

# Fighting off germs and how



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## TEACHER INTRODUCTION

The following teaching unit (best suited to yrs 5+) is based on the idea that the health of humans, animals, plants and the wider environment is closely linked and interdependent. We introduce students to the concept of 'antimicrobial resistance' which is when harmful germs (bacteria, viruses and fungi) no longer respond to the drugs designed to kill them.

Science Learning Hub offer teachers an extensive suite of resources to support this lesson including:

- *Reducing risks of antimicrobial resistance (AMR)*
- *History of antibiotics and AMR*
- *AMR as a context for learning*
- *AMR explained*
- *AMR a major health issue*
- *How AMR happens*
- *How to slow the spread of AM resistant bacteria.*

For a full list and to download these resources visit:  
<https://www.sciencelearn.org.nz/search?term=antimicrobial%20resistance>

## AN INTRODUCTION TO MICROORGANISMS

- Introduce the class to the word 'microorganism'. Do they know what a microorganism is? Have students brainstorm and list ideas eg: *what are they, where are they found, do they affect us in any way ...* Have students compare their answers with the short definitions at: <https://kids.britannica.com/kids/article/microorganisms/476296> to discover that there are several different types of microorganisms such as bacteria, viruses and fungi. Some can help us in many ways while some can cause serious problems for people, animals and plants. Discover how these different microorganisms help us and also what problems some can cause.
- As a class or in groups have students conduct detailed research about three different common types of microorganisms - bacteria, viruses and fungi at: [www.youtube.com/watch?v=XldMeDOy8AY](http://www.youtube.com/watch?v=XldMeDOy8AY) to discover:
  - *how tiny are bacteria and what do we need to be able to see them?*
  - *in what different places can bacteria be found?*
  - *how safe are most bacteria and what do we call some bacteria which can make us sick (pathogens)*
  - *what are some of the diseases pathogens cause?*
  - *how do we treat people who have become sick because of bad bacteria?*

## Learning Outcomes & Curriculum Links

### Personal Health and Physical Development

- Students will be introduced to microorganisms to discover what they are, where they are found and how they can affect us, our environment, plants and animals in positive ways. Students will also discover there are a smaller group of microorganisms that are harmful and can cause serious illnesses that we treat with antibiotics.
- Students will discover the many reasons that bad bacteria are becoming resistant to antibiotics and the steps we must take to stop or slow this down or face serious consequences.
- Students will also discover the six simple actions we can all take to stop the spread of infectious diseases.

### Additional Links: English, Technology, Arts, Science

- *how do the good bacteria inside our body help us?*
- *how do good bacteria and fungi, found on the Earth, help us and how do they help our atmosphere?*

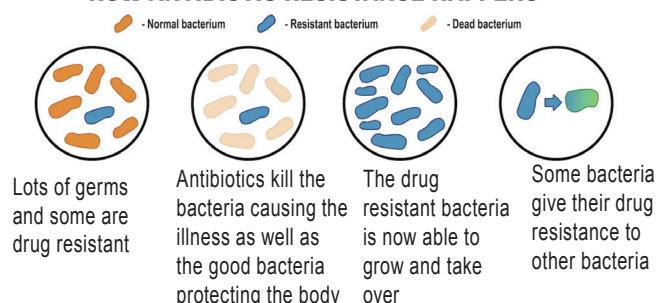
## WHY ANTIBIOTICS ARE SO IMPORTANT

- How many students have been sick and been told by a doctor that they will be placed on 'antibiotics'? Have students share their experiences with the class.
- Do students know antibiotics are designed to kill the bacteria that make us sick? Tell students that the bad bacteria that make us sick are called 'pathogens' Visit: <https://healthify.nz/medicines-a-z/a/antibiotics> to discover why it is so important for a doctor to diagnose your treatment.
- Have any students had pets placed on antibiotics by vets and why was it important to finish the course? Share their experiences with the class. Play/discuss video at: [www.youtube.com/watch?v=WVzaVoR\\_BVE](http://www.youtube.com/watch?v=WVzaVoR_BVE)

## ANTIBIOTIC-RESISTANCE: A MAJOR PROBLEM

- Remind students that the health of animals, people and our environment are all closely related. Did they know that the antibiotics we use to treat many ...

### HOW ANTIBIOTIC RESISTANCE HAPPENS



# ... we can all help with this fight.

diseases in plants, animals and ourselves are very similar, and this means that if we have a problem with any antibiotics, we all have a problem. When antibiotics stop working to help us, this resistance is known as **AMR – Antimicrobial resistance**.



Development of antibiotic resistance is a natural process but misuse of antibiotics is accelerating the problem

- Play and view the following three videos and have students isolate and list the main points of each video.
  - 1 How bacteria develop resistance to antibiotics at: <https://vimeo.com/225007102> (eg: AMR is spread by the misuse of antibiotics)
  - 2 How antibiotic-resistant bacteria spread at: <https://vimeo.com/225008215> (eg. AMR is spread by contact between people, food, animals and environment)
  - 3 How to help slow the spread of antibiotic-resistant bacteria at: <https://vimeo.com/225009608> (eg. List the many things we can do to slow the spread of AMR)
- Tell students that another name we use to describe antimicrobial resistance is 'Drug-resistant infections' and that these are very hard to treat.
- Project the following pdf and through class discussion, have students become aware of and find answers to the following problems that drug-resistant infections can cause. Discover the actions we must take to help the spread of drug-resistant bacteria. [www.royalsociety.org.nz/assets/Uploads/Factsheet-Drug-resistant-infections-are-hard-to-treat-web.pdf](http://www.royalsociety.org.nz/assets/Uploads/Factsheet-Drug-resistant-infections-are-hard-to-treat-web.pdf)
  - why is it important to take the same precautions that we take with plants, animals and the environment when we use antibiotics on humans?
  - in what two ways can we slow the spread of bacteria and other microbes?
  - why is it important to avoid using antibacterial soaps and cleaning products?
  - what gives us the best protection against some of the most infectious diseases?
  - why is it very important that we follow professional advice given by a doctor or vet for our pets and farm animals?
  - what must we always avoid doing?
  - what infections can not be treated with antibiotics?
  - what medicines may not work well in the future and what could be the possible consequences for humans or animals?
  - did they know that animal welfare can be compromised

- and if animals that make food (meat, eggs or milk) become ill then food production could be reduced?
- what are the consequences for humans if food becomes harder to produce and how would this compromise animal welfare?
- how do many drug-resistant bacteria arrive in New Zealand from overseas?



- Play and discuss the following video of Dr Siouxsie Wiles, a microbiologist at Auckland University where she describes and explains the growing health issues regarding antibiotic-resistance in New Zealand. How many people in the world are predicted to die each year if we don't find answers to this problem? [www.sciencelearn.org.nz/videos/1737-antimicrobial-resistance-a-major-health-issue](http://www.sciencelearn.org.nz/videos/1737-antimicrobial-resistance-a-major-health-issue)

## THERE ARE SIMPLE THINGS WE CAN DO TO HELP

- Remind students that they have already discovered that many microorganisms can help us in many ways but that there are some bacteria, viruses and fungi that can cause and spread infectious diseases.
- Introduce the idea that there are six simple steps we can all take to prevent us getting infectious diseases and spreading them. Challenge students to brainstorm and list the 6 steps they and their families can take and compare them with the following list:
  - immunising ourselves and our pets and livestock against infectious diseases
  - washing and drying our hands regularly and well
  - staying at home if you are sick
  - cleaning surfaces regularly
  - ventilating our home, school and workplace
  - knowing how to shop, store and prepare food safely.
- As a class, visit the Ministry of Health website at: [www.health.govt.nz/your-health/healthy-living/environmental-health/infectious-disease-prevention-and-control/prevent-spread-infectious-disease](http://www.health.govt.nz/your-health/healthy-living/environmental-health/infectious-disease-prevention-and-control/prevent-spread-infectious-disease) to discover and list the simple actions we can all take to solve these serious problems.
- Challenge students to design and produce posters for a class wall display that outlines both the problems and the solution(s) we and our families can all take.

# Let's share these important messages

## FOCUS ON FOOD SAFETY AT HOME



- The following links and videos give greater detail about how to shop for, transport, store, and prepare the food we eat, safely at home. These important steps will help us avoid getting infectious diseases and spreading them.
- Do students know that more than 200,000 New Zealanders get food poisoning every year in homes just like theirs and this is caused by harmful germs that are in or on the food we eat? Play the following video to introduce the causes and discover some of the ways we can prevent food poisoning happening at: [www.youtube.com/watch?v=sXPI6gsXdXI](http://www.youtube.com/watch?v=sXPI6gsXdXI) Discuss and list the many reasons why it happened.
- Read, identify and discuss the following tips on preparing, cooking, storing and transporting food: [www.mpi.govt.nz/food-safety-home/preparing-and-storing-food-safely-at-home/safe-food-preparation-cooking-and-storage-at-home](http://www.mpi.govt.nz/food-safety-home/preparing-and-storing-food-safely-at-home/safe-food-preparation-cooking-and-storage-at-home)

### PLAY AND DISCUSS THESE FURTHER 2 VIDEOS



- **The Importance of Cleaning & Washing During Food Preparation at:** [www.youtube.com/watch?v=JFq4sWTzTA8](http://www.youtube.com/watch?v=JFq4sWTzTA8)
- **How does Cross Contamination Happen and How can we Avoid it at:** [www.youtube.com/watch?v=Xm\\_X5LJmrbw](http://www.youtube.com/watch?v=Xm_X5LJmrbw)

## SHARING THIS INFORMATION WITH OUR FAMILIES

- Remind students that just over 200,000 people in New Zealand (over 500 per day) suffer from a food-borne illness. Have any class members suffered from this? Are they aware of any members of their families or friends who have suffered from it? Ask if they are allowed to share these stories with the class, how it was caught and how it was cured.
- Have students talk to their extended families about what they have been studying at school, including what they have found out about the causes of infectious diseases, and why antibiotics are becoming less and less able to successfully treat infectious diseases caused by bacteria.
- Have students along with whanau check at home to ensure there are no leftover antibiotics. If there are, these should be returned to their local pharmacy or vet. Proper disposal will make sure the antibiotics do not end up in our landfills and damage the environment.

## PLANNING AN AMR DAY/WEEK

- Involve the full class in setting up a series of computer stations where all the different videos the students have viewed will be played and discussed with the visitors – both other classes, parents and interested community members. Have each group prepare a short written summary of their video to distribute.
- Invite a health professional (nurse, doctor or vet) to talk to the guests and students about how we can reduce the need for antibiotics, why it is so important to visit a doctor, always complete a full course of antibiotics or medicines and why we don't take any tablets/medicines that the doctor has not prescribed.
- Include and involve guests in practical demonstrations of hand washing and ensure they know why it is important to take so much care.
- Prepare simple multi-choice questionnaires to distribute on different aspects of both good and bad bacteria and how they can help us and the problems they cause.

# TAKE PART

## World AMR Awareness Week 18-24 November 2024

**Antimicrobial Awareness** is a worldwide problem and the subject of an **International Awareness Week** which is an excellent project for your class. Its purpose is to encourage people to fight the spread of drug resistant pathogens. The theme for 2024 is '**Educate. Advocate. Act Now**' and we encourage you, your class, your school and parents to take part. Visit the detailed campaign guide at:

<https://www.who.int/campaigns/world-amr-awareness-week/2024>

Here you will find many sections and links for teaching materials including:

- Campaign Guides
- Campaign Materials
- Go for Blue Section
- Highlighted Events
- Fact Sheets