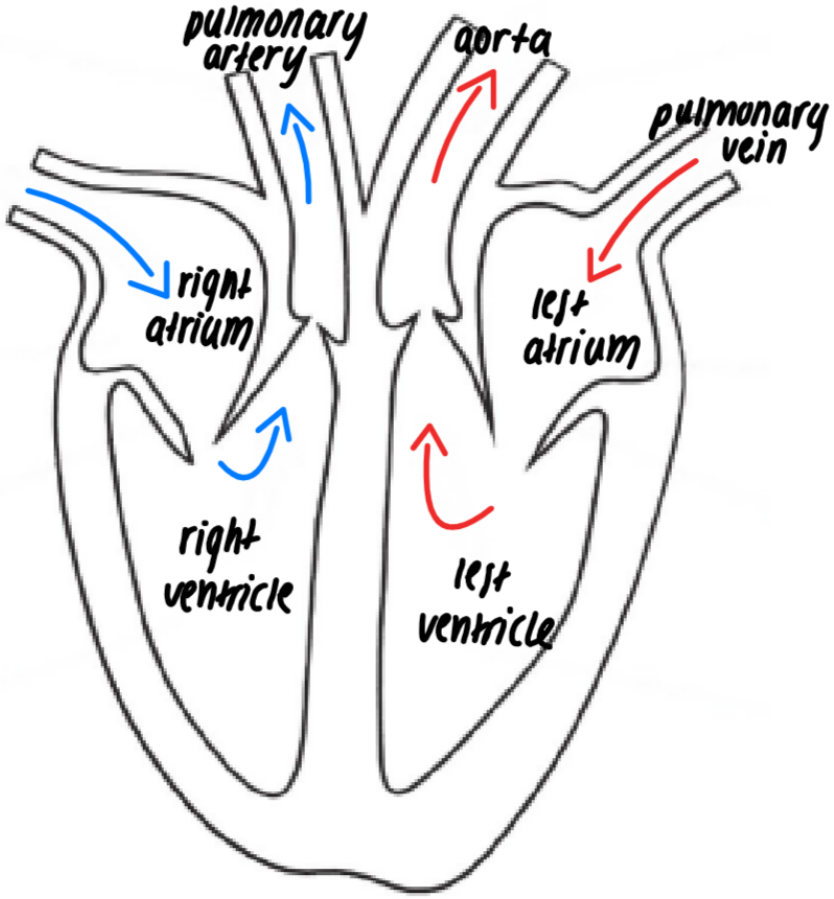
(d)

i. The air we breathe in contains more oxygen than the air we breathe out because the oxygen is filtered out into the blood and used later during respiration.

ii. The air we breathe in contains the same amount of nitrogen as the air we breathe out because we do not require nitrogen therefore it's not used up and instead is released into the air when we breathe out.

(e) The heart

(f)



(g) 1. An increase in reaction temperature would lead to an increase in the volume of gas collected because the increased temperature would cause an increase in the rate of respiration. **2.** Secondly, an increase in reaction temperature would lead to an increase in the volume of gas collected as gases expand when heated.

(h) Positive: Micro-organisms (bacteria) in the large intestines produce vitamin B and K while also preventing the growth of pathogenic (harmful) bacteria. **Negative:** Some harmful micro-organisms can cause disease in humans.