Pathogens and virus models

Student activity • observation and reasoning

YEAR 10 / LESSON 5 / BIOLOGY + SCIENCE (DOUBLE AWARD)

The question

Why is a virus different from a bacterial cell?

Classify disease-causing agents and compare a simplified virus model with a bacterial cell. Keep biological explanation separate from diagnosis.

Equipment

- Student booklet, pencil, ruler and coloured pencils
- Blank paper cards or reusable modelling pieces

Use paper or clean reusable models. No body samples, microbial cultures or unknown biological material are handled.

Course coverage: Shared Biology / Double Award: 1.4. Pathogen groups and viruses.

Plan, model or apparatus sketch

Draw a labelled model that explains the evidence; state what the model cannot show.

Method and reasoning

Read the whole sequence before starting

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1. Define pathogen as a disease-causing biological agent; list bacteria, fungi, protoctists and viruses.

2. Draw a simplified virus with genetic material inside a protein coat. Label DNA or RNA, rather than both as its genome.

3. Compare with a bacterial cell: viruses are not cells and lack the independent cellular machinery needed to reproduce.

4. Use supplied examples: influenza virus causes influenza; HIV damages the immune system and can lead to AIDS; tobacco mosaic virus causes leaf discolouration and reduced photosynthesis.

5. Separate pathogen from vector using Plasmodium and the mosquito that transmits it.

6. Explain why not all microorganisms cause disease and why symptoms or a diagram cannot diagnose an infection.

Cleanup

- Return reusable materials and retain your corrected reasoning.

Record your evidence

Blank spaces are for your own work

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Reference and task data

The model shows a genome and protein coat; some viruses also have an envelope. In this course viruses are not classified as living organisms because they lack cellular structure and cannot reproduce independently. Plasmodium is the malaria pathogen; a mosquito can be its vector. No patient information, body samples or microbial culture is used.

Example / task	Evidence / drawing	Reason / limitation
Virus / bacterium		
Named pathogen examples		
Pathogen / vector		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. Define pathogen.

2. Name the four groups that can contain pathogens.

3. Label two components of the simplified virus.

4. Why can viruses reproduce only inside host cells?

5. Distinguish HIV from AIDS.

6. Distinguish a malaria pathogen from its vector.