



Discovering Science: Global Challenges

Can chemistry help to feed a growing population, or overcome increasing bacterial resistance?

If your students are completing the whole of this course online and are not participating in the teacher-led lessons based on it, then they can complete useful and engaging activities based on the content covered. You can choose for your students to complete individual tasks by themselves or encourage group work. Though you may have your own ideas about what your students can do with the course content, we've made things easy for you by suggesting some activities that you can submit to your students below. Instructions for the students can be found later in this document.

Individual student tasks taken from the course

Reflection: Students write a 500 word reflection on what they learned from the course, including anything they might do differently now as a result of their learning, and anything additional they found out from their own reading around the topic. They will submit this reflection as a written essay, podcast or video.

Activity 1: Using the case study in Step 1.12 (Mr Hopkinson the farmer), students will write a short newspaper article which aims to answer the following questions:

- Why might it be better to avoid the use of antibiotics in these circumstances?
- How does restricting the use of antibiotics impact Mr Hopkinson's life?
- Why is it a difficult dilemma?

In writing their article, students should try to:

- demonstrate scientific understanding of the selected topic
- present a fair and balanced overview of the topic for the intended audience and provides sufficient context
- indicate an understanding of the key 'story'.

Activity 2: Students 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.

Research task: Students conduct research and produce a short report on antimicrobial resistance. In their reports, they should include:

- a definition of antimicrobial resistance
- recent developments in the use of antibiotics
- ways of combating antimicrobial resistance.

Sources of information given in Step 1.7 will be useful for research, as well as any others identified by the students.

Group tasks based on the course

Research task: Groups watch the video in Step 2.9 (Alternative methods of agriculture). Each group will research and create an informative leaflet or poster for one of the following approaches in agriculture:

- Synthetic agrochemicals
- Genetically modified crops
- Organic agriculture

Each leaflet or poster should explain what the approach involves, and any benefits and drawbacks identified. Groups should present their leaflet/posters to each other.

Discussion task: Each group discusses this question:

- What responsibilities do patients and doctors have in helping to use our current antibiotics sensibly?

Groups should make a list of responsibilities for both patients and doctors and submit to their teacher.

Collaborative task: In their groups, students complete the exercise in Step 1.11 (Ethical considerations). Groups should debate and discuss answers to each of the three questions and submit their responses to the teacher.

Additional support

You can use the [How to use FutureLearn guide](#) with your students to get them started. There is also a school-facing [Guide to safeguarding and security on FutureLearn](#) if you need it.

Test

You can use the test questions listed in the student instructions below as a short assessment to enable your students to demonstrate what they have learned on the course. The assessment has 15 marks in total.

The questions have been designed to be flexible and open. The questions indicate which steps the answers can be found on. The marks available reflect the likely length and complexity of the answer expected, and how many points they are likely to make. For example, a 5-mark question might reflect a longer, more complex question, or one where they have asked to describe or explain a number of elements. Depending on the level and ability of your students, you can decide how you wish to award the marks so they are appropriate for your class.

Each question suggests which steps the students may wish to return to answer the questions. **You can decide if you want to include this information when you share the assessment with your students.**

Student instructions

Reflection

Write a 500 word reflection of what you have learned from the course. It should include anything you might do differently now because of what you learned, and anything additional you found out in your reading around the topic. Submit this reflection to your teacher as a written essay, podcast or video.

Activity 1

Using the case study in Step 1.12 (Mr Hopkinson the farmer), write a short newspaper article which answers the following questions:

- Why might it be better to avoid the use of antibiotics in these circumstances?
- How does restricting the use of antibiotics impact Mr Hopkinson's life?
- Why is it a difficult dilemma?

In writing your article, you should try to:

- demonstrate scientific understanding of the selected topic
- present a fair and balanced overview of the topic for the intended audience and provides sufficient context
- indicate an understanding of the key 'story'.

Activity 2

Watch the video in Step 1.5 (Development of antibiotics). Take notes and create a timeline of the dates and developments explained in the video.

Research task

Conduct research and produce a short report on antimicrobial resistance. In your report, you should include:

- a definition of antimicrobial resistance
- recent developments in the use of antibiotics
- ways of combating antimicrobial resistance.

Sources of information given in Step 1.7 will be useful for research, as well as any others you identify.

Group discussion

In your group, discuss this question:

- What responsibilities do patients and doctors have in helping to use our current antibiotics sensibly?

Make a list of responsibilities for both patients and doctors and submit to your teacher.

Group research task

Watch the video in Step 2.9 (Alternative methods of agriculture). Your group will research and create an informative leaflet or poster for one of the following approaches in agriculture:

- Synthetic agrochemicals
- Genetically modified crops
- Organic agriculture

Each leaflet or poster should explain what the approach involves, and any benefits and drawbacks identified. Groups will present their leaflet/posters to each other.

Group collaborative task

In your group, complete the exercise in Step 1.11 (Ethical considerations). You should debate and discuss answers to each of the three questions and submit your group's responses to your teacher.

Test

Complete the assessment questions below to demonstrate your understanding of the course. You can refer back to the course to find the answers or more detail as you need to. You should not however share your answers with other students.

Your answers should be written in full sentences and be appropriately detailed. Make sure you read the questions carefully before starting to answer. Each question shows how many marks are available – use this to guide how much detail or how many points you need to include.

[The questions also indicate where you can start to look to find the answer. You can also include information from other steps if that is relevant.]

1. What is an antibiotic and what are they used for? (2 marks) [Step 1.3]

2. List three important developments in the history of antibiotics. (3 marks) [Step 1.5]

3. What is antimicrobial resistance? (2 marks) [Step 1.4]

4. Give two suggestions of how AMR can be prevented by patients. (2 marks) [Step 1.7]

5. Give two suggestions of how AMR can be prevented by doctors. (2 marks) [Step 1.7]

6. Briefly summarise one of the following approaches in agriculture. Explain how it could help to address the challenge of feeding a growing global population.
 - Synthetic agrochemicals
 - Genetically modified crops
 - Organic agriculture(4 marks) [Step 2.9]