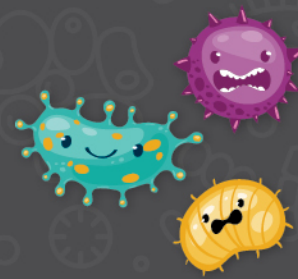


Introduction to Microbes and Antibiotic Use



Year 2 Lesson Plan

- Year 2 Lesson Plans covering five lessons
- Templates for activities
- Additional resources
- Activities and outcomes link to the Australian Curriculum (Version 8.4)

Unit: Introduction to microbes and antibiotic use

Year level: Year 2

Lessons: 5

Links to Australian curriculum: Science | Health and Physical Education (*see details below*)

Key Learning Outcomes

- Understand that whilst some microbes can be helpful some can be harmful.
- Understand that the microbes that can make us unwell can also be passed from person to person.
- Understand that antibiotics are used to treat bacterial infections.
- Understand what antibiotic resistance is and why it is important.
- Understand that misuse and overuse of antibiotics can lead to antibiotic resistance.

Rationale

This lesson plan aligns with the Australian Science curriculum. Understanding micro-organisms (microbes) is an important component of science education as microbes play an important role in the health of humans and animals. Harmful microbes such as viruses and certain types of bacteria can make us unwell. While doctors can prescribe a type of antimicrobial (antibiotics) to help prevent and treat bacterial infections, the overuse and misuse of antibiotics has meant that the bacteria are increasingly becoming resistant to antibiotics which is a concern for now and the future. Health and Physical Education streams such as 'Personal, social and community health' are relevant to this, as human behaviour plays a role in preventing and/or managing antimicrobial resistance. Understanding hygiene, how to prevent illness from infection and how to properly use antibiotics are all important aspects of personal and community safety and wellbeing.

Australian Curriculum Outcomes

Learning Area	Learning Outcome(s)
Health and Physical Education	Personal, Social and Community Health / Being healthy, safe and active: Recognise situations and opportunities to promote health, safety and wellbeing (ACPPS018) Personal, Social and Community Health / Communicating and interacting for health and wellbeing: Examine health messages and how they relate to health discussions and behaviours (ACPPS021)
Science	Science understanding / Chemical sciences: Different materials can be combined for a particular purpose (ACSSU031) Science as a Human Endeavour / Nature and development of Science: Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE034) Science Inquiry Skills / Planning and conducting: Participate in



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guided investigations to explore and answer questions ([AC SIS038](#))

Science Inquiry Skills / Communicating: Represent and communicate observations and ideas in a variety of ways ([AC SIS042](#))

Resources

Activity resources

- Making bacteria guide **Page 8**.
- Fill in the gap and complete the sentences template **Page 9 (answers Page 10)**
- Yes and No flash cards **Page 11 and 12 (answers Page 13)**

Teachers to provide:

- Pom Poms
- Pipe cleaners
- Computer/Internet

Additional Resources

- 'Bugs' by Teachers TV (13min 49sec) <https://www.stem.org.uk/resources/elibrary/resource/30639/bugs>
- 'How Antibiotics work' The Dr Binocs Show (8min) <https://www.youtube.com/watch?v=WELYkx1yIY8&t=102s>
- Awareness of Antimicrobial Resistance (AMR) animation by Health Education England (1min 49sec) <https://www.youtube.com/watch?v=oMnU6g2djm4>
- '[The relative size of particles](#)', on the Visual Capitalist. Design by Harrison Schell.
- [Antimicrobial Programs Education Resources, SA Health](#)



Lesson Outline

Lesson 1: Microbes and Bacteria – Making Bacteria

Overview

This lesson introduces students to bacteria.

Discussion/Engagement

Bacteria are amongst the smallest living things in the world, made up of just one cell. Bacteria are so small that we need a microscope in order to see them. Bacteria can be found everywhere, including in the air, on our skin, in the ground, in our bodies, and other places in nature.

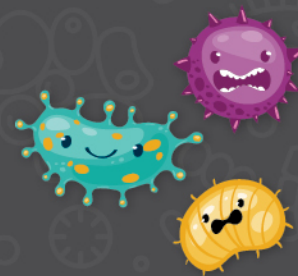
Most bacteria are not dangerous, though there are some kinds of bacteria that can make us sick. Bacteria that cause disease are called pathogens. Pathogens can cause diseases in many living things, including animals and plants. Our bodies can fight off some pathogens with our immune system, but sometimes we can become very unwell. We can prevent pathogens from entering our bodies by washing our hands.

Activities

1. **Watch** 'Bugs' by Teachers TV (13min 49sec):
<https://www.stem.org.uk/resources/elibrary/resource/30639/bugs>
2. To give the students an idea of the size of bacteria and viruses compared to a grain of salt and human hair, show them this image, '[The relative size of particles](#)' via the Visual Capitalist by Harrison Schell.
3. **Make** Bacteria. Refer to guide on **Page 8**.
 - Firstly, look up bacteria structure on the internet or show the class an example and note the key elements and shapes.
4. Using pipe cleaners and pom poms construct some bacteria.

Post Activity Discussion/Engagement

Compare bacteria within the class. Do they look the same or are they different? Were different colours used? Shapes? Size? Do you think bacteria differ like this in real life?



Lesson 2: Bugs, antibiotics, and resistance

Overview

Learn about antibiotic-resistant infections and why this is such a risk to human and animal health. Find out how we can prevent antimicrobial resistance.

Discussion/Engagement

- **Watch:** 'How Antibiotics work' The Dr Binocs Show (8min 02sec)
<https://www.youtube.com/watch?v=WELYkx1yIY8&t=102s>
- **Discuss:**
 - What do antibiotics do? Do students know when they should be used?
 - What impact have antibiotics had on controlling disease?
 - Antibiotic resistant superbugs might soon become a serious medical problem. True or false?

Activity

1. After watching the video **complete** the activity on **Page 9** to test understanding (and discuss answers provided on **Page 10**).



Lesson 3: Conducting research

Overview

Increase student understanding by getting to them to do some online research using the internet.

Engagement

Research the types of microbes (e.g., bacteria, viruses, fungi), and antibiotics. Get students to formulate three to four questions they want answers to before researching.

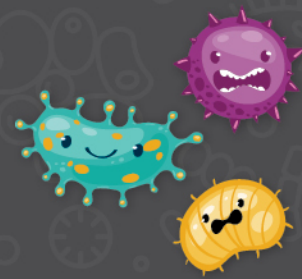
Some questions/issues to research might be:

- What are bacteria?
- What is a virus?
- What illnesses do bacteria and viruses cause?

Activity

1. **Create** a poster

Using the information students found from their research, get the students to create a poster with imagery highlighting what they discovered. This could be hand drawn or made in creative program such as Canva.



Lesson 4: Yes or No flash cards

Overview

Review learning by using the flash cards to see what the students have learned so far from the previous lessons.

Activity

1. Flash Cards

Print, cut out and display the Yes and No cards on a whiteboard or have the students work in small groups. Ask students to answer yes or no to the questions provided on **Page 11 and 12. Answers are on Page 13.**

Discuss the answers to each to ensure understanding.



Lesson 5: Why antibiotics are used, when they are used and why misuse is a problem

Overview

Antibiotics are sometimes used to treat bacterial infections and should only be used if given by your doctor. Having green snot does not mean you need antibiotics! Using too many or not using the correct amount can lead to something called 'antimicrobial resistance'. This is where the 'bugs' have changed or grown stronger and cannot be killed by the antibiotics. This means that the antibiotics may not work if you need them again in the future.

Discussion/Engagement

- Explain that viruses and bacterial infections are different and that antibiotics do not work for viruses.
- If a doctor tells you that you need antibiotics it is important you take the amount prescribed.
- Explain that viruses and bacterial infections are different and that antibiotics do not work for viruses.
- If a doctor tells you that you need antibiotics it is important you take the amount prescribed.

Activity

1. **Watch:** Awareness of Antimicrobial Resistance (AMR) animation by Health Education England (1min 49 sec). <https://www.youtube.com/watch?v=oMnU6g2djm4>
2. Antimicrobial Awareness Week is held in November each year. [Return to this link in October 2022 for activities and competitions.](#)



Make Bacteria

Using pipe cleaner's and pom poms, build your own bacteria.



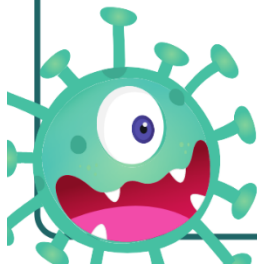
*Compare the bacteria within the classroom.
How do they differ? What types of bacteria are they?*



Name: _____

Fill in the gaps and complete the sentences

1. _____, _____, _____ are three types of microbes.
2. _____ are used to prevent bacterial infections.
3. The first type of antibiotic created was discovered by _____.
4. _____ and _____ of antibiotics can lead to antimicrobial resistance.
5. _____ can not be cured with antibiotics.





Fill in the Gaps answers

1. **Bacteria, viruses and fungi** are three types of microbes.
2. **Antibiotics** are used to prevent bacterial infections.
3. The first type of antibiotic was discovered by **Alexander Fleming**.
4. **Misuse** and **overuse** of antibiotics can lead to antimicrobial resistance.
5. **Viruses** cannot be cured with antibiotics.





Flash Cards

Pathogens can cause diseases in many living things.

Yes or No

Using antibiotics when you don't need them may cause antibiotic resistance.

Yes or No

If you feel better you should stop using the antibiotics and throw them away.

Yes or No

Antibiotic resistance means the bugs are resistant to the antibiotics.

Yes or No



Microbes come in all shapes and sizes.

Yes or No

We can remove harmful microbes from our hands when we wash them properly.

Yes or No

Green snot means we need antibiotics.

Yes or No

Antibiotics are used to treat infections caused by bacteria and viruses.

Yes or No



Answers to flash cards

1. Pathogens can cause diseases in many living things. **YES**
2. Using antibiotics when you don't need them may cause antibiotic resistance. **YES**
3. If you feel better you should stop using the antibiotics and throw them away. **NO this can lead to antimicrobial resistance. Complete the course given by your doctor. Unused antibiotics should be returned to a pharmacy.**
4. Antibiotic resistance means the bugs are resistant to the antibiotics. **YES**
5. Microbes come in all shapes and sizes. **YES**
6. We can remove harmful microbes from our hands when we wash them properly. **YES**
7. Green snot means we need antibiotics. **NO this is not a sign that antibiotics are needed. This symptom can often clear up on its own.**
8. Antibiotics are used to treat infections caused by bacteria and viruses. **NO they are used to treat bacterial infections.**

