

Viruses vs Bacteria

Name: _____

Date: _____ Score: ____ / 27

Key ideas

Bacteria: single prokaryotic cells (no nucleus); reproduce by binary fission; shapes are cocci (spheres), bacilli (rods) and spirilla (spirals); prefixes strepto- = chains, staphylo- = clusters.

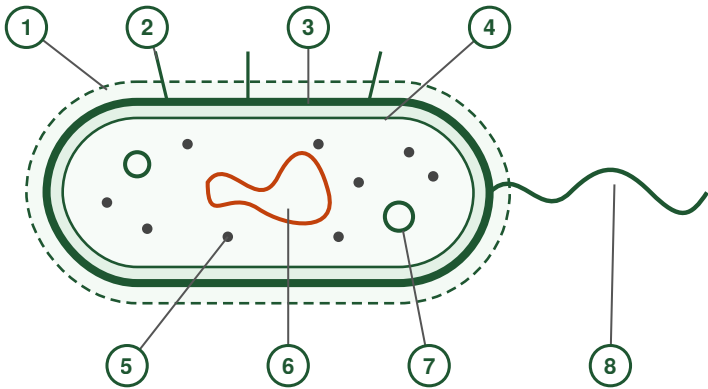
Viruses: non-living particles of DNA or RNA inside a protein capsid; reproduce only inside a host cell by the lytic cycle (host cell bursts) or lysogenic cycle (viral DNA hides in the host chromosome).

Treatment: antibiotics kill bacteria only; vaccines prevent viral (and some bacterial) diseases.

A Label the bacterial cell

4 marks

Word bank: Capsule · Cell membrane · Cell wall · Flagellum · Nucleoid · Pilus · Plasmid · Ribosome

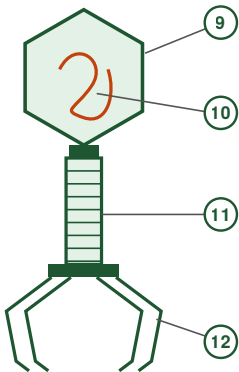


- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____
- 7. _____
- 8. _____

B Label the virus (bacteriophage)

2 marks

Word bank: Capsid · Nucleic acid · Tail fibres · Tail sheath



- 9. _____
- 10. _____
- 11. _____
- 12. _____

C Compare bacteria and viruses

6 marks

1 mark per row.

	Feature	Bacteria	Viruses
13.	Is it a cell?		
14.	Approximate size		
15.	Genetic material		
16.	Ribosomes and metabolism		
17.	How it reproduces		
18.	Treated with antibiotics?		

D Identify the bacterial shape

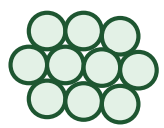
4 marks

Name each sample using the shape and arrangement (e.g. *Streptococcus*).

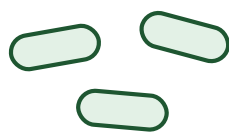
19. Sample A



20. Sample B



21. Sample C



22. Sample D



E The lytic and lysogenic cycles

4 marks

- P** Assembly: new capsids and DNA are put together into new viruses
- Q** Attachment: the virus binds to receptors on the host cell
- R** Lysis: the cell bursts and releases the new viruses
- S** Replication: the host cell copies viral DNA and makes viral proteins
- T** Entry: the virus injects its DNA into the host cell

23. Put the steps of the lytic cycle in order using the letters.

24. How is the lysogenic cycle different from the lytic cycle?

25. Cold sores often return during stress or illness. Explain why, using what you know about viral cycles.

F Antibiotics and helpful bacteria

5 marks

26. Why do antibiotics work on bacteria but not on viruses?

27. Explain how a population of bacteria becomes resistant to an antibiotic. (2 marks)

28. Give two ways bacteria are helpful to humans or ecosystems. (2 marks)

G Spot the mistake

2 marks

29. A student writes: "Viruses are the smallest living cells." Explain the error and correct it.

30. A student says: "I have the flu, so my doctor should give me antibiotics." Explain the error and correct it.

Viruses vs Bacteria

ANSWER KEY

Key ideas

Bacteria: single prokaryotic cells (no nucleus); reproduce by binary fission; shapes are cocci (spheres), bacilli (rods) and spirilla (spirals); prefixes strepto- = chains, staphylo- = clusters.

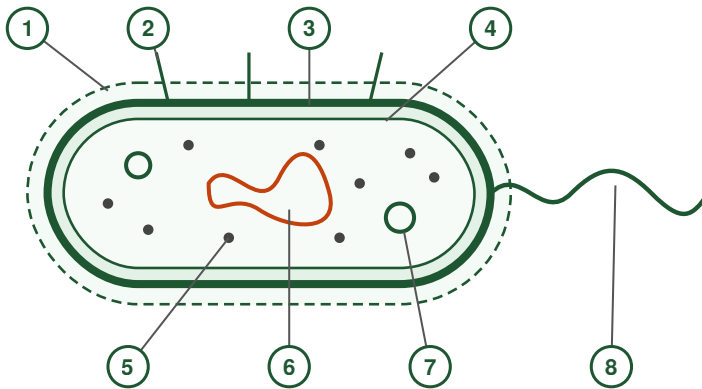
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Treatment: antibiotics kill bacteria only; vaccines prevent viral (and some bacterial) diseases.

A Label the bacterial cell

4 marks

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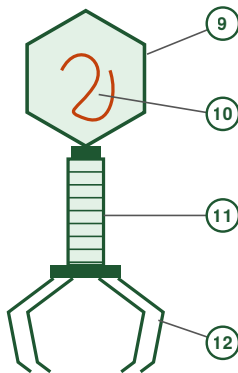


1. Capsule
2. Pilus
3. Cell wall
4. Cell membrane
5. Ribosome
6. Nucleoid (circular DNA)
7. Plasmid
8. Flagellum

B Label the virus (bacteriophage)

2 marks

Word bank: Capsid · Nucleic acid · Tail fibres · Tail sheath



9. Capsid (protein coat)
10. Nucleic acid (DNA)
11. Tail sheath
12. Tail fibres

C Compare bacteria and viruses

6 marks

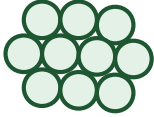
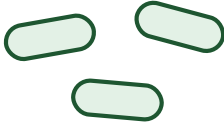
1 mark per row.

	Feature	Bacteria	Viruses
13.	Is it a cell?	Yes, a single prokaryotic cell	No, not made of cells
14.	Approximate size	1–10 μm (seen with a light microscope)	20–300 nm (needs an electron microscope)
15.	Genetic material	Circular DNA (nucleoid) plus plasmids	DNA or RNA, never both, inside a capsid
16.	Ribosomes and metabolism	Has ribosomes; carries out its own metabolism	No ribosomes; uses the host cell's machinery
17.	How it reproduces	On its own, by binary fission	Only inside a host cell (lytic or lysogenic cycle)
18.	Treated with antibiotics?	Yes, often	No; prevented with vaccines, some treated with antivirals

D Identify the bacterial shape

4 marks

Name each sample using the shape and arrangement (e.g. *Streptococcus*).

19. Sample A  Streptococcus (cocci in chains)	20. Sample B  Staphylococcus (cocci in clusters)	21. Sample C  Bacillus (rod-shaped)	22. Sample D  Spirillum (spiral)
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E The lytic and lysogenic cycles

4 marks

- P Assembly: new capsids and DNA are put together into new viruses
- Q Attachment: the virus binds to receptors on the host cell
- R Lysis: the cell bursts and releases the new viruses
- S Replication: the host cell copies viral DNA and makes viral proteins
- T Entry: the virus injects its DNA into the host cell

23. Put the steps of the lytic cycle in order using the letters.
Q → T → S → P → R (attachment, entry, replication, assembly, lysis)
24. How is the lysogenic cycle different from the lytic cycle?
Viral DNA joins the host chromosome as a prophage and is copied each time the cell divides. No new viruses are made and the cell is not killed until a trigger switches it to the lytic cycle.
25. Cold sores often return during stress or illness. Explain why, using what you know about viral cycles.
The herpes simplex virus stays dormant in nerve cells, similar to the lysogenic cycle. Stress or illness triggers it to enter the lytic cycle, making new viruses and a new cold sore.

F Antibiotics and helpful bacteria

5 marks

26. Why do antibiotics work on bacteria but not on viruses?
Antibiotics target structures and processes only bacteria have, such as cell walls and bacterial ribosomes. Viruses have no cell wall, ribosomes or metabolism of their own, so there is nothing to attack.
27. Explain how a population of bacteria becomes resistant to an antibiotic. (2 marks)
Random mutations give a few bacteria resistance. The antibiotic kills the non-resistant bacteria, and the resistant survivors reproduce by binary fission (and can share resistance genes on plasmids), so the population becomes mostly resistant. Overuse and unfinished courses speed this up.
28. Give two ways bacteria are helpful to humans or ecosystems. (2 marks)
Any two: digest food and make vitamin K in the gut; decompose dead matter and recycle nutrients; fix nitrogen in root nodules; make foods such as yogurt and cheese; produce insulin through genetic engineering.

G Spot the mistake

2 marks

29. A student writes: "Viruses are the smallest living cells." Explain the error and correct it.
Viruses are not cells and are not usually considered living. They cannot reproduce or carry out metabolism outside a host cell.
30. A student says: "I have the flu, so my doctor should give me antibiotics." Explain the error and correct it.
The flu is caused by a virus, and antibiotics only work on bacteria. Rest and fluids help; the flu vaccine prevents it and antivirals can shorten it.