

GCSE Combined Science: Trilogy

Worksheet: Waste water treatment

TIME 15 min	TOTAL 16 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Waste water treatment

NAME _____

CLASS _____

DATE _____

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

0 1 . 1

Name the process used to break down organic matter in sewage sludge, which also produces methane gas.

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.....

.....

.....
[1 mark]

0 2

Sewage must be treated before the water can be released into the environment.

0 2 . 1

Which stage of sewage treatment produces sewage sludge and effluent?

Tick (✓) **one** box.

Anaerobic digestion

Screening

Sedimentation

Sterilisation

☐

☐

☐

☐

[1 mark]

0 2 . 2

What is removed from sewage during screening?

.....

.....

[1 mark]

0 2 . 3

Name **two** things that must be removed from sewage and agricultural waste water.

.....

.....

.....

.....

[2 marks]

0 3

0 3 . 1

Which stage of sewage treatment removes large solid objects, such as rags and plastic?

Tick (✓) **one** box.

Screening

☐

Sedimentation

☐

Aerobic biological treatment

☐

Anaerobic digestion

☐

[1 mark]

0 4

In some regions, treated sewage effluent (after aerobic biological treatment) is used to irrigate crops that are not eaten raw, rather than being released into a river.

0 4 . 1

Suggest **two** advantages of reusing treated effluent for irrigation in this way.

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.....

.....

.....

[2 marks]

0 5

0 5 . 1

Which stage happens first: screening, or sedimentation?

.....

.....

.....

[1 mark]

0 5 . 2

Explain why sedimentation must happen before either the sludge or the effluent can be treated further.

.....

.....

.....

.....

[2 marks]

0 6

After screening and grit removal, sewage is left to settle in sedimentation tanks. This produces sewage sludge and effluent.

0 6 . 1

Describe how the sewage sludge and the effluent are then treated.

.....

.....

.....

.....

[2 marks]

0 6 . 2

Industrial waste water may need extra treatment compared with sewage. Explain why.

.....

.....

.....

.....

[2 marks]

0 6 . 3

Anaerobic digestion of sewage sludge produces methane. Suggest how the sewage works could use this methane.

.....

.....

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Waste water treatment · 16 marks

Question 1 (1 mark)

01.1 [1 mark]

Answer: anaerobic digestion

- anaerobic digestion (1)
-
-

Question 2 (4 marks)

02.1 [1 mark]

Correct: Sedimentation

02.2 [1 mark]

- large objects (e.g. rags, plastics) / grit (1)
-

02.3 [2 marks]

- organic matter (1)
 - harmful microbes (1)
-
-

Question 3 (1 mark)

03.1 [1 mark]

Correct: Screening

Question 4 (2 marks)

04.1 [2 marks]

- it reduces the demand for fresh water from rivers / reservoirs for irrigation, helping conserve limited water supplies (1)
 - nutrients remaining in the effluent, e.g. nitrogen compounds, can help fertilise the crops (allow: it reduces the volume of wastewater discharged into rivers) (1)
-

Question 5 (3 marks)

05.1 [1 mark]

Answer: screening

- screening (1)

05.2 [2 marks]

- sedimentation separates the solid sewage sludge from the liquid effluent (1)
- sludge (treated by anaerobic digestion) and effluent (treated by aerobic biological treatment) need different treatment methods, so they must first be separated (1)

Question 6 (5 marks)

06.1 [2 marks]

- sewage sludge: anaerobic digestion (by bacteria) (1)
- effluent: aerobic biological treatment (air is bubbled through so bacteria break down organic matter) (1)

06.2 [2 marks]

- it may contain harmful chemicals (e.g. toxic metal compounds) (1)
- which must be removed as well as organic matter before the water is released (1)

06.3 [1 mark]

- as a fuel, e.g. to generate electricity / heat for the sewage works (1)
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