

Time 2 hours

Mr. A. Goodison 2nd year Science Test GCS

Name _____

Answer all questions in the spaces provided.

Good luck!



An image taken by the international space station of a solar eclipse. The moon has passed in front of the sun and the shadow of the moon may be seen on the earth.

Question	Marks	Awarded
1	44	
2	15	
3	21	
4	15	
5	24	
6	36	
7	15	
8	33	
9	24	
Total	227	
Grade descriptor		

Question 1 (27 marks)

The following image (Image 1) gives the different phases of the moon



Image 1: Moon Phases

The next image (Image 2) below shows **the path of the Moons orbit around the Earth** and the position of the sun (not to scale). Using both Image 1 and 2, **Draw a dot** on the Moons orbit to represent the Moon for each **phase of the Moon**. The waxing crescent moon has been done as an **example**. (14)

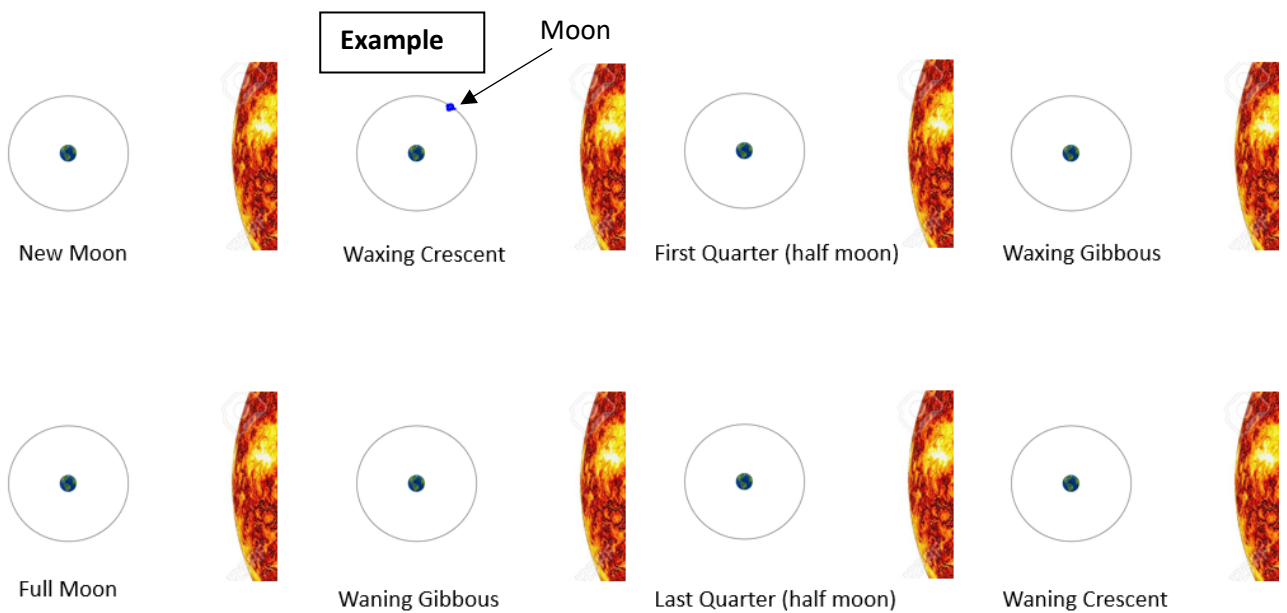


Image 2. Moon orbit position

Why can we see the Moon even though it does not produce any light?

(3)

Below is an image (Image 3) of the Earth and Sun (not to scale). The Earth is in two different positions (**A** and **B**) at different times of the year.

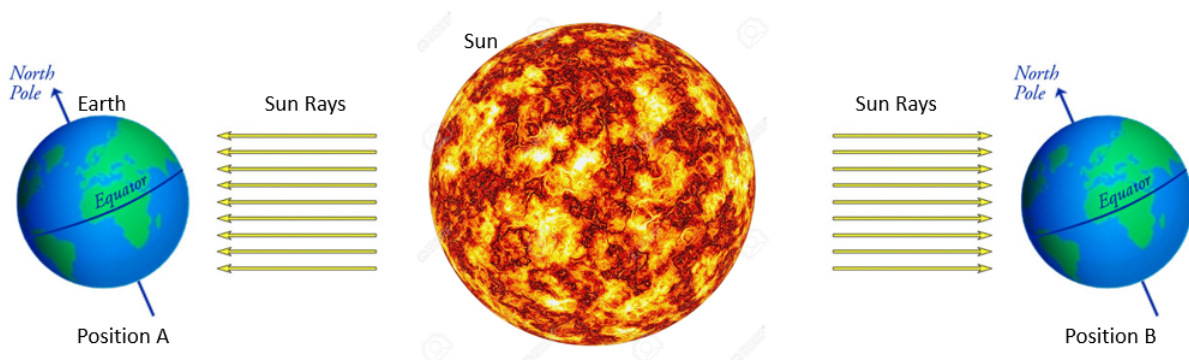


Image 3: Sun rays striking Earth at different times of the year

Ireland is in the Northern Hemisphere and Australia is in the Southern Hemisphere. What season (either **Summer** or **Winter**) are these countries in for the below questions.

Ireland **season** in position A _____ (3)

Australia **season** in position A _____ (3)

Explain your answer

 _____ (3)

Ireland season in **position B** _____ (3)

Australia season in **position B** _____ (3)

Explain your answer

 _____ (3)

How many months would it take Earth to travel from position A to position B? _____ (3)

Describe the arrangement of the Sun, Moon and Earth to allow a **solar eclipse** to be seen from Earth

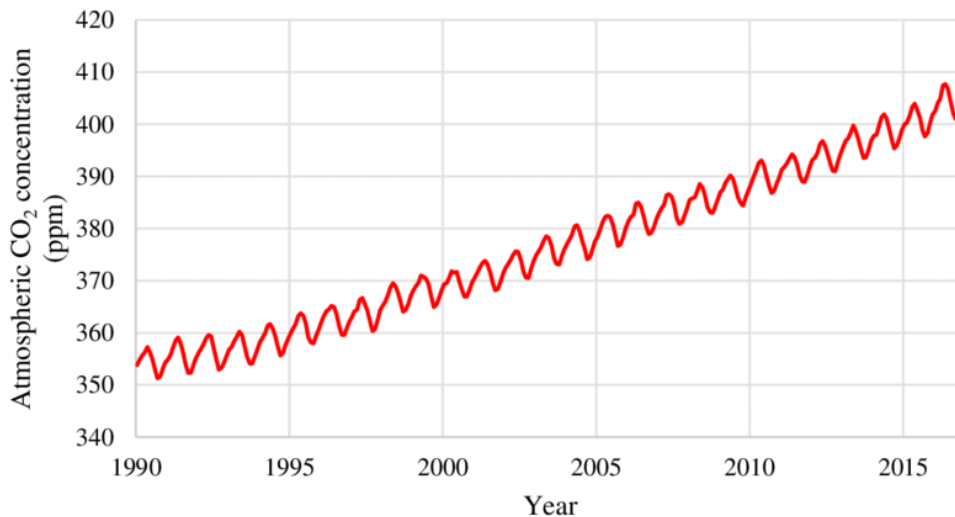
 _____ (6)

Describe the arrangement of the Sun, Moon and Earth to allow a **lunar eclipse** to be seen from Earth

(3)

Question 2 (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)

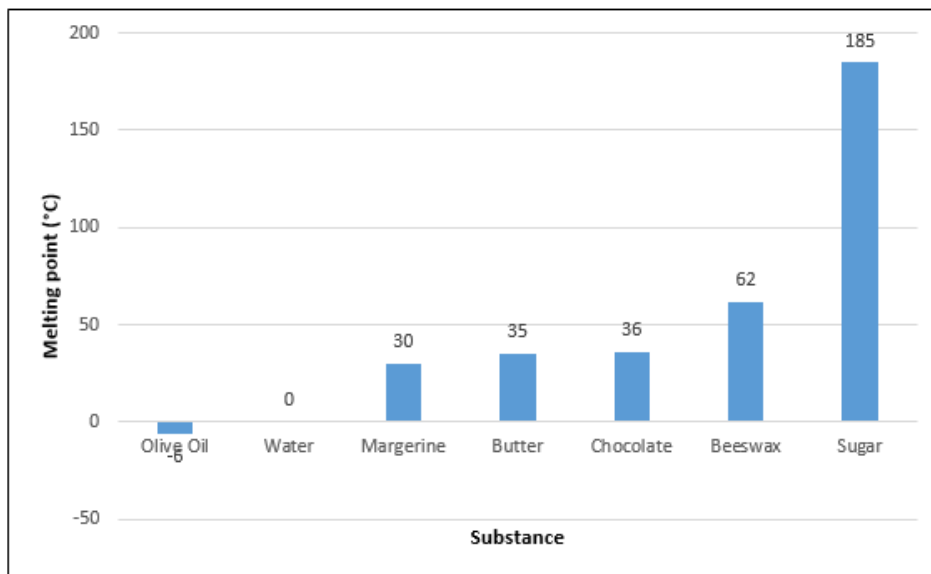
Fill in the blanks for the word equation of photosynthesis using the key words. **Water, Light-energy, Carbon dioxide, Oxygen.**

_____ + _____ + _____ → Glucose (food) + _____ (6)

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

Question 3 (21 marks)

Below is a bar chart showing the melting points of different substances found in the kitchen.



Graph 2: melting points for various substances

Explain what is meant by “melting point”:

(6)

Human body temperature is 37 °C. **Use the data** from Graph 2 to say whether butter and/or beeswax would melt in your hand. **Explain your answers:**

(a) Butter (write “melt” or “would not melt”): _____ (3)

Explain:

(3)

(b) Beeswax (write “melt” or “would not melt”): _____ (3)

Explain:

(3)

A chocolate biscuit cake is made by melting butter and sugar together, and then adding other ingredients.



Using **Graph 2** on melting points, what is the **minimum temperature** which the butter and sugar mixture would have to reach to melt both substances?

Answer: _____ (3)

Question 4 (15 marks)

You want to do an experiment to see make a berocca (effervescent tablet) dissolve as quickly as possible.

Name two factors you could change to increase the rate of the chemical reaction so that it would dissolve faster.



1st thing you could change _____ (3)

Explain in terms of the **particles** how this would increase the reaction rate:

_____ (3)

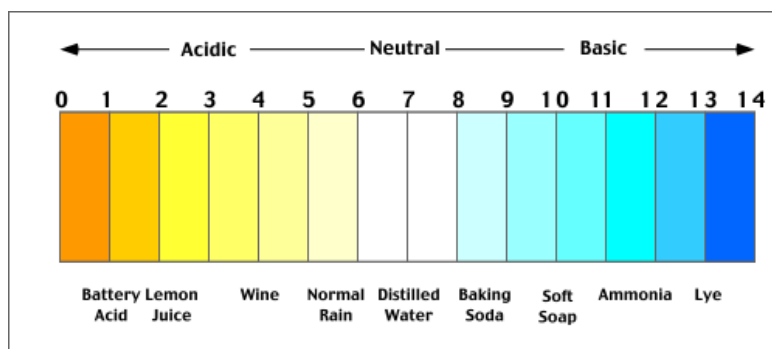
2nd thing you could change _____ (3)

Explain in terms of the **particles** how this would increase the reaction rate:

_____ (3)

What gas was produced in this chemical reaction? _____ (3)

Question 5 (24 marks)



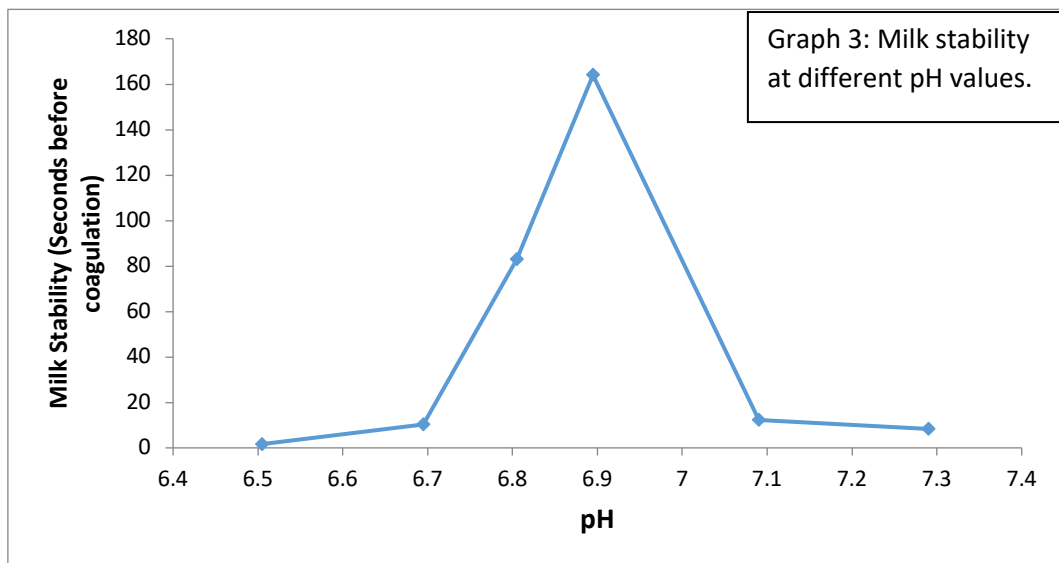
What pH is a neutral solution? Less than 7, greater than 7 or exactly 7. Answer _____ (3)

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)**

Question 6 (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

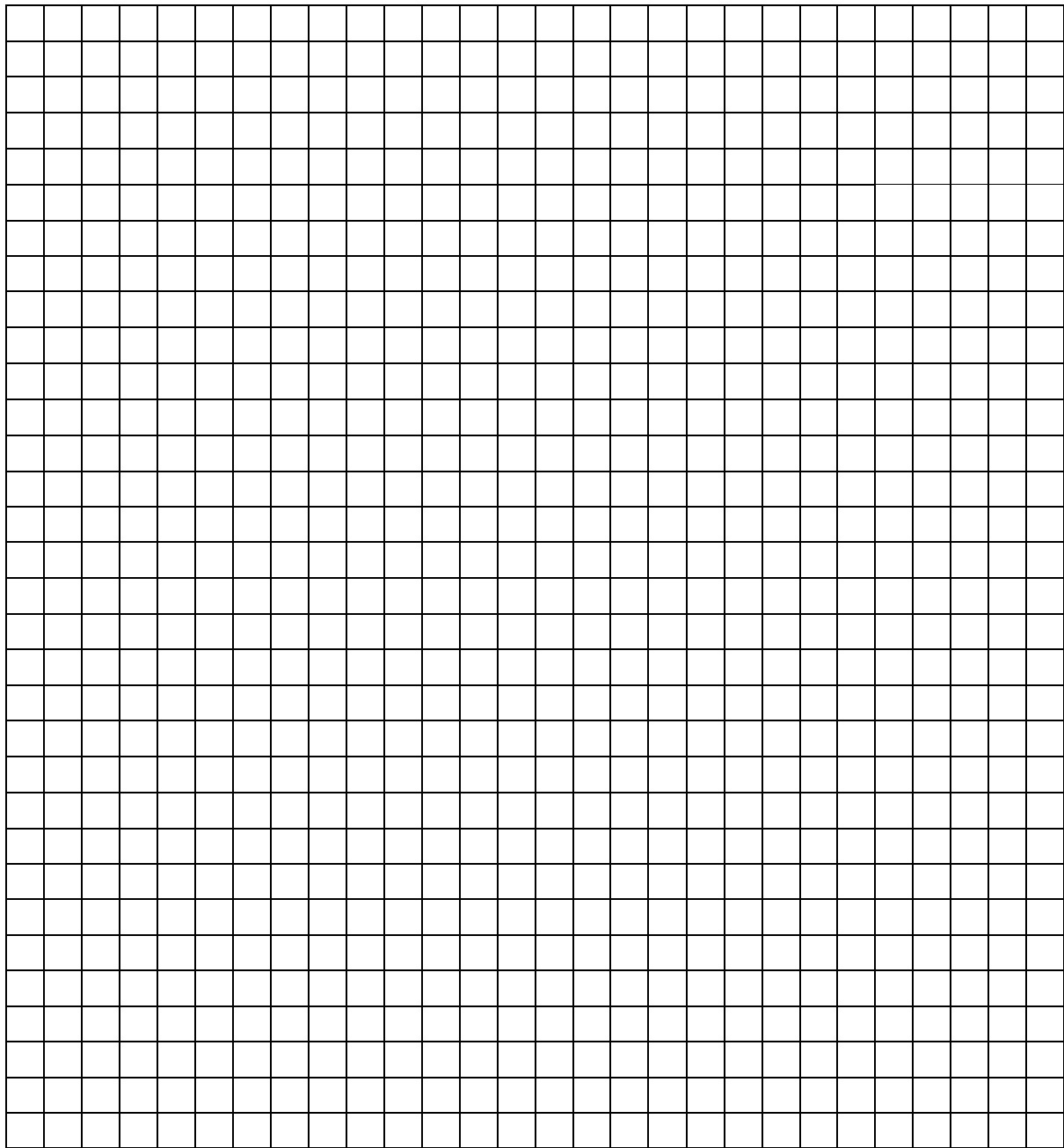
State one variable that you think the student should have **kept constant** during the experiment.

(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?

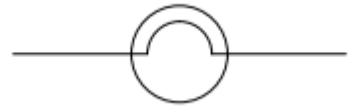
_____ (6)

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

Question 7 (15 marks)

The symbol shown on the right is that of a light bulb. In each of the spaces provided, draw two bulbs so that they are arranged in (i) series and (ii) in parallel

(6)



(i) Two bulbs in series

(ii) Two bulbs in parallel

You are really excited for Christmas and decide to put up a Christmas tree in summer. You take out your Christmas tree lights and find that two of the bulbs are not working but the rest are lighting.

Are these bulbs arranged in series or in parallel? _____ (3)

Explanation: (6)

Question 8 (33 marks)

The diagram shows part of the human breathing system.

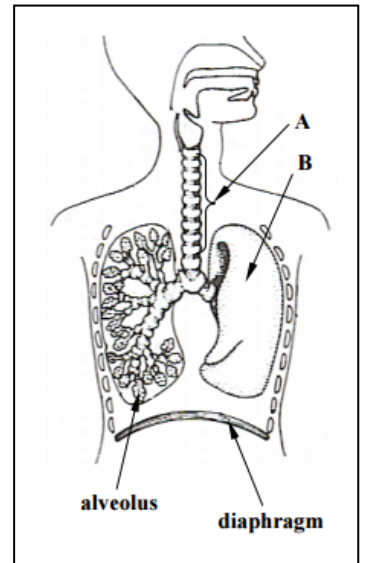
(i) Name the parts labelled **A** and **B** in the diagram.

A _____ (3)

B _____ (3)

(ii) Part **A** has rings of cartilage. What do the rings of cartilage do?

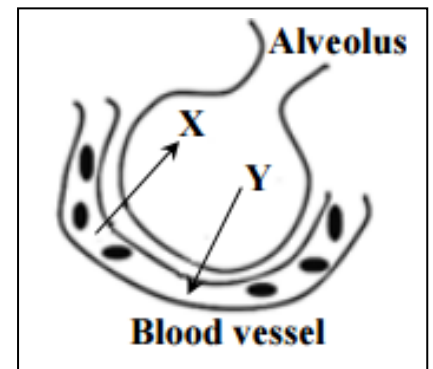
 _____ (3)



During gas exchange in the lungs, gas **X** leaves the blood vessel and enters the alveolus. At the same time, gas **Y** leaves the alveolus and enters the blood vessel.

(i) Name gas **X** _____ (3)

(ii) Name gas **Y** _____ (3)

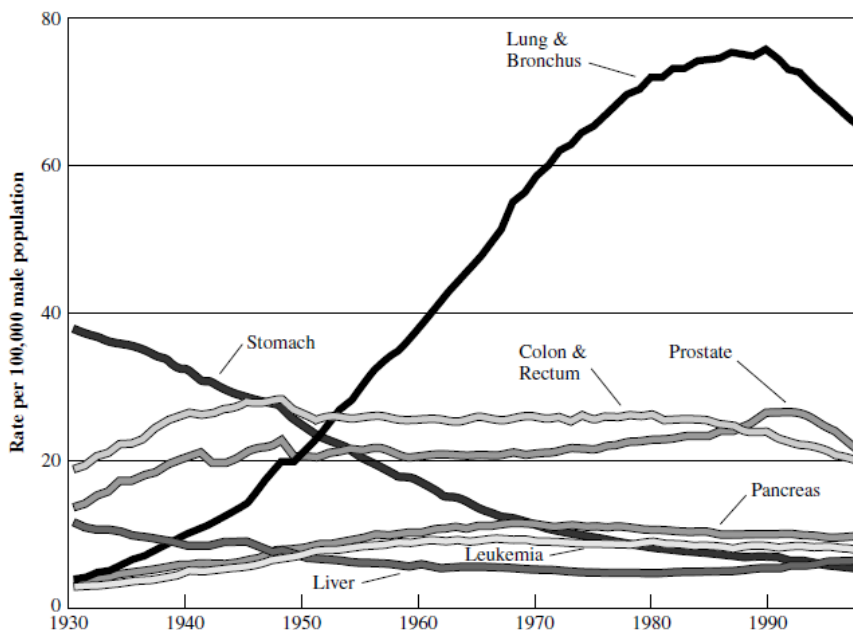


Name a lifestyle factor (something you choose to do) which can affect your breathing system in a positive and negative way.

Positive factor: _____ (3)

Negative factor: _____ (3)

Study the **Graph 4** below on cancer rates and answer the following questions



Graph 4. Cancer rates between 1930 and 2000

What trend in lung cancer do you notice between the years 1930 to 1990? _____ (3)

What trend in lung cancer do you notice after the year 1990? _____ (3)

Suggest a reason for the trends in lung cancer from the graph

(6)

Question 9 (27 marks)

Sophie is a Runner and wants to buy the shoe which will give her the most grip.

She sets up an experiment where she is using a newton balance to test the amount of force it takes for the shoe to begin moving.



She gets the following results

Shoe	Nike	Adidas	Asics
Force (N)	3.02	3.42	3.68

Which shoe should she buy so that she has the most grip? _____ (3)

In this experiment what was the:

Cause variable (the thing she changed). Ans _____ (3)

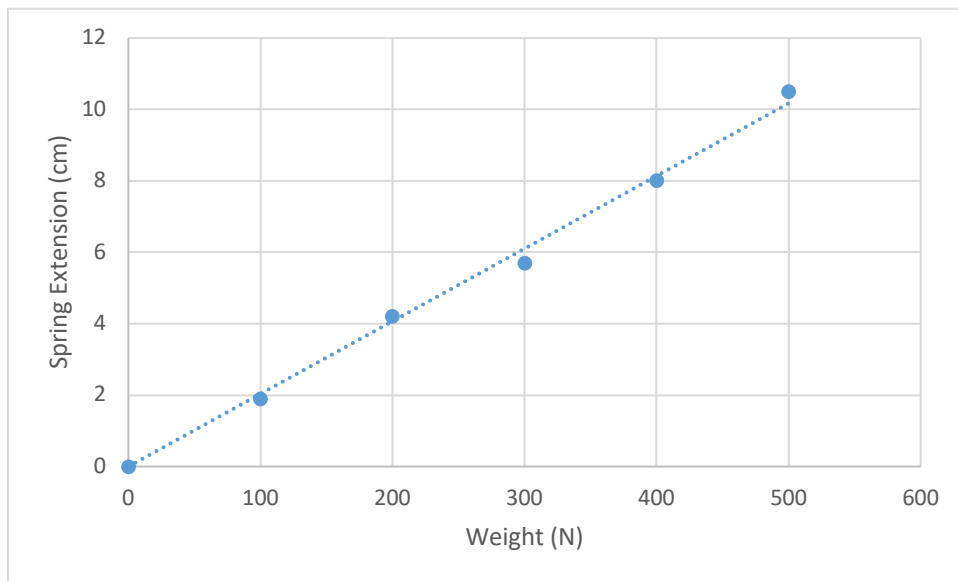
Effect variable (the thing she measured). Ans _____ (3)

Control variable (the things she kept the same). Ans _____ (3)

What is the force which causes grip? _____ (3)

What is the unit of force? _____ (3)

You wish to investigate the relationship between the weight (force) placed on a spring and the extension on that spring you gather the appropriate data and plot the following graph.

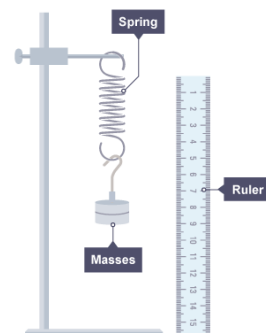


Graph 5, Weight on a spring and spring extension.

What conclusion can you make from looking at **Graph 5**?

(6)

You then place a stone onto the spring and note a spring extension of 9 cm. Use your graph to find the weight of the stone. Answer _____ (3)



Well done, and thank you for being a great student for the whole year and making it a pleasure to be your teacher!

Enjoy the summer =]

If you have time, try to estimate your grade from this test.

If you are completely finished colour in the below picture

