Community level systems – 2021/20 GCSE Gateway Biology Combined Science A

1. Nov 2021/Paper_J250/02/No.1

Which term describes **all** the different plants and animals that live in the same place?

A Community

B Ecosystem

C Habitat

D Trophic level

Your answer ☐ **[1]**

2. Nov 2021/Paper_J250/02/No.2

Cheetah hunt and kill zebra, then feed on the zebra meat.

Which term describes this feeding relationship?

A Competition

B Mutualism

C Parasitism

D Predation

Your answer ☐ **[1]**

3. Nov 2021/Paper_J250/02/No.4

Which statement describes a **positive** human interaction on an ecosystem?

A Drilling for oil under the North Sea.

B Growing one type of crop in a large area of land.

C Removing peat from bogs for fuel.

D Replanting hedgerows around fields.

Your answer ☐ **[1]**

4. Nov 2021/Paper_J250/02/No.11

(a) Materials are cycled in the environment.

Complete these sentences about cycled materials.

Choose words from this list. You can use each word once, more than once or not at all.

decomposition	**condensation**	**nutrition**
photosynthesis	**translocation**	**transpiration**

Plants remove carbon from the atmosphere by the process of ..... .

Plants return water to the atmosphere by the process of ..... .

Nitrogen is returned to the soil by the process of ..... .

[3]

(b) Describe **two** ways that the water cycle is important to humans.

1 .....

.....

2 .....

..... **[2]**

(c) Abiotic and biotic factors can affect ecosystems.

Which two are biotic factors?

Tick (✓) **two** boxes.

- Light intensity ☐
- Food availability ☐
- pH of soil ☐
- Predators ☐
- Temperature ☐

[2]

(d) The diagram shows a weather chart over 3 days.

Day	Saturday April 2	Sunday April 3	Monday April 4
	Partly cloudy  14°C	Mainly sunny  16°C	Mainly cloudy  12°C
Feels like:	14	16	10
Low:	6°	9°	4°
24 Hr Rain:	-	~1 mm	-
Wind:	12 km/h	20 km/h	20 km/h
Hrs of Sun:	5	8	1

(i) The 24-hour rainfall for Sunday April 3 is **~1 mm**.

Explain what is meant by the term **~1 mm**.

..... **[1]**

(ii) Plants are an important part of ecosystems.

Which day would plants be **most** likely to take up water from the soil at the fastest rate?

Tick (✓) **one** box.

Saturday April 2 ☐

Sunday April 3 ☐

Monday April 4 ☐

Explain your answer.

.....

.....

..... **[3]**

5. Nov 2021/Paper_J250/02/No.15

White clover plants have two variants.

Cyanogenic variants produce a toxin when their cells are damaged.
Acyanogenic variants do not produce a toxin.

The cells of clover plants can be damaged by freezing temperatures or by snails eating the leaves.
The toxin kills snails but also damages the plant.

Table 15.1 shows growing regions of the two variants.

Variant	Regions where most often found
acyanogenic	colder climates
cyanogenic	warmer climates

Table 15.1

(a) Complete the **hypothesis** to link each variant to the region it is most often found.

Acyanogenic variants are found in colder climates because .....

.....

.....

.....

Cyanogenic variants are found in warmer climates because .....

.....

.....

.....

[2]

(b) To investigate a hypothesis a field study is needed.

Sampling techniques are used to estimate the population size of each variant in different areas.

(i) Why are sampling techniques used instead of counting the total number of individual plants in each area?

.....

..... **[1]**

(ii) Two students investigate the variant plants living at altitudes of 0–250 metres.

The students use random sampling as a starting point of their investigation. They then go on to complete a transect.

Explain how random sampling differs from a transect.

.....

.....

.....

..... **[2]**

(iii) Explain why using a transect would **develop** and **improve** their investigation.

.....

.....

.....

..... **[2]**

(c) **Fig. 15.1** shows the number of cyanogenic variant plants found in a total clover population of 200 at different altitudes.

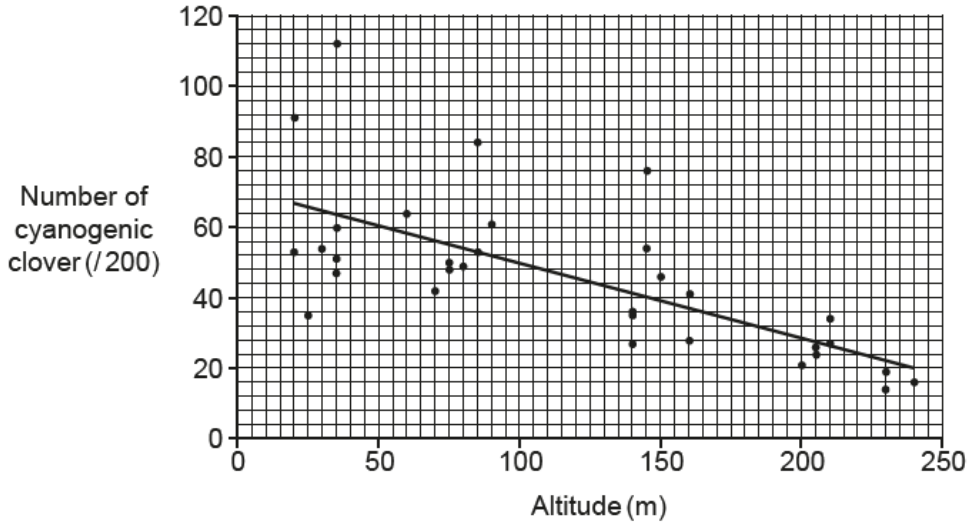

Fig. 15.1

(i) What conclusion can be made about the effect of altitude on the distribution of **cyanogenic** clover?

.....

..... **[1]**

(ii) Predict the altitude where you would expect to find mostly **acyanogenic** clover plants. Explain why most clover plants are acyanogenic at that altitude.

Altitude .....

Explanation .....

.....

[1]

(d) Use the theory of natural selection to explain how the **cyanogenic** variant of white clover plant could have developed.

.....

.....

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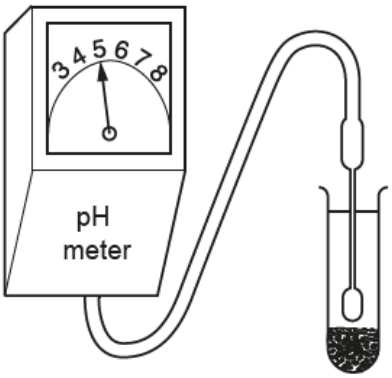
.....

.....

..... **[3]**

6. Nov 2020/Paper_J250/02/No.1

Which abiotic factor is measured using this apparatus?



A Acidity levels

B Light intensity

C Moisture content

D Temperature

Your answer ☐ **[1]**

7. Nov 2020/Paper_J250/02/No.14

Look at the picture of an African ecosystem called a savannah.

(a) Describe the levels of organisation in the savannah.

Complete the missing parts of the table.

Part of savannah	Level	Description
giraffes elephants zebras trees grasses weather soil atmosphere	.....	The living organisms in an area, together with the non-living components of the environment.
giraffes elephants zebras trees grasses	.....	....
zebras	.....	....
zebra	organism	individual

[3]

(b) Elephants have evolved large, very thin ears. This adaptation helps them to survive the effects of one abiotic factor affecting their population.

Complete the sentences about the adaptations in elephants.

The elephants have adapted to survive in high ..... .

The elephant ears have a ..... surface area.

This helps them to ..... heat from the skin surface.

[3]

8. Nov 2021/Paper_J250/08/No.3

Which term describes the interaction between living organisms and their physical environment?

A Community

B Ecosystem

C Habitat

D Trophic level

Your answer ☐ **[1]**

9. Nov 2021/Paper_J250/08/No.6

Animals can indicate water pollution levels. The animals in **Fig. 6.1** were sampled in various parts of a river.

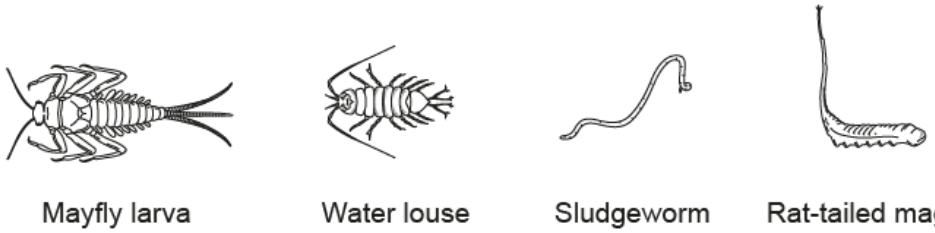


Fig. 6.1

The biomass of the different animals is shown in **Fig. 6.2**.

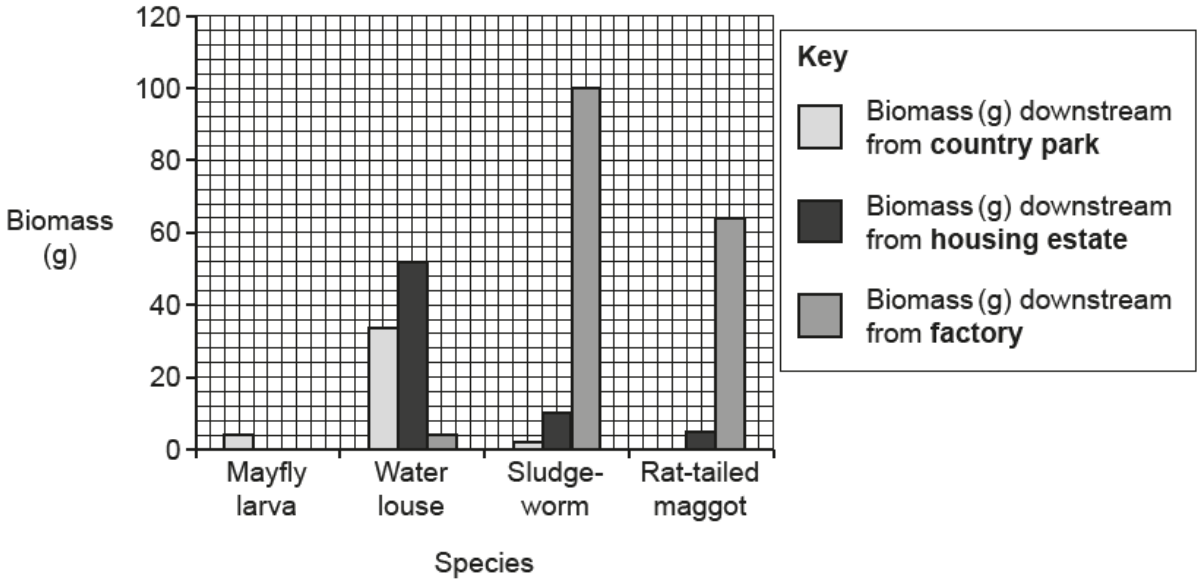


Fig. 6.2

Which row describes pollution levels downstream of a country park, housing estate and factory?

	Country park	Housing estate	Factory
A	high	medium	low
B	low	medium	high
C	low	medium	medium
D	low	high	high

Your answer ☐ **[1]**

10. Nov 2021/Paper_J250/08/No.8

Mutualism and parasitism involve two different organisms living together.

Which statement describes the difference between mutualism and parasitism?

A Both organisms benefit from living together in mutualism, only one benefits in parasitism.

B Both organisms benefit from living together in parasitism, neither benefit in mutualism.

C Neither organism benefits from living together in parasitism, both benefit in mutualism.

D One organism benefits from living together in mutualism, both benefit in parasitism.

Your answer ☐ **[1]**

11. Nov 2021/Paper_J250/08/No.12

(a) Materials cycle through the environment.

Complete these sentences about recycled materials.

Carbon inside carbohydrates is released back into the atmosphere by the process of

..... .

Water that collects in lakes can be returned to the atmosphere when the water

..... .

[2]

(b) The flowchart in **Fig. 12.1** shows bacteria involved in cycling nitrogen.

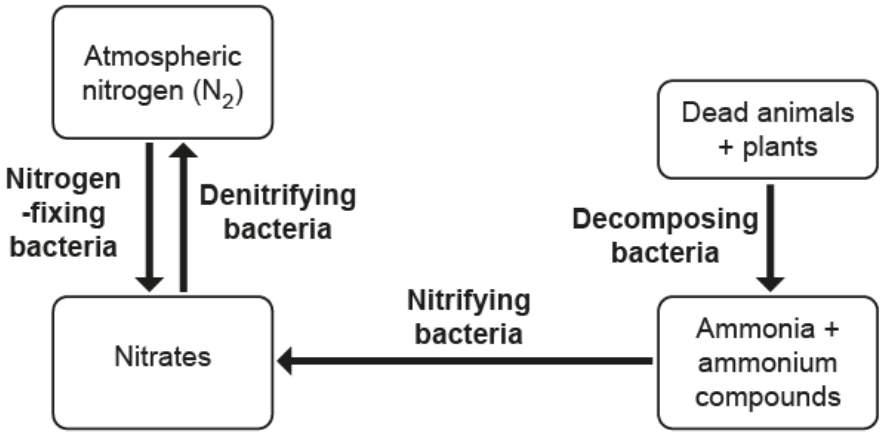


Fig. 12.1

(i) Identify which of the bacteria in **Fig. 12.1**, if present in large amounts, would make the soil poor for plant growth.

Tick (✓) **one** box.

Decomposing bacteria ☐

Denitrifying bacteria ☐

Nitrifying bacteria ☐

Nitrogen-fixing bacteria ☐

[1]

(ii) Explain why large amounts of these bacteria would make the soil poor for plant growth.

.....

..... **[1]**

(iii) Abiotic and biotic factors can affect the bacterial communities.

Which is a biotic factor?

Tick (✓) **one** box.

Ammonia + ammonium compounds ☐

Atmospheric nitrogen (N_2) ☐

Dead animals + plants ☐

Nitrates ☐

[1]

(c) Plants are an important part of any community.

Fig. 12.2 shows the effect of abiotic factors on the rate of photosynthesis by plants.

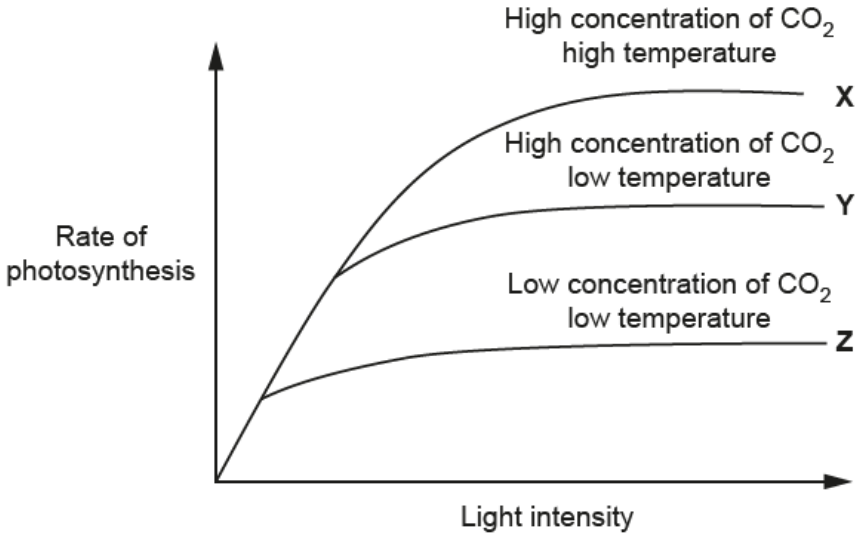


Fig. 12.2

Explain why lines **X**, **Y** and **Z** level out at different rates of photosynthesis.

.....

.....

.....

.....

.....

.....

..... **[3]**

12. Nov 2020/Paper_J250/08/No.3

Which of these is a **biotic** factor that can affect an ecosystem?

A Acidity of soil

B Bacterial levels in a river

C Carbon dioxide levels in the atmosphere

D Oxygen levels in a river

Your answer ☐ **[1]**

13. Nov 2020/Paper_J250/08/No.4

Lichens are made up of a fungus and algae living together. The fungus gets nutrients from the algae and algae is sheltered by the fungus.

Which term describes this type of relationship?

A Competition

B Mutualism

C Parasitism

D Predation

Your answer ☐ **[1]**

14. Nov 2020/Paper_J250/08/No.6

Carbon is recycled in the ecosystem.

Which process helps reduce the level of carbon in the atmosphere?

A Photosynthesis

B Respiration

C Translocation

D Transpiration

Your answer ☐ **[1]**