



# Atmospheric Chemistry: Planets and Life beyond Earth

*Learn about the atmospheric chemistry of planets and celestial bodies and explore the possibility of finding life beyond Earth.*

If your students are completing the whole of this course online, then they can complete useful and engaging activities, or a test 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. Choose whichever suits your students and needs.

Each task has student-facing instructions you can use (found later in this pack).

## 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 submit this reflection as a written essay, podcast or video.

**Research task:** Students create a sketch of the layers in Titan's and Earth's atmospheres following some research (Step 1.8). They submit their sketch as a photo or image file.

## Group tasks based on the course

**Research task:** The students create a collaborative slideshow detailing the different sets of data collected about planetary atmospheres from earth and space probes, including what they can tell us. They will submit their presentation alongside a summary of how they worked together as a team.

## 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.

## Additional support

You can use the [How to use Futurelearn guide](#) with your students to get started. If you have any more questions, please refer to the [FAQ](#) section.

# Student instructions

## Reflection

Write a 500-word reflection on 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.

## Research task

Find out what the layers in Titan's and Earth's atmospheres are by doing some research. You may find Step 1.8 of the course helpful. Your research should be able to answer these questions:

- What are the chemical layers of Titan's and Earth's atmospheres and what are the most abundant molecules present?
- What are clouds made of on Titan versus Earth?
- What about the upper layers of the atmospheres?

Use your research to make a rough sketch of what they look like and submit it to your teacher. You could draw it on paper and send your teacher a photograph or create the sketch on your computer and submit your file to them.

## Group research task

Your group needs to create a collaborative slideshow about researching planetary atmospheres. Your presentation should include:

- the different sets of data we can collect about planetary atmospheres from Earth
- the different sets of data we can collect about planetary atmospheres from space probes
- what the data sets can tell us.

Your presentation should include a brief summary of how your team worked together to produce the slideshow – who contributed to which parts and how you reviewed each other’s work. Submit both your presentation and your summary 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. Describe some of the key differences between the atmospheres of planets in our solar system, using examples. (5 marks) [Step 1.5]
2. What did the mission to Saturn and Titan discover? (3 marks) [Step 1.8 and 1.9]
3. How has the way the Earth’s atmosphere developed affected how we look for other habitable planets? (4 marks) [Step 2.2]
4. What is the Drake equation and how can it be used? (3 marks) [Step 2.5]