

Bench to Bedside Virtual Workshop

Teacher Guide

This is a resource aimed at [KS4 students](#) to put into context the learning around [antibiotic resistance](#) and [medicine development](#). It also gives students an introduction to some of the job roles that exist in this field.

The video features two Roche employees, Amy and Ksenia, with opportunities to pause the video to answer questions and generate discussion between students.

There is also a crossword to check for learning which can be shown on screen or printed from this pack.

You will need

- Lesson video.
- Crossword puzzle and answers.
- Modelling antibiotic resistance worksheet and answers.

Lesson outline

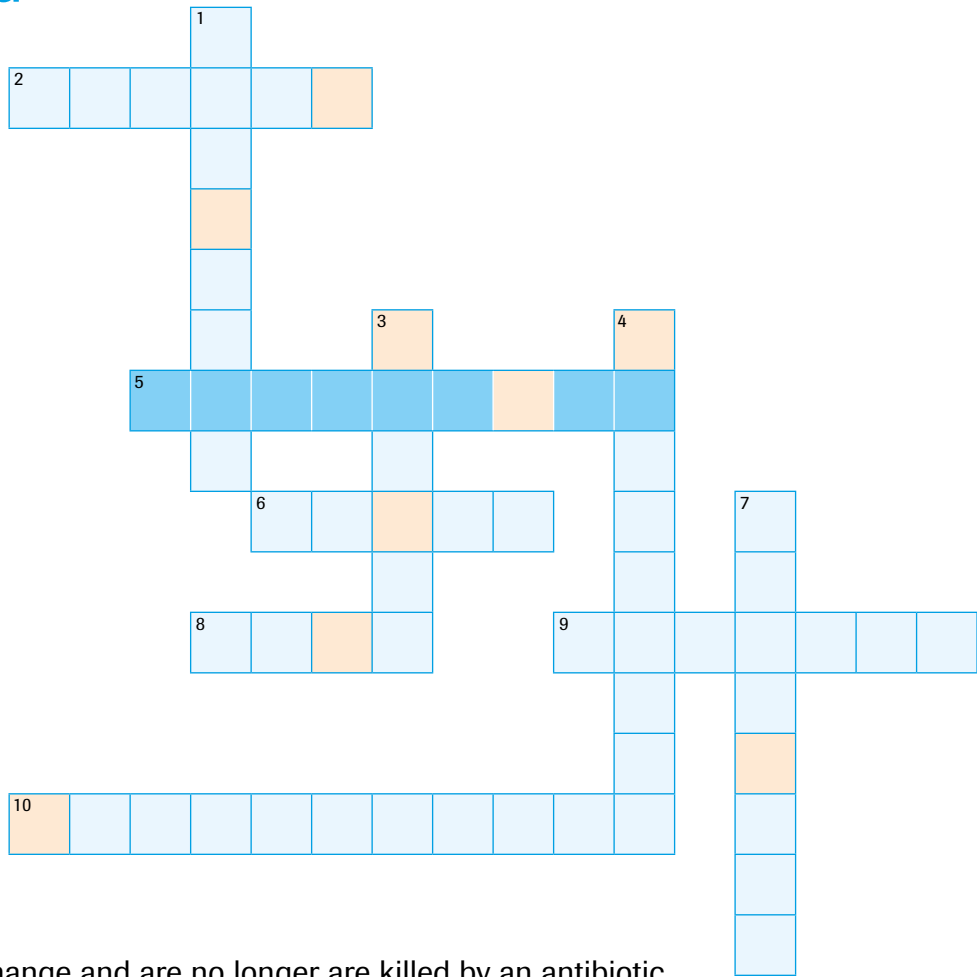
<p>Main activity</p> <p>Play the video and complete crossword.</p>	25 mins	Page 2
<p>Optional extension</p> <p>Modelling antibiotic resistance activity. This can be completed after watching the video in the classroom or set for independent work at home. Answers to modelling activity.</p>	30 mins	Page 4

Curriculum links

- Bacteria, viruses and fungi as pathogens in animals and plants.
- Body defences against pathogens and the role of the immune system against disease.
- Reducing and preventing the spread of infectious diseases in animals and plants.
- The process of discovery and development of new medicines.

Bench to Bedside Virtual Workshop

Crossword



Across

- 2. Bacteria that change and are no longer are killed by an antibiotic.
- 5. The first phase in taking a drug from bench to bedside.
- 6. The number of phases in clinical trials.
- 8. Phase 3 clinical trials find the optimum _____ to give to patients.
- 9. Phase 1 clinical trials are conducted on these types of humans.
- 10. A type of drug that kills bacteria.

Down

- 1. A single celled living organism.
- 3. Antibiotics: finish the whole _____ or they won't work!
- 4. The technical term used for 'making' a new drug.
- 7. The term used to describe how the number of bacteria rapidly increase.

Extra challenge

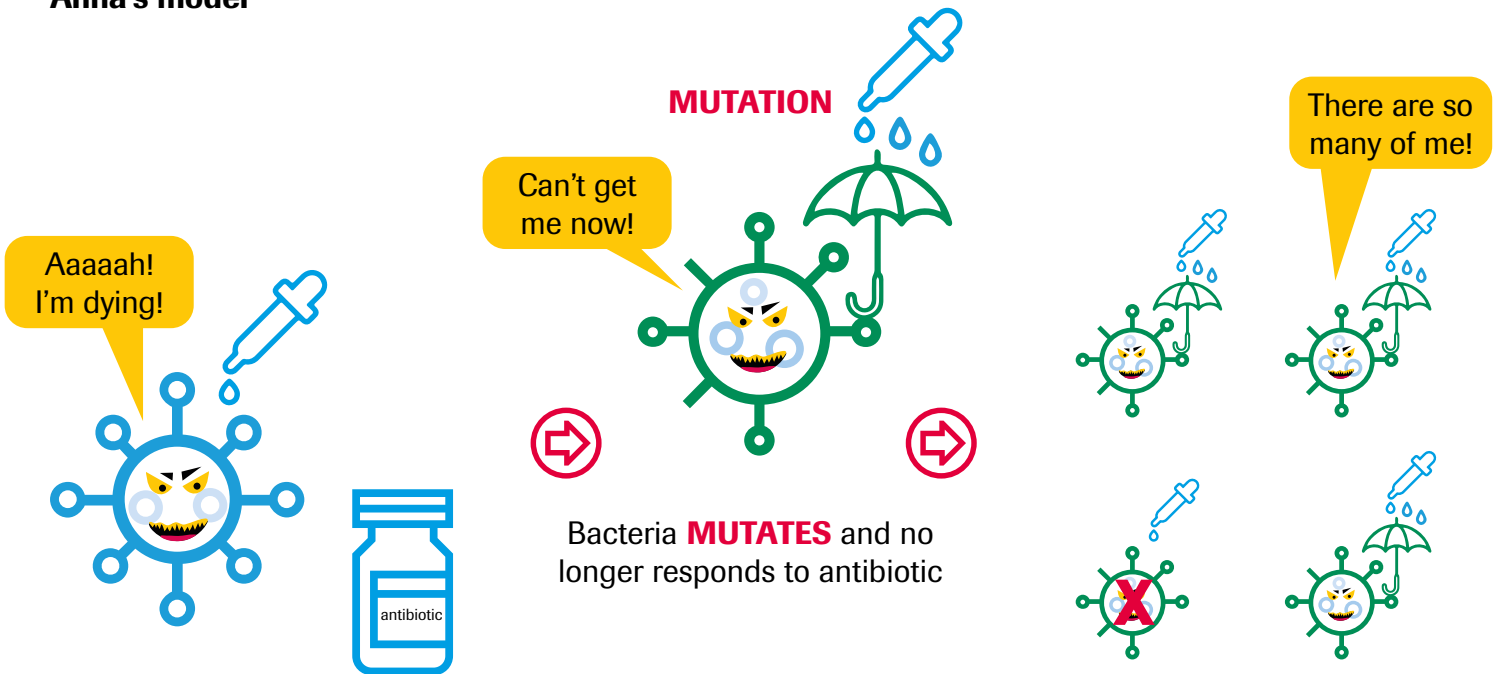
Pull out the letters from the orange highlighted boxes. Can you rearrange them to make a key term?

Extension activity

Modelling antibiotic resistance

Anna has created a model to help explain antibiotic resistance to primary school children. Take a look at her model and then answer the questions below.

Anna's model



An antibiotic is invented to kill that **SPECIFIC** bacteria

Mutated bacteria can multiply and make you unwell

Questions

1. What does the umbrella represent in Anna’s model? Explain your answer.

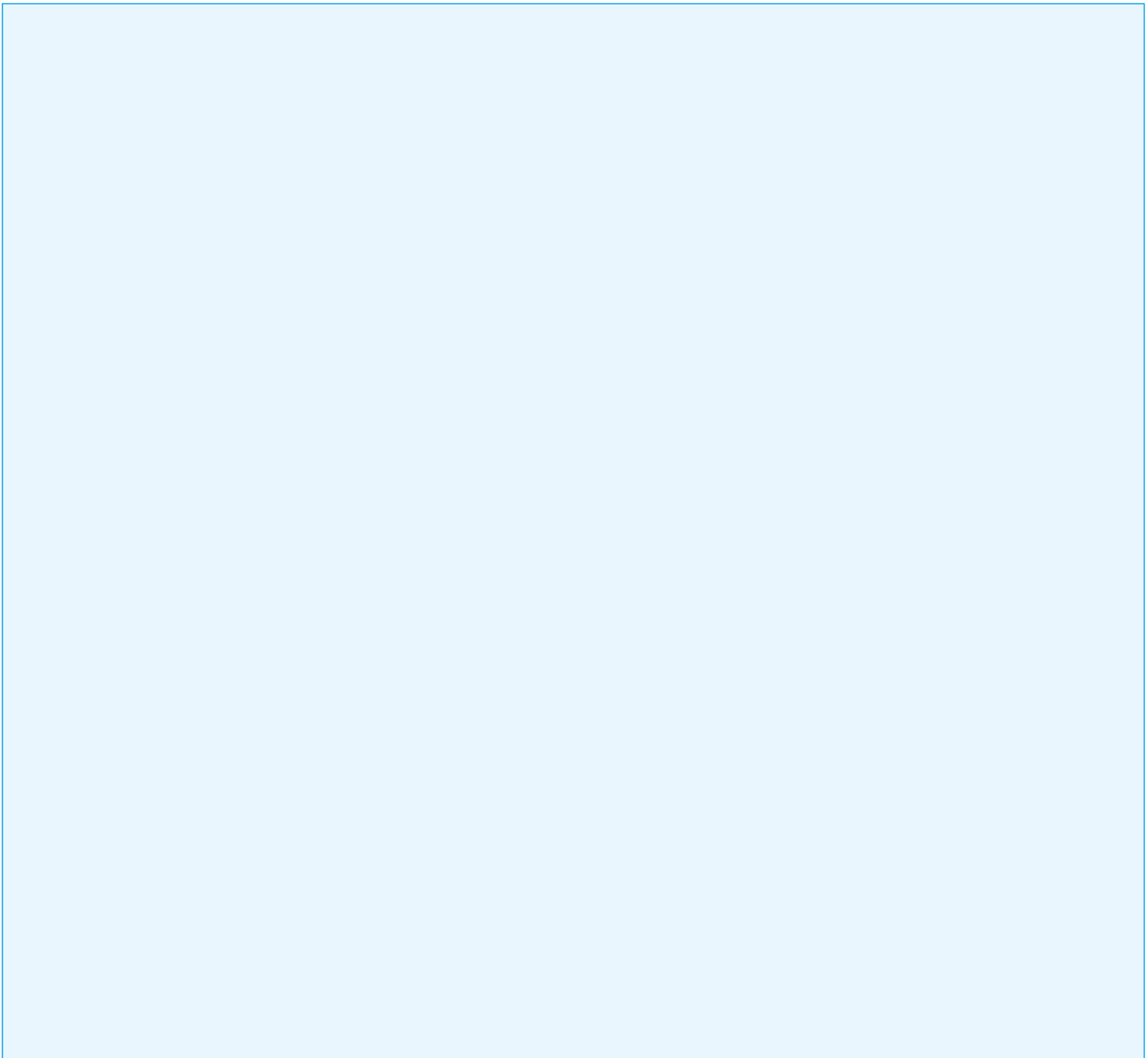
2. Describe one way that Anna’s model is a **good** way of explaining antibiotic resistance to primary school children.

3. Describe one way that Anna’s model is a **bad** way of explaining antibiotic resistance to primary school children.

4. Suggest 3 ways you can improve Anna's model.

You could:

- Draw a labelled diagram of your new model, based on Anna's.
- Create an entirely new model and draw and annotate it.
- Build an improved physical model and take photos of it.
- Design a new model on a computer program such as Minecraft.
- Use stop go animation to tell the story of antibiotic resistance, providing an explanatory voice over.

A large, empty rectangular box with a light blue background and a thin blue border, intended for students to draw or write their answers to the task.

Extension activity

Modelling antibiotic resistance [answers](#)

1. The umbrella represents the mutation on the bacteria. The mutation is now stopping the antibiotic from killing the bacteria hence it is now a resistant bacteria.

Possible answers

- The pictures are engaging.
- The model is easy to understand.
- Children know how an umbrella works and have used one themselves.
- It's easy to see how the umbrella is blocking the water and stopping the bacteria from dying.
- The speech bubbles make it clear that the antibiotic is designed to kill the bacteria.
- The cartoons make it clear that these bacteria are harmful.
- Any other sensible suggestions.

2. Possible answers

- The model shows an antibiotic is just water, when it is a more complex chemical.
- The model does not show the exponential multiplication of bacteria so pupils may underestimate the problem the resistant strain will cause.
- The model shows an external mutation via addition of the umbrella, when actually mutation occurs inside the bacteria.
- The model gives the impression the umbrella protects the whole of the bacteria, when an umbrella only protects part of you, not all.
- Pupils may think solving resistant bacteria is easy, as the model suggests you can just take away the umbrella.

3. Credit creativity for students new improved models. Ensure new models address problems identified with the original model. The new model should still appeal to primary school children.