

# LCC LEARNING

Primary to A Level academic tuition

## GCSE Assessment

## Biology

You have **60 minutes** to complete this exam.

Please read the questions carefully

You may **NOT** leave early.

**\_\_ / 100 marks**

**Turn over for instructions**



## Instructions

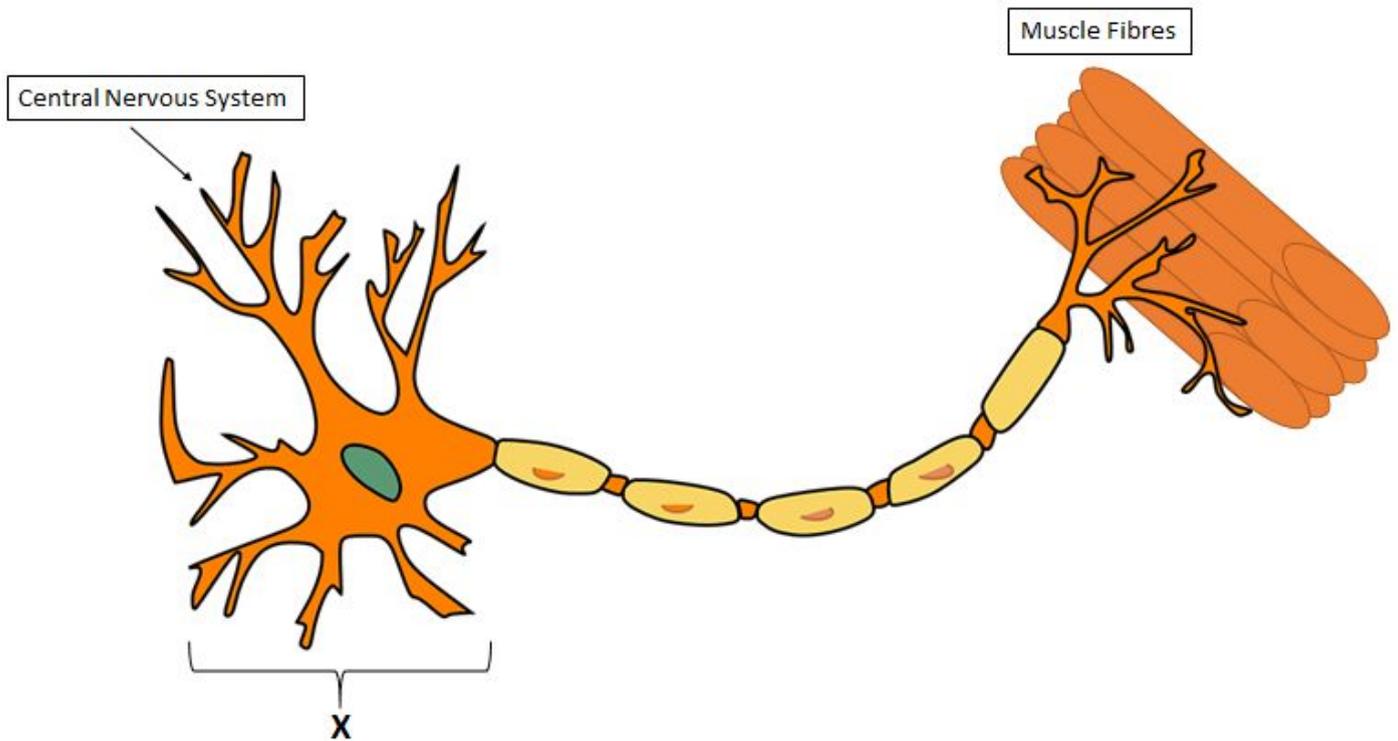
- Answer all questions
- Write all your working inside the question booklet.
- It is suggested that you make use of a periodic table (provided separately)
- You may use a calculator - but you are advised to make a note of each step of your calculations

## Equipment needed

- Ruler
  - Pen or pencil
- Calculator



1. a) What type of neuron is shown? (1)



b) What is the name of part X? (1)

c) What name is given to the gap between an incoming nerve from the CNS and the neuron shown? (1)

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d) Draw a diagram in the space below summarising a human nervous system's response to touching a hot pan. (3)

e) In the future, some believe that damage to parts of the body that do not normally regenerate such as the spinal cord may be repairable. Describe the process that may achieve this. (3)

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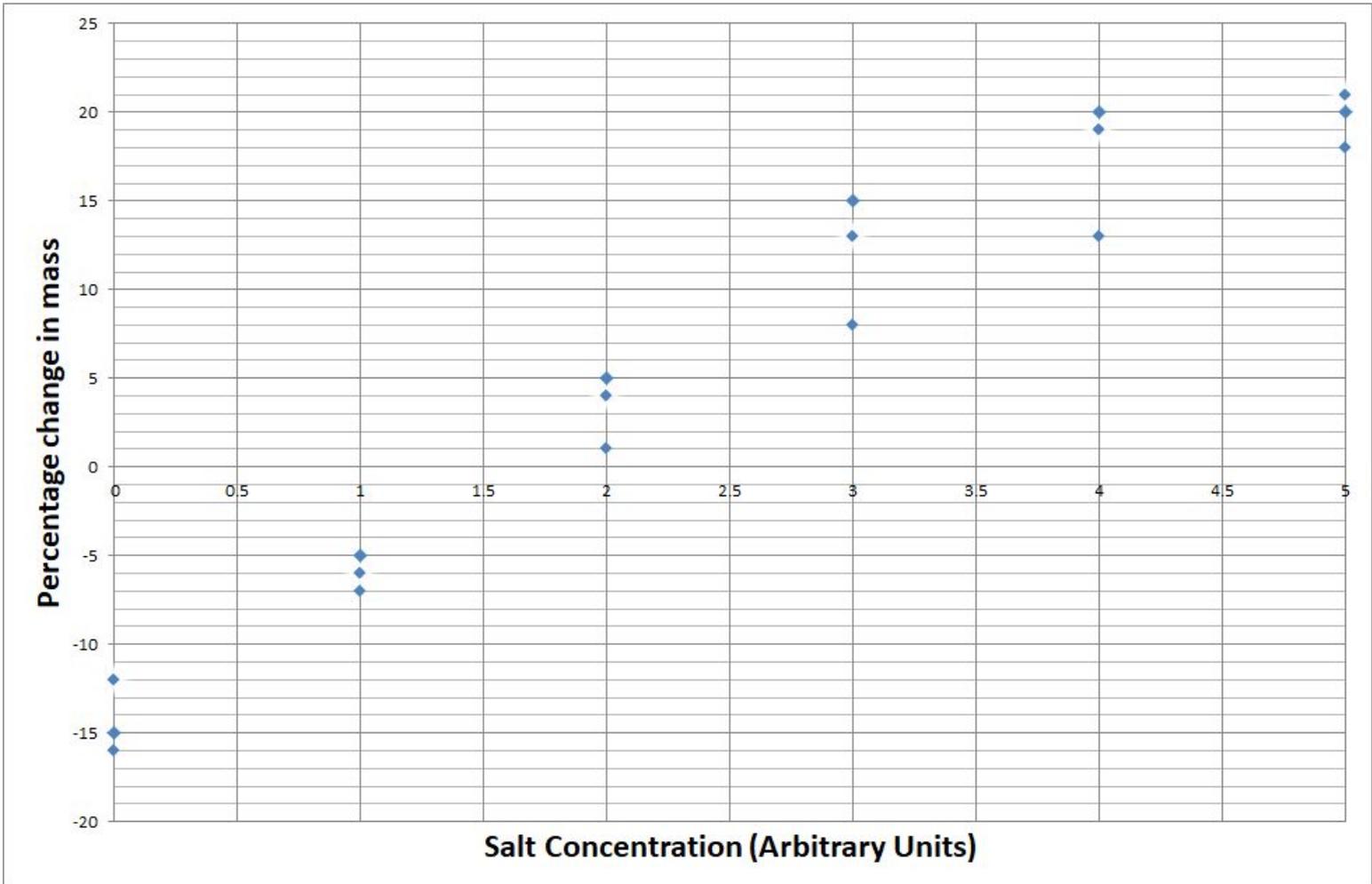




3. Rudolf used a knife to cut pieces of potato, and weighs them.

He places pieces into different concentrations of sugar solution; after 24 hours he pats the pieces dry and weighs them.

The graph below shows the percentage change in mass for each concentration.



a) Draw a line of best fit for this experiment. (2)

b) Why did Rudolf plot the percentage change in mass, and not the difference in mass? (1)

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c) Which process is responsible for these results? (1)

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d) Suggest the solute concentration of the original potato (1)

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e) Suggest **two** ways Rudolf could improve on his experiment, and explain how these changes would affect the results. (4)

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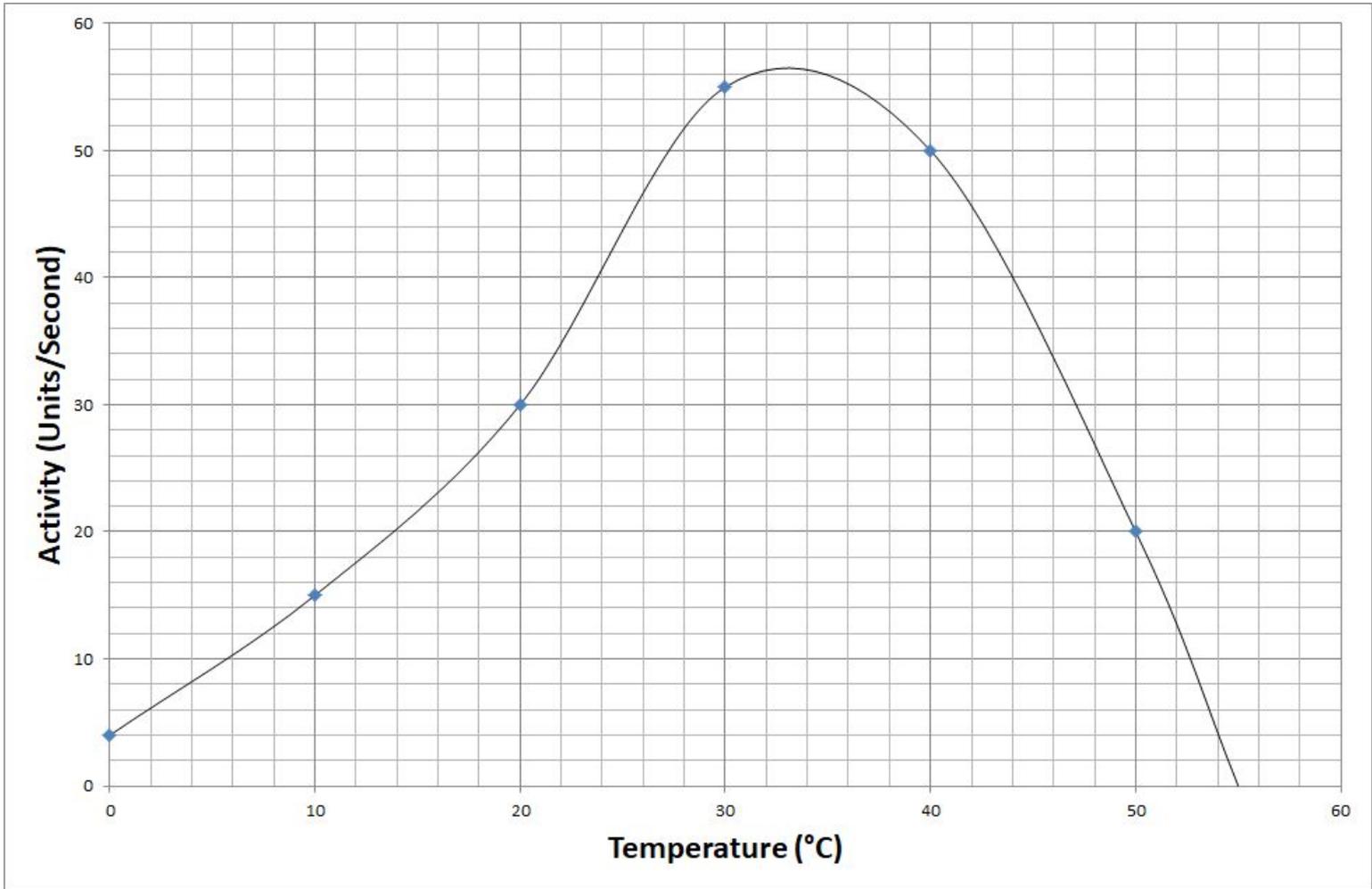
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4. The graph below shows the activity of a human enzyme at different temperatures



a) Explain the shape of this graph, particularly in relation to the lock and key hypothesis of enzyme function. (6)

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5. a) What type of cell division enables the organism shown below to grow into an adult? (1)



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b) What happens to the ribosomes of each cell before this division? (1)

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c) What name is given to the cells produced? (1)

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d) Describe the organisation of genetic information in Eukaryotes. (2)

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e) How does the cell cycle relate to Cancer? (2)

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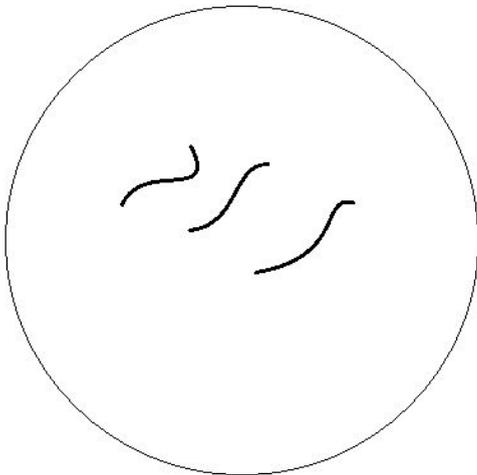
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f) How is the cell cycle exploited in the treatment of cancer by chemotherapy? (1)

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g) The figure below shows the nucleus of a haploid cell. Draw the nucleus of a diploid cell from the same organism in the box provided. (2)



6. The table describes a food chain in terms of biomass.

Organism	Average Dry Mass (kg)	Estimated Population	Total Biomass (kg)
Bamboo	18	5000	
Bamboo Lemur	0.9	7900	
Harrier Hawk	0.6	1135	

a) Fill in the column for total biomass. (1)

b) Draw a pyramid of biomass for this food chain in the space provided. (3)

A large grid for drawing a biomass pyramid. The grid is 10 columns wide and 10 rows high, providing a space for the student to draw and label the pyramid.

c) On your pyramid, label each trophic level. (1)



d) For this data, explain the structure and shape of the pyramid, with respect to the flow of energy. (4)

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e) How would you expect the biomass of the respective organisms to change, if another predator of lemurs was introduced? (2)

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7. An arctic fox, adapted to cold conditions, is pictured beneath.



Describe two adaptations to the cold, and explain how they aid the survival of the fox. (4)

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8. a) Give **two** functions of the transpiration stream in plants. (2)

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b) How does a plant respond to low water conditions? (1)

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c) Which plant tissue is responsible for the movement of sugars? (1)

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d) Give **one** way in which the transport of sugar differs from transpiration. (1)

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e) In animals, these processes are vastly different. Give the name of the organ system in humans which is responsible for the transport of sugar. (1)

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f) These sugars are taken into the body in the small intestine.

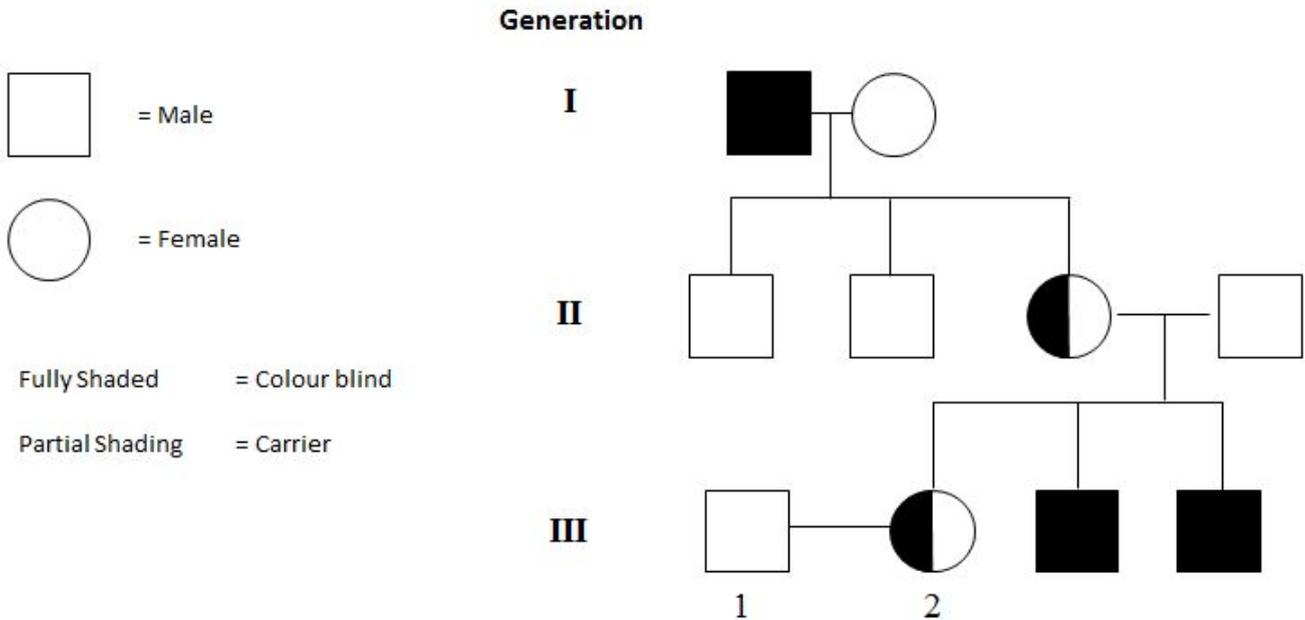
Draw a diagram showing a microscopic section of the small intestine, labelling all parts relevant to sugar intake. (4)



9. Colour blindness is often caused by a recessive genetic. This results in problems with at least one type of the colour photoreceptors in the eye.

It is inherited through the X chromosome and so is a **sex-linked disorder**.

The pedigree diagram below shows the inheritance of colour blindness in a family.



a) What are the sex chromosomes of a human male? (1)

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b) Consider the inheritance of a gene on the X chromosome.

Explain why the male offspring in generation 2 do not have colour blindness, but female offspring must be carriers. (3)

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c) What are the probabilities of each possible phenotype if persons 1 and 2 in generation 3 have a child? (3)

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d) For a non-sex linked recessive disorder, what would be the chances of two carriers having unaffected offspring? (2)

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e) (i) Down's syndrome is an example of a characteristic that shows discontinuous variation. State the cause of Down's syndrome. (1)

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(ii) Explain how discontinuous variation differs from continuous variation, in its expression and causes. (3)

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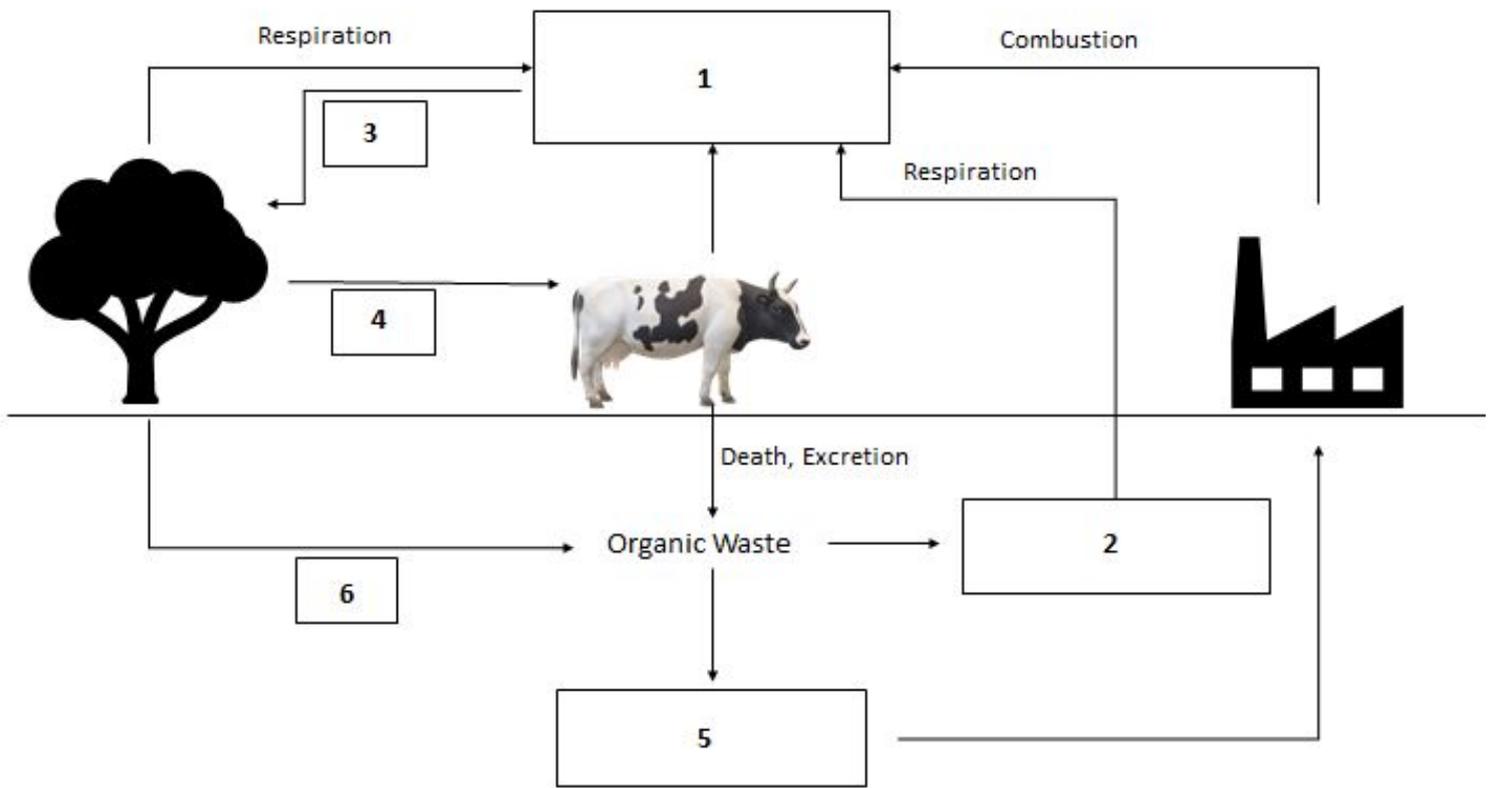
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10. A summary of the carbon cycle is shown below.



a) Give the names of the carbon stores and processes represented by numbers 1 to 6. (4)

- 1: \_\_\_\_\_
- 2: \_\_\_\_\_
- 3: \_\_\_\_\_
- 4: \_\_\_\_\_
- 5: \_\_\_\_\_
- 6: \_\_\_\_\_

b) Explain the role of process **3** in the carbon cycle. (3)

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c) Describe why nitrifying bacteria are important to agriculture. (2)

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d) In the absence of nitrifying bacteria, what other approach may farmers use to improve their crop performance? (1)

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e) Give two reasons as to why nitrates are essential to the growth of living organisms. (2)

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