

Time 1 ½ hours

Mr. A. Goodison 1st year Science 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 | 15 | |
| 2 | 12 | |
| 3 | 21 | |
| 4 | 39 | |
| 5 | 21 | |
| 6 | 6 | |
| 7 | 18 | |
| 8 | 36 | |
| 9 | 21 | |
| 10 | 42 | |
| Total | 231 | |
| Grade descriptor | | |

Question 1 (15 marks)

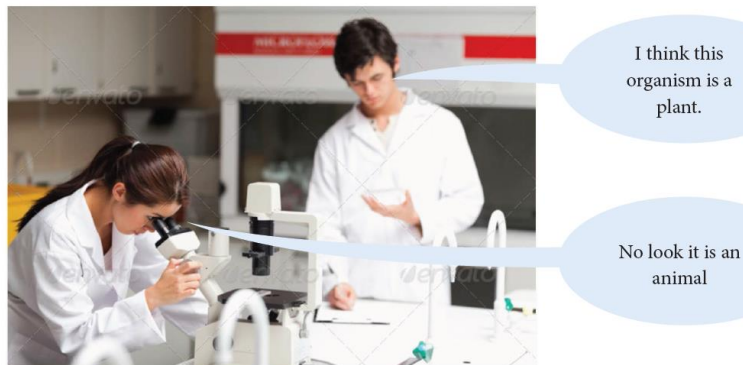
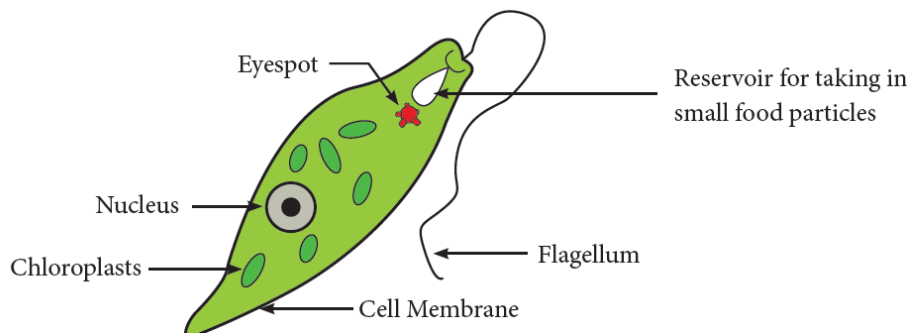
The diagram below shows an organism called Euglena. It is made of only one cell. It lives in ponds and streams.

Conor and Caoimhe were using a microscope to examine a specimen of Euglena.

Why did Conor and Caoimhe use a microscope?

(3)

This is a diagram of Euglena



Look at the diagram and give evidence that:

a) Support Caoimhe's hypothesis, that this organism is an animal.

(6)

b) Support Conor's hypothesis that this organism is a plant.

(6)

Question 2 (12 marks)

Plants and animals can reproduce by **sexual** reproduction or **asexual** reproduction and in some cases by both methods.

What is **asexual** reproduction?

(3)

Give an example of a plant or animal which uses **asexual** reproduction _____(3)

What is **sexual** reproduction

(3)

Give an example of a plant or animal which uses **sexual** reproduction _____(3)

Question 3 (21 marks)

Mary and John are expecting a baby in the coming months and are curious about what the chances (or probability) is that the baby will have blue eyes.

Key: **Gene B = codes for brown eyes.** **Gene b = codes for blue eyes.**

Mary has blue eyes and carries two blue eye genes (**bb**), John has brown eyes but carries a gene for both brown eyes and blue eyes (**Bb**)

Use the space below to draw a **punnett square** to investigate the possible combinations of genes for the baby (9).

Using your **punnett square** what are the chances (either % or as a fraction) that the baby will have:

blue eyes: Answer _____ (3)

Brown eyes: Answer _____ (3)

Explain why John's eyes are **brown** even though he carries a gene for **blue** eyes?

(6)

Question 4 (39 marks)

Below is a diagram which shows the structure of an atom:

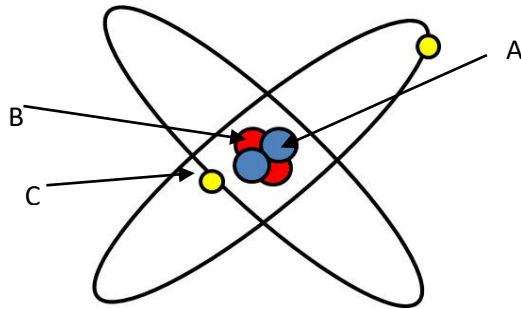


Figure 2

Complete the following table for the particles A, B and C. (9)

| Particle | Particle Name | Charge | location |
|----------|---------------|---------|----------|
| A | | Neutral | |
| B | | | |
| C | | | |

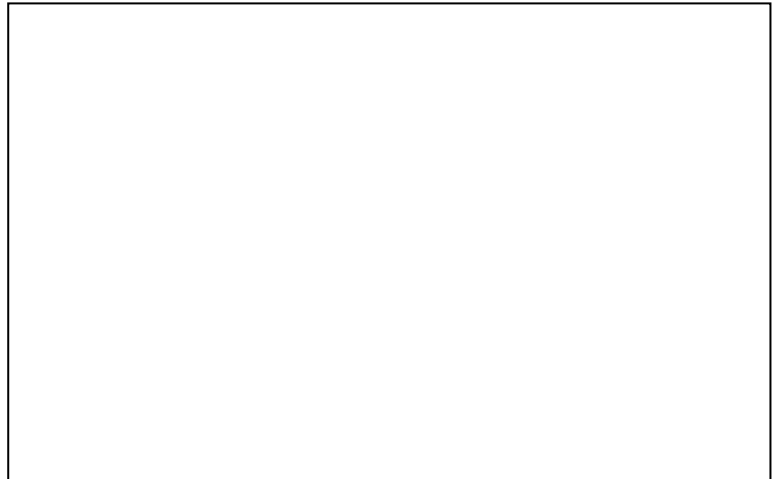
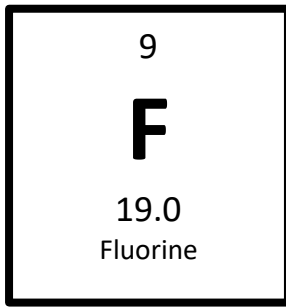
Here is the symbol for **Fluorine** from the Periodic table:

Complete the following table for a neutral atom of Fluorine (6)

| | |
|---------------------|--|
| Number of protons | |
| Number of neutrons | |
| Number of electrons | |

| |
|----------|
| 9 |
| F |
| 19.0 |
| Fluorine |

Draw the Bohr model of a Fluorine atom in the space provided (9)



How many electrons are in the **outer** shell? -

_____ (3)

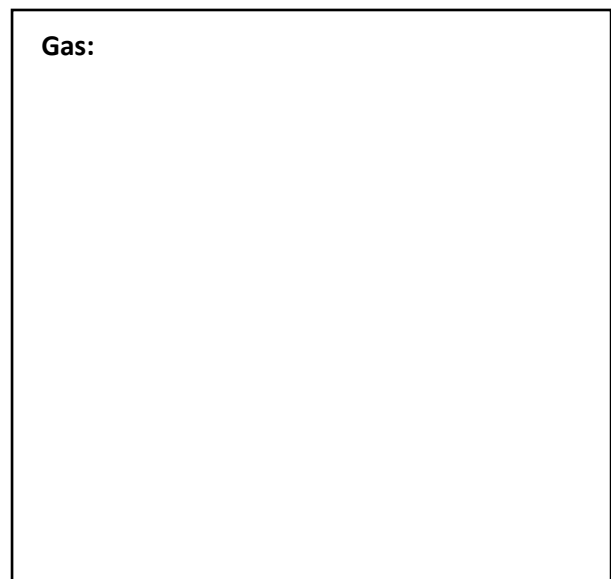
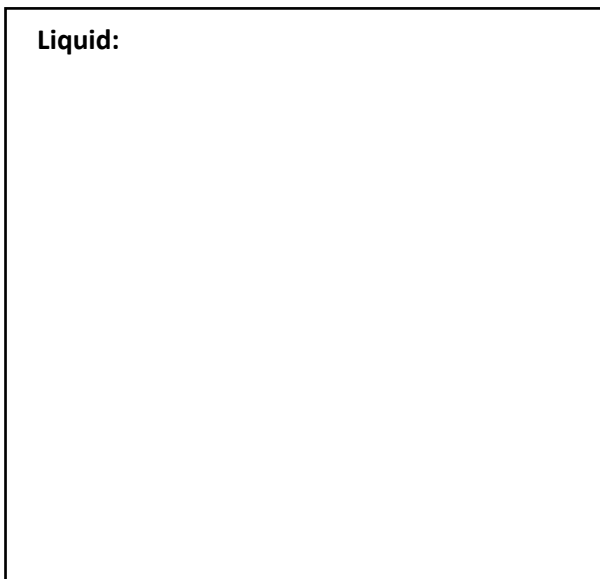
How many extra electrons would it take to **fill** the outer shell? _____ (3)

Are the electrons **bigger** or **smaller** than the protons and neutrons? _____ (3)

What sub-atomic particles make up the **nucleus**? _____ and _____ (6)

Question 5 (21 marks)

Draw diagrams showing how the particles are **arranged** and **move** in a liquid and in a gas (6):



Eoin finds two plastic bottles on the path on his way home from school. Both have lids screwed on tightly. One is empty (except for the air inside) and the other is full of water. He decides to stand on both. He notices that he can squash the empty one, but not the full one.



Explain, in terms of the particles in the liquid and gas diagrams you have drawn above, and your knowledge of the states of matter, why Eoin can only squash the empty one.

(6)

Write the **name** of the change of state which happens in the following cases:

Tiny water drops form on the inside of a cold window when you breathe on it: **eg. condensation**

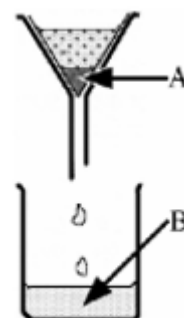
Wet clothes drying on a washing line: _____ (3)

Wax turns into a liquid as a candle burns: _____ (3)

In a glass factory, molten (liquid) glass cools and turns into a solid: _____ (3)

Question 6 (6 marks)

A mixture of sand and salt was stirred up with water and then filtered as shown in the diagram.



Substance **A** was did not pass through the filter paper. Name **A**.

A _____ (3)

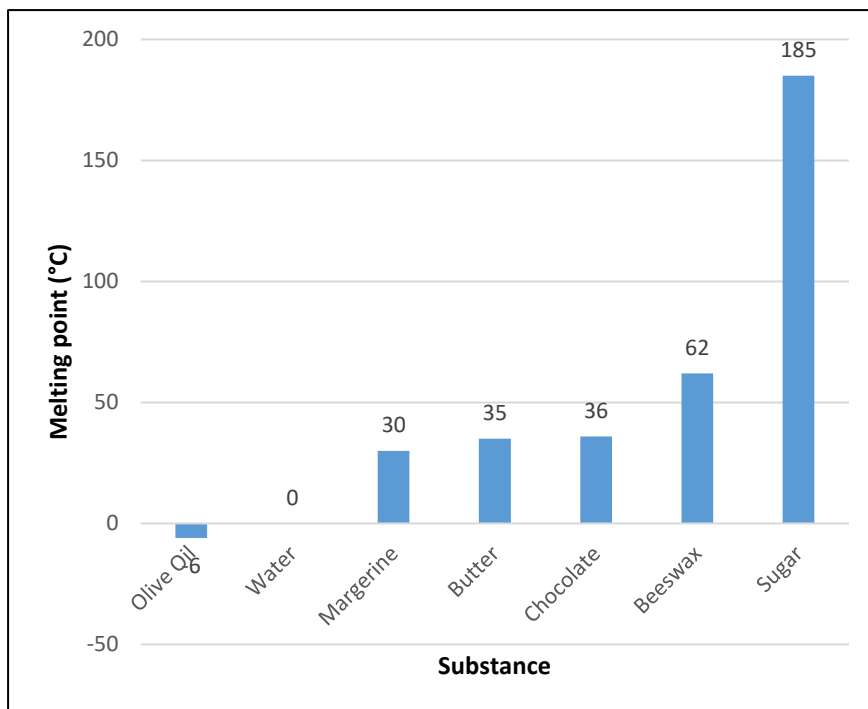
Substance **B** was passed through the filter paper.

Name substance **B** which is dissolved in the water.

B _____ (3)

Question 7 (18 marks)

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



Explain what is meant by “melting point”:

(3)

Human body temperature is 37 °C. **Use the data** in the bar chart 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)

You find the **volume** of the bolt to be **36 cm³**.

Your science teacher then asks you to figure out **what type of metal** the bolt is made from by determining its **density**.

You measure the **mass** of the bolt to be: **162 g**

Use the formula below to calculate the density of the bolt

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

Density of the bolt _____ (6)

Use the density of the bolt and the table below to identify which type of metal the bolt is made from.

| Metal | Density (g/cm³) |
|--------------|-----------------------------------|
| Aluminium | 2.712 |
| Brass | 8.52 |
| Cast iron | 7.3 |
| Copper | 8.94 |
| Gold | 19.32 |
| Iron | 7.85 |
| Lead | 11.34 |
| Lithium | 0.534 |
| Mercury | 13.593 |
| Nickel | 8.908 |
| Platinum | 21.4 |
| Silver | 10.49 |
| Sodium | 0.971 |
| Steel | 7.85 |
| Tin | 7.28 |
| Titanium | 4.5 |
| Tungsten | 19.6 |
| Zinc | 7.135 |

Type of metal the bolt is made from _____ (3)

The density of water is 1 g/cm^3 . Name one metal in the table that will float on water?

(3)

Explain your answer

(6)

Question 9 (21 marks)

Zofia wants to plot a graph of her motion as she cycles her bicycle, and devises a way to do it.

She cycles along a flat track and drops a piece of blu-tak every two seconds (as measured on her watch), each of which sticks to the road. Then she measures the distance of each piece from the starting line. By doing this she is able to construct a data table for her motion as follows:



| | | | | | | |
|--------------|---|---|----|----|----|----|
| Distance (m) | 0 | 5 | 10 | 15 | 20 | 25 |
| Time (s) | 0 | 2 | 4 | 6 | 8 | 10 |

Draw a distance-time graph of her motion, putting **time** on the x-axis (12):



Use your graph to estimate how far she had travelled after 5 seconds: _____ (3)

Using the formula: $Speed = \frac{Distance}{Time}$ to calculate Zofia's speed at 10 seconds.

Answer: _____ (6)

Question 10 (42 marks)

| Planet | Distance from the sun (Astronomical Units) | Relative volume compared to Earth | Surface Gravity (m/s ²) | Number of Moons |
|---------|--|-----------------------------------|-------------------------------------|-----------------|
| Mercury | 0.4 | 0.056 | 0.37 | 0 |
| Venus | 0.7 | 0.87 | 8.9 | 0 |
| Earth | 1 | 1 | 9.8 | 1 |
| Mars | 1.5 | 0.15 | 3.7 | 2 |
| Jupiter | 5.2 | 1300 | 2.5 | 67 |
| Saturn | 9.5 | 760 | 10.4 | 62 |
| Uranus | 19 | 63 | 8.9 | 27 |
| Neptune | 30 | 58 | 11.2 | 13 |

Which planet is closest to the Sun _____ (2)

Which planet is farthest from the Sun _____ (2)

Which planet is the biggest in volume _____ (2)

Which planet is the smallest in volume _____ (2)

Which planet is the closest in volume to Earth _____ (2)

Which planet has the weakest surface gravity _____ (2)

Which planet has the strongest surface gravity _____ (2)

On which planet would you weigh the most? _____ (2)

Which planets have no Moons? _____ (2)

Match the correct word to the explanation (6)

| | | |
|--------|--|---|
| Matter | | The amount of matter in an object |
| Mass | | The amount of space an object takes up |
| Volume | | Anything that occupies space and has mass |

Imagine in 15 years' time you have achieved your dream of becoming an astronaut.

- (i) Will you have mass in outer space? (**yes** or **no**) _____ (3)
- (ii) Will you have weight in outer space? (**yes** or **no**) _____ (3)



Give the SI unit of mass _____ (3)

If your teacher has a mass of **72 kg** what is his **weight** on **Earth** and on **Mercury**? **Hint, use the planet data table above. (9)**

Use the following formula: $Weight = mass \times surface\ gravity$

Weight on Earth _____

Weight on Mercury _____

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 and then colour in the pictures on the next page.

