

2nd Year Science, Summer 2019

Time allowed: 1 hour

Mr. A. Goodison

Student Name _____

Answer all questions in the spaces provided.

Good luck!

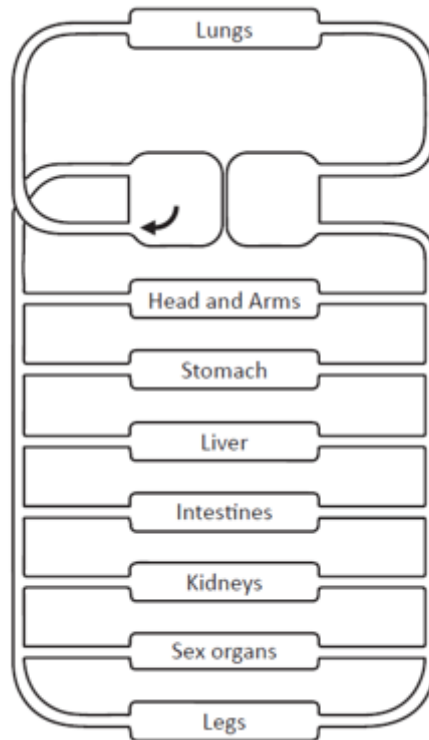


Question	Marks	Awarded
1	45	
2	30	
3	24	
4	15	
5	30	
6	32	
7	27	
8	36	
Total	239	
Grade descriptor		

A photo of the planet Saturn, taken by the Cassini space probe. The tiny bright dot at the arrow is Earth.

Question 1 (45 marks)

The diagram below shows a model of the system which is used to move blood around the body.



- (a) Name the organ which pumps blood around the body. _____ (3)
- (b) The arrow on the diagram shows the direction the blood is flowing in at that point. Draw three more arrows in different parts of the diagram to show what direction the blood is flowing there. (3)
- (c) Write the letter G in the diagram at a place where the blood gains oxygen. (3)
- Write the letter W in the diagram at a place where waste is removed from the blood. (3)
- Write the letter N in the diagram at a place where the blood takes in nutrients. (3)
- (d) One of the reasons we need our blood to move through our bodies is so that it can transport different substances to and from various parts of our bodies. State one other reason why we need our blood to flow. Answer:

(3)

- (e) Explain why it is important that our bodies get both nutrients and oxygen. Answer:

(6)

(f) Write the letter P in the diagram at a place where your pulse could be taken. (3)

(g) Why might your pulse increase while you are exercising? Answer:

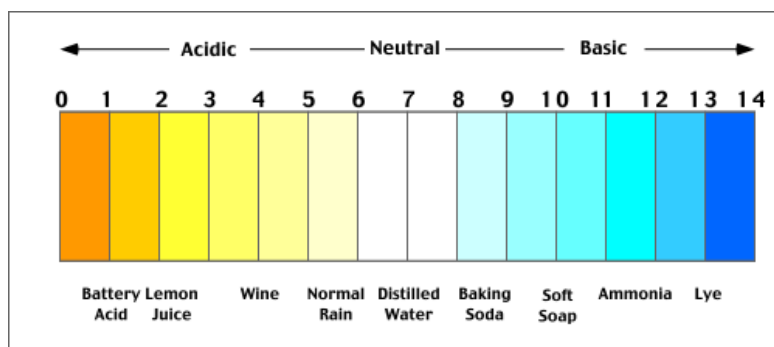
(3)

(h) Name one lifestyle choice that could cause your resting pulse to decrease over time. Answer: _____ (3)

(i) State a function of the liver _____ (3)

Describe the relationship between the respiratory, circulatory and digestive system. How do they depend on each other to function? (9)

Question 2 (30 marks)



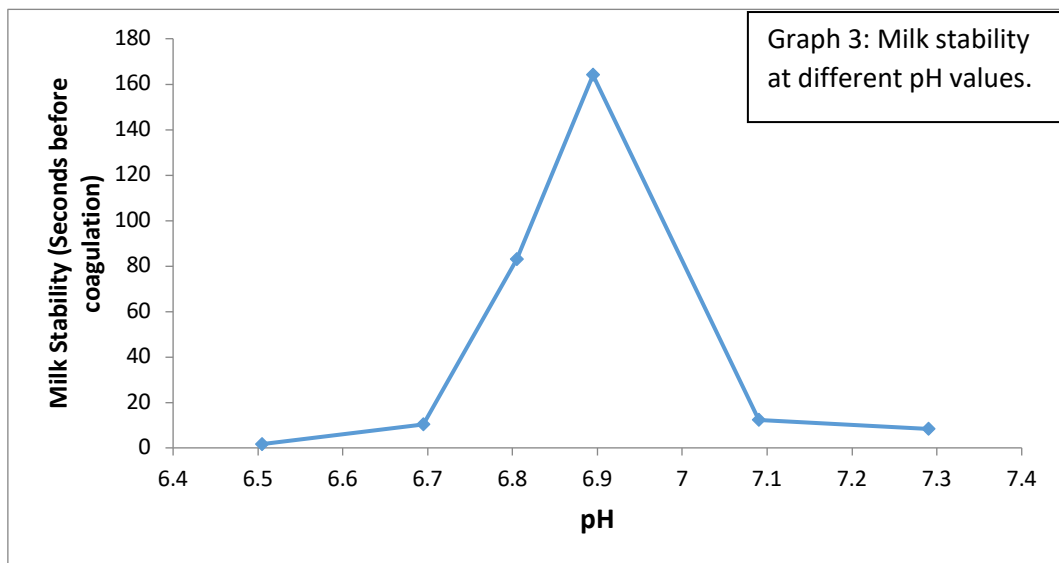
What pH is a neutral solution? Less than 7, greater than 7 or exactly 7. Answer _____ (3)

What pH is an acidic solution? Less than 7, greater than 7 or exactly 7. Answer _____ (3)

What pH is a basic solution? Less than 7, greater than 7 or exactly 7. Answer _____ (3)

pH is very important for the food industry, particularly for milk production. Milk is often **heated to kill bacteria**. The milk must be a certain pH to ensure that the milk does not **coagulate** when heated.

Study the graph below and answer the following questions.



From Graph 3, what pH should the milk be heated at to get the best stability (will not coagulate easily) Answer _____ (3)

From the Graph 3, what pH value gave the worst stability? Answer _____ (3)

Grainne is working at Dairy Gold and checks the pH of the milk **before** the milk is heated to kill the bacteria. Grainne notices that the **pH is 6.7**. Grainne stops the milk and says the pH must be **changed** before being heated. (See Graph 3).

Do you agree with Grainne? Answer (yes or no) _____

Explanation (3)

Should Grainne add an **acid** or a **base** to the milk? Answer (Acid or Base): _____

Explanation: (3)

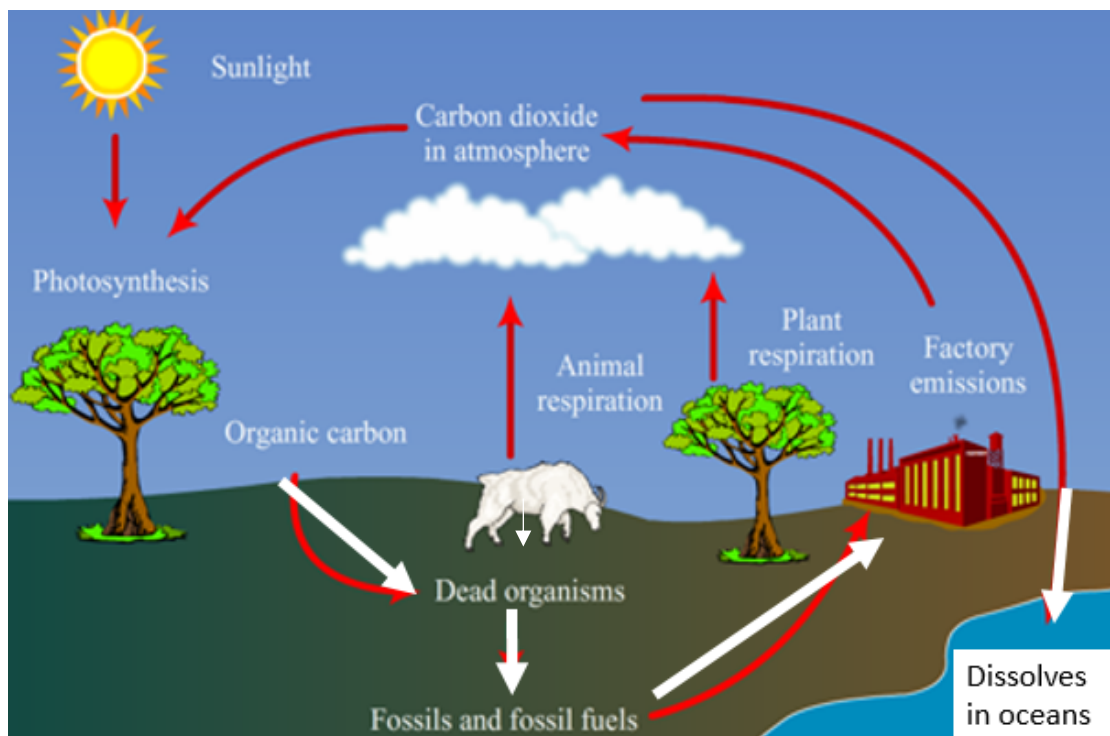
The next day Brian is working and notices that the pH is **at 6.8**. Brian wants to heat the milk for **60 seconds** to kill the bacteria. Brian lets the milk get heated **without** changing the pH. Do you agree with Brian's decision? (See Graph 3). Answer (yes or no)_____

Explanation: (3)

Another example of an acid-base reaction would be when baking soda is added to a test tube of citric acid. When this happens fizzing occurs and a gas is produced. Would you expect the pH of the solution in the test tube to increase or decrease during the reaction? Explain your answer. (6)

Question 3 (24)

The diagram below shows the carbon cycle.



Name the carbon containing gas that living things produce during respiration _____(3)

Name the process that involves the intake of carbon dioxide by green plants _____(3)

List **two** ways carbon dioxide is removed from the atmosphere (6)

1 _____

2 _____

List two ways carbon dioxide is released into the atmosphere. (6)

1 _____

2 _____

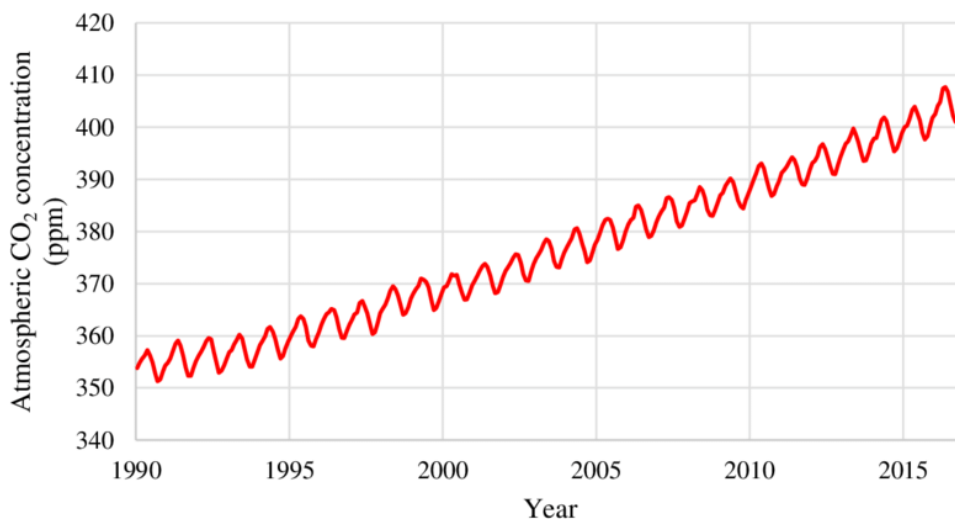
List two places carbon may be stored in the carbon cycle (6)

1 _____

2 _____

Question 4 (15 marks)

Changing levels of carbon dioxide in the atmosphere



Graph 1. Average carbon dioxide (CO₂) in the Atmosphere at Mouna Loa, Hawaii

From Graph 1, is the amount of carbon dioxide in the atmosphere **increasing** or **decreasing**?

Answer _____ (3)

What human factors could be causing a change in the amount of carbon dioxide in the atmosphere?

Answer _____ (3)

Fill in the blanks for the word equation of respiration using the key words. **Water, Light-energy, Carbon dioxide, Oxygen, Glucose (food)**

_____ + _____ → _____ + _____ + _____ (6)

Give an example of a process that removes carbon from the atmosphere _____ (3)

Question 5 (30)

The elements

Periodic table of the elements

1											18						
1 H 1.008											2 He 4.003						
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.41	31 Ga 69.72	32 Ge 72.64	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (97.90)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.8	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209.0)	85 At (210.0)	86 Rn (222.0)
87 Fr (223.0)	88 Ra (226.0)	89 Ac (227.0)	104 Rf (261.1)	105 Db (262.1)	106 Sg (266.6)	107 Bh (264.1)	108 Hs (277.0)	109 Mt (268.1)	110 Ds (271.0)	111 Rg (272.2)	112 Uub (285.0)	113 Uut* (289.0)	114 Uuq (289.0)	115 Uup* (289.0)	116 Uuh (289.0)	117 Uus* (293.0)	118 Uuo (293.0)

Use the periodic table to identify an example (by symbol or name) to match each description in the table below. (12)

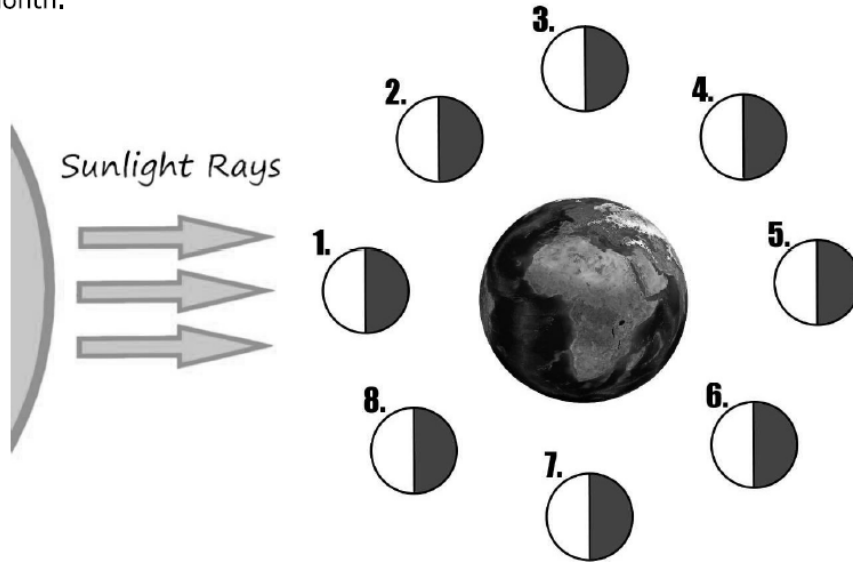
Description	Example
An element that has a full outer shell	
An element that has 1 electron in its outer shell	
An element that has 3 electrons in its outer shell	
An element that has 7 electrons in its outer shell	

Use the periodic table to predict the ratio of atoms and the chemical formula for each of the compounds listed. (18)

Compound	First element	Second element	Ratio	Formula
Water	Hydrogen (H)	Oxygen	2:1	H ₂ O
Hydrochloric acid	Hydrogen (H)	Chlorine (Cl)		
Beryllium Fluoride	Beryllium (Be)	Fluorine (F)		
Methane	Carbon (C)	Hydrogen (H)		

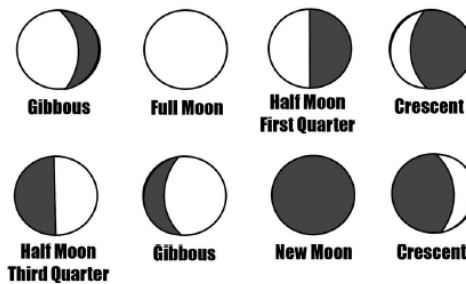
Question 6 (32m)

The diagram below shows the moons orbit around the Earth in one lunar month.



Draw what each position looks like to people on Earth and name each phase. Use the diagram below to help you.

1:		2:		3:		4:	
Name:		Name:		Name:		Name:	
5:		6:		7:		8:	
Name:		Name:		Name:		Name:	



Question 7 (27m)

Solar eclipses can happen a few times each year.

- (a) The diagram below shows a simple model of a solar eclipse (an eclipse of the Sun). In the diagram, write the letter X for Earth, Y for Moon and Z for Sun.



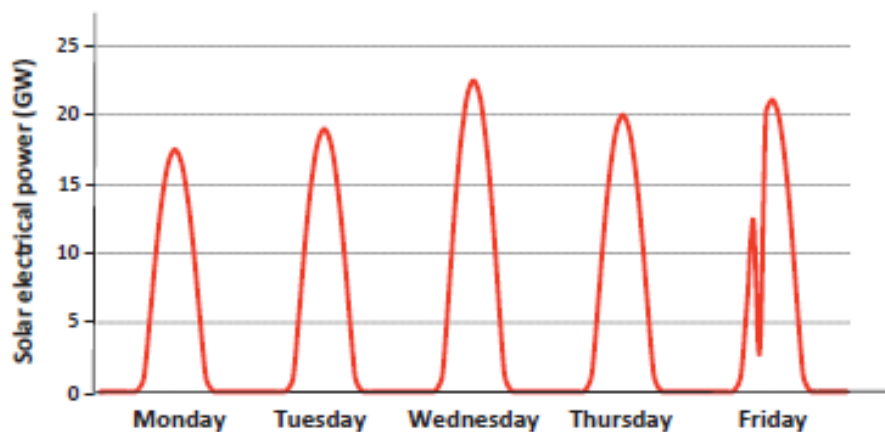
- (b) Two weeks before or after a solar eclipse sometimes there is a lunar eclipse (an eclipse of the Moon). Draw a labelled diagram to show a model of a lunar eclipse.

Labelled diagram

A large empty rectangular box with a black border, intended for the student to draw a model of a lunar eclipse. The text 'Labelled diagram' is written in the top left corner of the box.

A solar eclipse in March 2015 affected the solar electrical power produced in the German electricity grid.

The graph below shows the solar electrical power produced from Monday to Friday during the week of the solar eclipse.



On which day of the week did the solar eclipse occur? Justify your answer.

(6)

Which was the brightest day of the week? Justify your answer.

(6)

Question 8 (36 marks)

Two students carried out an experiment in which they measured the maximum mass of salt that can be dissolved in water at different temperatures (Table 1)

Suggest a **hypothesis** that the students might have formed before the experiment.

(3)

What **instrument** would the students have used to measure:

1. The temperature of the water: _____ (3)

2. The mass of salt: _____ (3)

Table 1: The maximum mass of salt that could be dissolved in water at various temperatures

Temperature of water (°C)	Mass of salt dissolved (g)
20	35
40	65
60	120
80	170
100	250

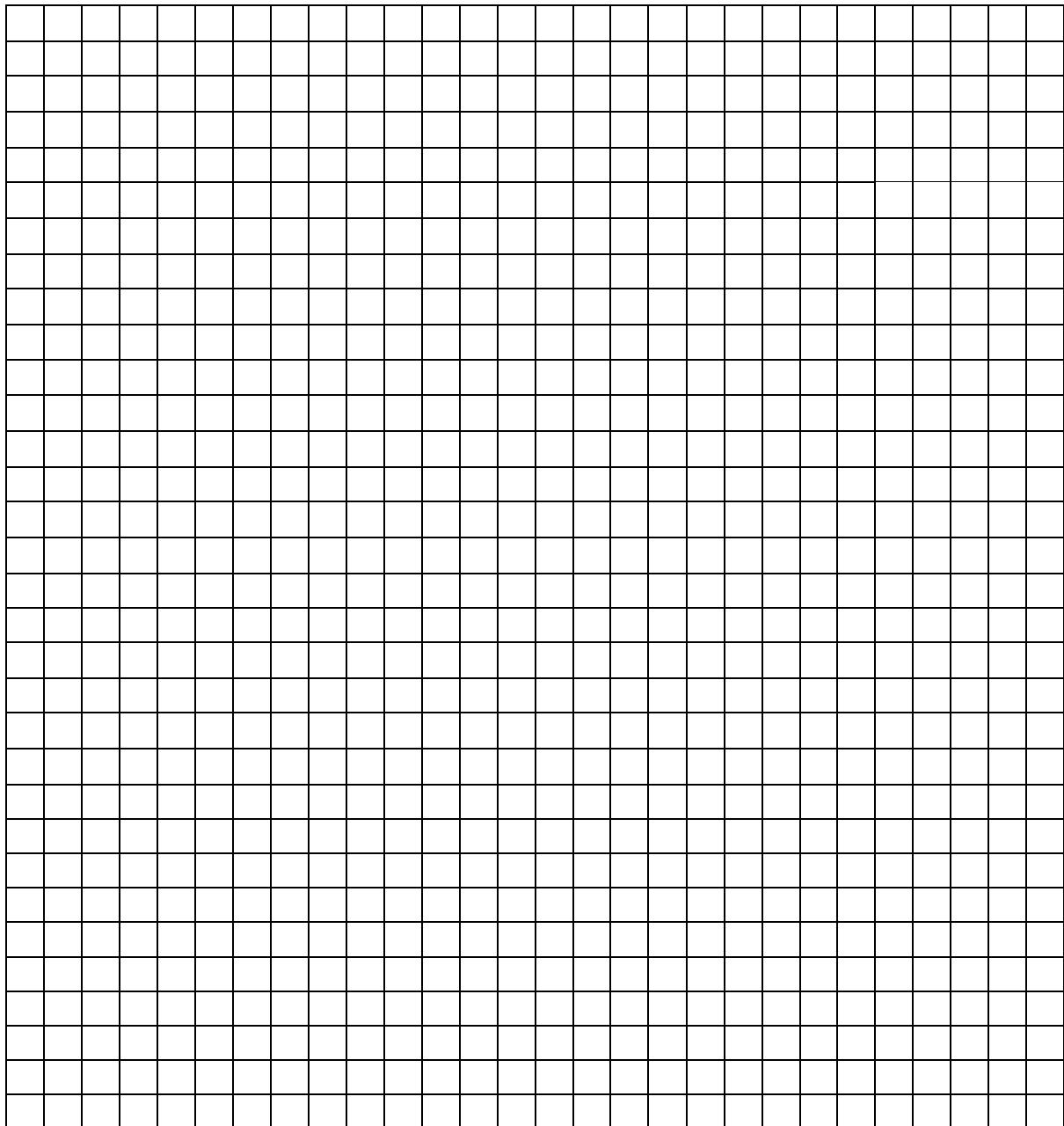
State one variable that you think the student should have **kept constant** during the experiment.

(3)

Explain why you think it would have been important for that variable to be kept constant.

(3)

Draw a graph of temperature of water against mass of salt dissolved from the data in **Table 1**, putting temperature on the x-axis (horizontal) from the data in the table. (12)



What **conclusion** can you draw from your graph that you made from the **Table 1** data?

_____ (6)

Estimate what mass of salt could be dissolved in the water at 50°C: _____ (3)

You are finished! Well done, make sure to double check your answers before you hand this exam up.

Thank you for your hard work throughout the year and have a great summer!