



# Discovering Science: Global Challenges

## Scheme of Work

	Lesson 1	Lesson 2	Lesson 3
<b>Length</b>	Approx. 1 hour	Approx. 1 hour	Approx. 1 hour
<b>Objectives</b>	<p>To define some key terms related to antibiotics.</p> <p>To describe historical developments in the field of antibiotics.</p> <p>To investigate antimicrobial resistance and ways to combat it.</p>	<p>To explore the challenges of educating people in the proper use of antibiotics.</p> <p>To reflect on and describe the ethical considerations of using antibiotics in farming.</p> <p>To communicate information on antibiotic use in a clear, accessible way.</p>	<p>To consider the ways in which food and food security present global challenges.</p> <p>To analyse and present information on alternative approaches to agriculture.</p> <p>To reflect on how we could sustainably feed a rapidly growing population.</p>

Lesson plans for each session can be found on the following pages.

# Discovering Science: Global Challenges

## Lesson 1 plan

<p><b>Starter activity</b></p> <p>Through discussion, ask students to agree on definitions for the following:</p> <ul style="list-style-type: none"> <li>• Antibiotic</li> <li>• Microbe</li> <li>• Superbug</li> </ul> <p>Guide the discussions and definitions.</p>	<p><b>Learning objectives</b></p> <ul style="list-style-type: none"> <li>• To define some key terms related to antibiotics.</li> <li>• To describe historical developments in the field of antibiotics.</li> <li>• To investigate antimicrobial resistance, and ways to prevent it.</li> </ul>
<p><b>Main activities</b></p> <p>As a class, watch the video in Step 1.5 (Development of antibiotics). Students should take notes and create a timeline of the dates and developments explained in the video. Ask one student to share their timeline.</p> <p>Students will now conduct research and produce a short report (250-500 words) on antimicrobial resistance. In their reports, they should include:</p> <ul style="list-style-type: none"> <li>• a definition of antimicrobial resistance</li> <li>• recent developments in the use of antibiotics</li> <li>• ways of combating antimicrobial resistance.</li> </ul> <p>Sources of information given in Step 1.7 will be useful for research, as well as any others identified by the students.</p> <p>When complete, students should swap with a peer and provide feedback, identifying any relevant information they missed.</p>	<p><b>Resources required</b></p> <ol style="list-style-type: none"> <li>1. Device for watching video.</li> <li>2. Devices and relevant materials for conducting research.</li> <li>3. Materials for producing reports.</li> </ol> <p><b>Assessment for Learning</b></p> <p>Timelines, individual reports, peer feedback.</p> <p><b>Differentiation</b></p> <p><b>SEND:</b> Videos have subtitles.  <b>Low ability:</b> Peer-learning.  <b>Gifted and Talented:</b> Peer-teaching.</p> <p><b>Plenary</b></p> <p>Lead a brief class discussion asking the following:</p> <p>What responsibilities do patients and doctors have in helping to use our current antibiotics sensibly?</p> <p>Make a list of responsibilities for both patients and doctors.</p>

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## Lesson 2 plan

<p><b>Starter activity</b></p> <p>In small groups, students complete the exercise in Step 1.11. Groups should debate and discuss answers to each of the three questions.</p> <p>After brief time for discussion, circulate the 'educator feedback' for the exercise, for groups to discuss.</p>	<p><b>Learning objectives</b></p> <ul style="list-style-type: none"> <li>• To explore the challenges of educating people in the proper use of antibiotics.</li> <li>• To reflect on and describe the ethical considerations of using antibiotics in farming.</li> <li>• To communicate information on antibiotic use in a clear, accessible way.</li> </ul>
<p><b>Main activities</b></p> <p>Circulate copies of the case study in Step 1.12 (Mr Hopkinson the farmer). Students will now write a short newspaper article (no more than 300 words) which aims to answer the following questions:</p> <ul style="list-style-type: none"> <li>• Why might it be better to avoid the use of antibiotics in these circumstances?</li> <li>• How does restricting the use of antibiotics impact Mr Hopkinson's life?</li> <li>• Why is it a difficult dilemma?</li> </ul> <p>Although they will write the article individually, encourage students to discuss the case study together. In writing their article, advise students that they should try to:</p> <ul style="list-style-type: none"> <li>• demonstrate scientific understanding of the selected topic</li> <li>• present a fair and balanced overview of the topic for the intended audience and provides sufficient context</li> <li>• indicate an understanding of the key 'story'.</li> </ul>	<p><b>Resources required</b></p> <ol style="list-style-type: none"> <li>1. Exercise from Step 1.11 (PDFs or devices to complete).</li> <li>2. Copies of the case study in 1.12.</li> <li>3. Materials to write their newspaper articles.</li> </ol> <p><b>Assessment for Learning</b></p> <p>Exercise contributions, discussion and newspaper articles.</p> <p><b>Differentiation</b></p> <p><b>SEND:</b> Teacher-led support.  <b>Low ability:</b> Peer-learning.  <b>Gifted and Talented:</b> Peer-teaching.</p> <p><b>Plenary</b></p> <p>Students can use the rest of the time to complete their articles, and/or complete as homework.</p>

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## Lesson 3 plan

Starter activity	Learning objectives
<p>Start with this question on the board:</p> <p>How can we sustainably feed a rapidly growing population?</p> <p>Ask students to consider this question and the different ways in which food and food security may present global challenges. Discuss in pairs.</p> <p>Briefly share some ideas as a class.</p>	<ul style="list-style-type: none"> <li>• To consider the ways in which food and food security present global challenges.</li> <li>• To analyse and present information on alternative approaches to agriculture.</li> <li>• To reflect on how we could sustainably feed a rapidly growing population.</li> </ul>
Main activities	Resources required
<p>Students watch the video in Step 2.9 (Alternative methods of agriculture).</p> <p>Divide the class into three groups. Each group will research and create an informative leaflet or poster for one of the following approaches in agriculture:</p> <ul style="list-style-type: none"> <li>• Synthetic agrochemicals</li> <li>• Genetically modified crops</li> <li>• Organic agriculture</li> </ul> <p>Each leaflet or poster should explain what the approach involves, and any benefits and drawbacks identified.</p> <p>Groups should present their leaflets to the class and answer questions from other students.</p>	<ol style="list-style-type: none"> <li>1. Devices for watching video.</li> <li>2. Devices for research.</li> <li>3. Materials for creating leaflets and posters.</li> </ol>
	Assessment for Learning
	<p>Discussion contributions, posters/leaflets.</p>
	Differentiation
<p><b>SEND:</b> Videos have subtitles.  <b>Low ability:</b> Peer-learning.  <b>Gifted and Talented:</b> Peer-teaching.</p>	
Plenary	
<p>Lead a class discussion on the following question:</p> <ul style="list-style-type: none"> <li>• What balance of the three approaches do you think will be needed to meet the challenge of feeding a growing global population?</li> </ul>	