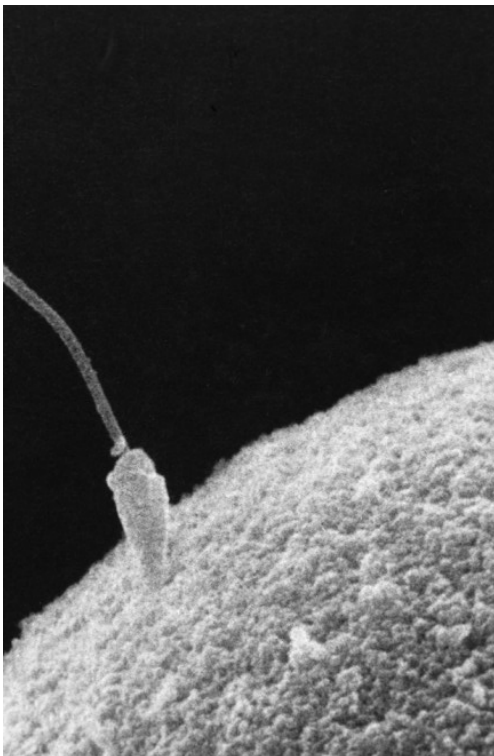


1st Year Science, Summer 2022

Time allowed: 1 hour

Mr. A. Goodison

Student Name _____



Answer all questions in the spaces provided.

Good luck!

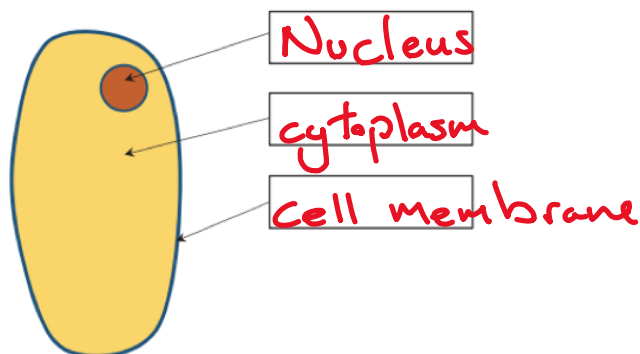
An image of a sperm meeting an egg.

Question	Marks	Awarded
Total	47	
Grade descriptor		

Junior Cycle	
Percentage	Grade Descriptor
≥ 90 to 100	Distinction
≥ 75 and < 90	Higher Merit
≥ 55 and < 75	Merit
≥ 40 and < 55	Achieved
≥ 20 and < 40	Partially Achieved
≥ 0 and < 20	Not Graded (NG)

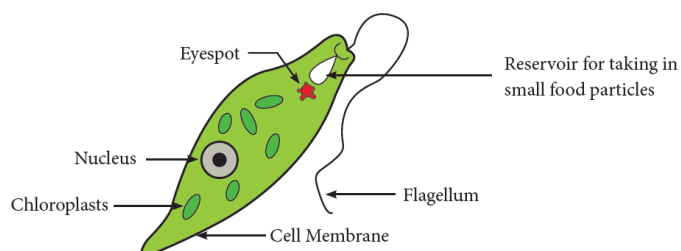
Question 1

(a) The diagram below shows a cell. Fill in the blanks to label the parts of the cell (3)



This is a diagram of Euglena

The diagram on the right shows an organism called Euglena. It is made of only one cell. It lives in ponds and streams. Emma and Caoimhe were using a microscope to examine a specimen of Euglena.



b) Support Caoimhe's hypothesis, that this organism is an animal. (1)

This organism has chloroplasts, animal cells do not have chloroplasts.

This organism has no cell wall, animal cells have no cell wall.

c) Support Emma's hypothesis that this organism is a plant. (1)

This organism has chloroplast, plant cells have chloroplasts.

d) Complete the table to give the function of the following cell structures. One is already done. (2)

Cell structure	Function
Mitochondria	Releases energy from food during respiration
Nucleus	Stores DNA OR controls the activities of the cell
Cell membrane	Controls (allows) what substances can enter and exit the cell

Question 2

(a) Describe one difference between sexual and asexual reproduction.

(2)

Sexual reproduction involves two parents while asexual reproduction involves only one.

OR any other valid responses: Sexual reproduction involves gametes/offspring are not clones etc

Below is an outline of evolution by natural selection. Use the words provided to fill in the blanks. (6)

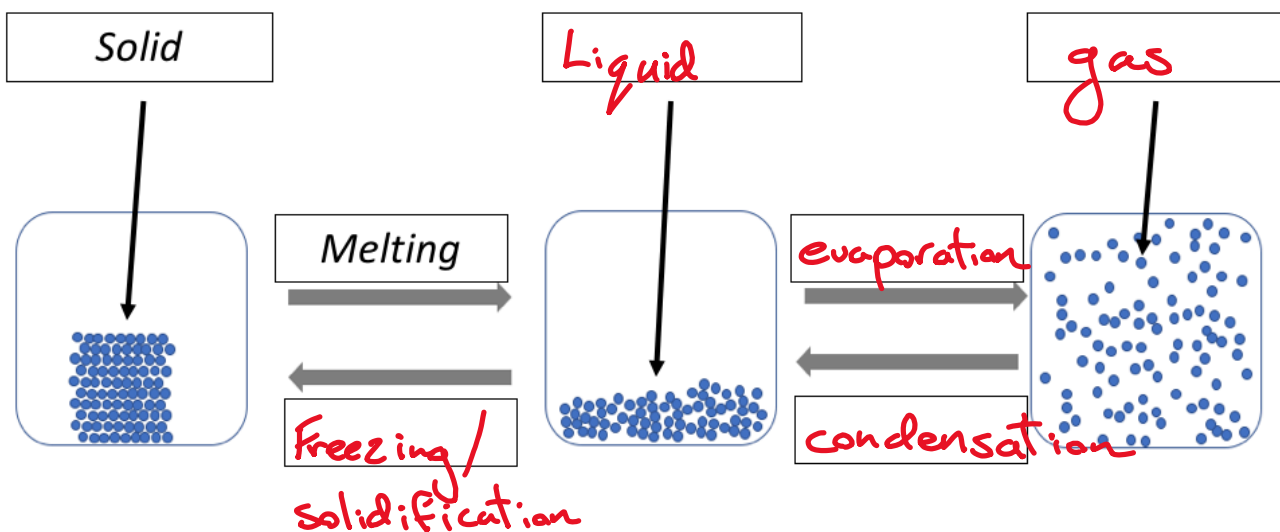
species, reproduce, fittest, competition, overpopulation, mutations

As species reproduce they produce many offspring, this is called overpopulation. Due to random genetic mutations in DNA there is variation between members of a species.

Due to limited resources available competition takes place and only the fittest offspring, which is the best suited to their environment, will survive. This is called survival of the fittest. The surviving organism is more likely to reproduce and pass on these beneficial genes to the next generation. Over a long period of time a new species may form.

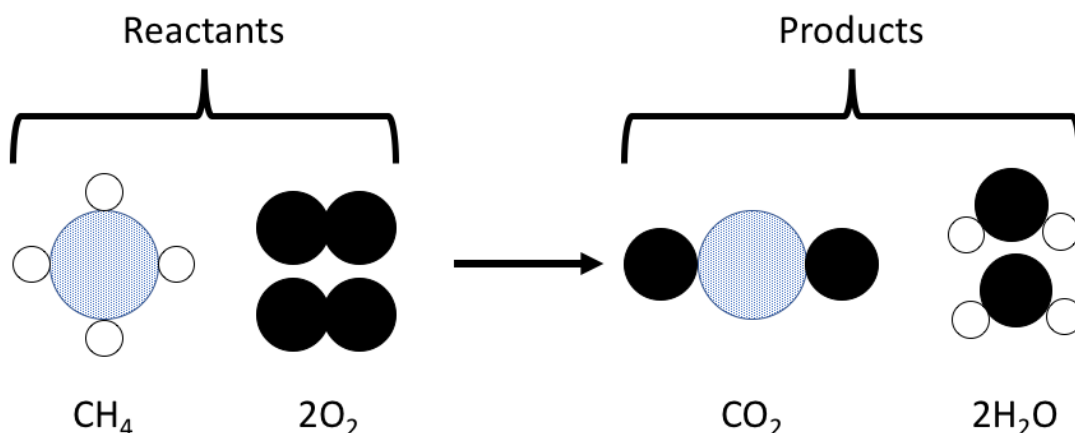
Question 3

a) The diagram below shows three states of matter and the changes of state. Fill in the blanks to complete the diagram. (5)

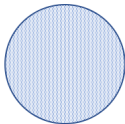




Question 4

Natural gas contains methane (CH₄). Methane is a fuel. Methane burns in oxygen to produce carbon dioxide and water. The diagram below represents the reaction.



(a) Count the number of each type of atom in the products to complete the table below (1)

Element	Type of atom	Number of atoms in reactants	Number of atoms in products
Carbon		1	1
Hydrogen		4	4
Oxygen		4	4

(b) Mass is conserved (the same) during this reaction. What evidence is there for this? (2)

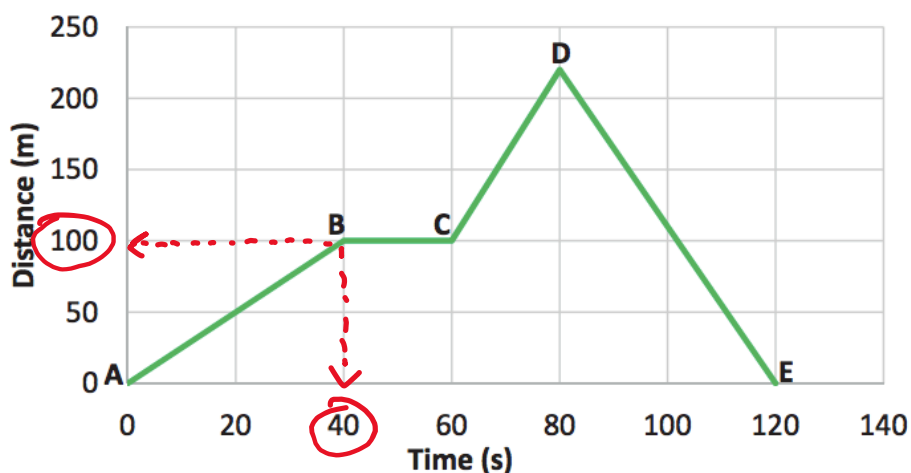
The same type and number of atoms in the reactants is the same as the products

(c) The burning of methane is an example of a chemical change. Describe one difference between a physical change and a chemical change. (2)

In a chemical change a new substance (OR type of particle) is formed. No new substance (OR type of particle) is formed in a physical change.

Question 5

The graph below represents the journey of a cyclist.



(a) Name an instrument that could be used to measure the time taken for the journey. (1)

A stopwatch

(b) Calculate the average speed of the cyclist as he travelled from point A to point B. Include the unit for your answer. (3)

$$\text{Speed} = \frac{\text{Dist}}{\text{Time}}$$

$$= \frac{100\text{m}}{40\text{s}} = 2.5\text{m/s}$$

$$\text{Speed} = ?$$

$$\text{Dist} = 100\text{m}$$

$$\text{Time} = 40\text{s}$$

(c) Describe the cyclist's motion between points B and C of his journey. (1)

Stopped OR stationary

(d) The cyclist's speed as she travelled from point A to point B was less than her speed as she travelled from point C to point D. What evidence is there in the graph to support this? (1)

The slope from C to D is steeper than the slope from A to B.

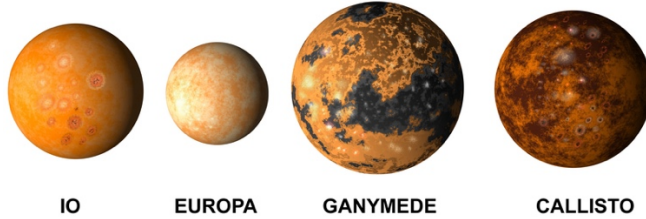
(e) Describe what the cyclist did at point D. (1)

Turned around OR turned back OR Began moving towards starting location

Question 6

The planet Jupiter is the largest planet in our solar system and is described as a “gas giant”. Jupiter has four large moons and many smaller ones. These large moons were discovered in 1610 by Italian scientist Galileo Galilei. Data about the size and density of the four large moons of Jupiter are given in the table below.

Moon of Jupiter	Diameter (km)	Density (g/cm ³)
Io	3640	3.53
Europa	3120	3.01
Ganymede	5270	1.94
Callisto	4820	1.83



IO

EUROPA

GANYMEDE

CALLISTO

Data about the size and density of some other objects in our solar system are given in the table below.

Object	Diameter (km)	Density (g/cm ³)
Mercury	4880	5.43
Earth	12700	5.51
Earth's Moon	3470	3.34
Mars	6780	3.93
Jupiter	140000	1.33
The Sun	139000000	1.41

a) What is the diameter of Europa? (1)

3120 km

b) Which planet has the smallest diameter? (1)

Mercury

c) Which planet has the greatest density? (1)

Earth

d) Jack and Emma look at the data in the tables. Jack says “I think as the diameter of the increases the density increases” Emma disagrees. Does the data support Jack’s hypothesis? Explain your answer. (1)

No, the data does not support his hypothesis. From looking at the data we can see that Jupiter has the largest diameter of all the planets and moons but has the lowest density.

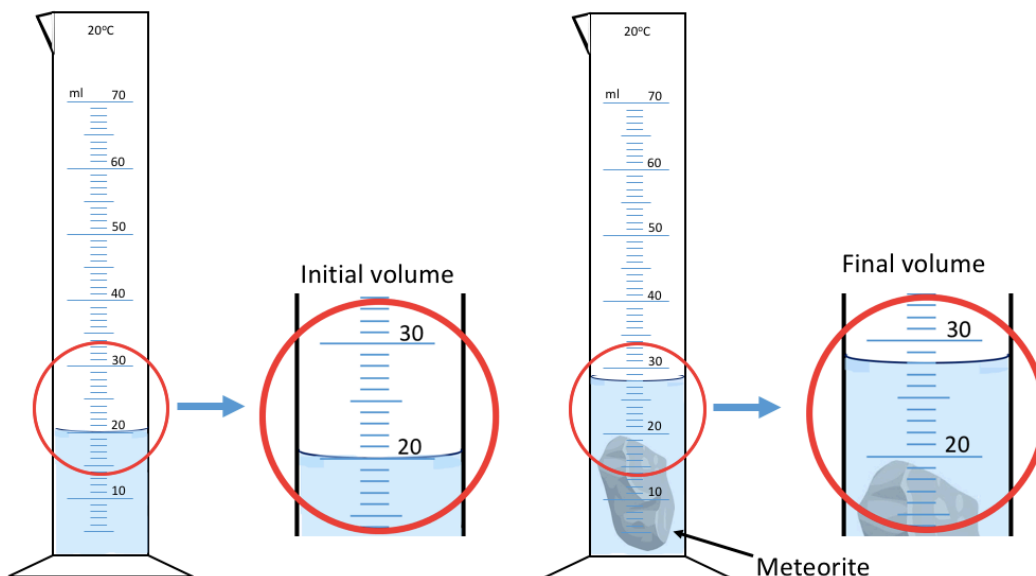
(e) Callisto is a moon and Mercury, of similar size, is a planet. What is the difference between a moon and a planet? (2)

A moon orbits a planet while a planet orbits a star.

Question 7

A meteorite is an object that comes from outer space and lands on Earth.

Emma is working with a small meteorite which came from space and landed on Earth. She takes a piece of it and wants to measure its volume.



Study the diagram above for measuring the volume of the meteorite carefully.

a) Name the measuring instrument being used to measure the volume. (1)

Graduated cylinder

b) What was the initial volume of water? (1)

20 cm³

c) After the meteorite was added, what was the final volume? (1)

28 cm³

d) Calculate the volume of the meteorite. (1)

8 cm³

e) Afterwards, Emma then wants to measure the mass of the meteorite. What measuring instrument should she use to do this? (1)

Mass balance

The densities of four materials commonly found in space objects are given in the table on the right.

Object	Density (g/cm ³)
Water	1.0
Granite	2.8
Basalt	3.0
Iron	8.0

The **mass of the meteorite was 24 g**. Using the **volume** of the meteorite which you calculated in part (d), Calculate the density of the meteorite and identify the meteorite as either, granite, basalt or iron using the table above. Include the unit with your answer. (4)

Use the correct formula from the list below to calculate the density.

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

$$= \frac{24\text{g}}{8\text{cm}^3}$$

$$= 3\text{g/cm}^3$$

$$\text{Mass} = 24\text{g}$$

$$\text{Volume} = 8\text{cm}^3$$

$$\text{Density} = ?$$

$$F = -ks$$

$$\sigma = \frac{F}{A}$$

$$\varepsilon = \frac{\Delta l}{l}$$

$$E = \frac{\sigma}{\varepsilon}$$

$$\rho = \frac{m}{V}$$

$$\mu = \frac{F}{R}$$

$$p = \frac{F}{A}$$

Forces and materials

Hooke's law

stress

strain

Young's modulus

density

coefficient of friction

pressure

Density (and unit) _____

Is the meteorite granite, basalt or iron? Basalt

Finished early section

Do you want to tell me something you learned in science this year which has not been asked in the exam? Use the space below to show off your scientific knowledge. You may get bonus points!