

Infection

Download the teacher notes,
technician notes and student workbook
that accompany this resource at
[rsc.li/3uUoCiQ](https://www.rsc.li/3uUoCiQ).

Learning objectives

By the end of this session, you will be able to:

- Explain how infections spread between humans.
- Describe some methods of preventing and fighting infections.



What is infection?

An infection is the invasion of the body's tissues by microorganisms such as bacteria and viruses.

These disease-causing agents produce reactions in their host as the immune system fights the microorganisms and the toxins they produce.

A cold is a type of viral infection.



University laboratory technician apprentice

Meet Tyler, a university laboratory technician apprentice, who works with university students by supporting them with their research into infectious diseases such as Covid-19 and long-term conditions such as lung diseases.

A FUTURE IN CHEMISTRY
MAKING THE DIFFERENCE

[University laboratory technician apprentice](#)





Activity 1



Spreading the infection



See student workbook

Spreading the infection

1. Interact with another learner, eg shake hands and say 'Hello'.
2. Every time you interact with another learner, transfer five drops of solution from your cup to theirs using your pipette. The other learner will transfer five drops of their solution into your cup.
3. Use your empty pipette to stir your solution and move on to the next learner.
4. Repeat this process until your teacher tells you to return to your seat.
5. Add 2–3 drops of universal indicator to your cup.



Answers

- (a) An orange, pink or red colour shows that the solution in your cup contains the acid.
- (b) The learner with the number recorded by the teacher should have the most intense red colour in their cup and can be identified as the source of the 'infection'. Their solution should be the most acidic as they started off with just the acid being present in their cup.
- (c) This is dependent on your results and techniques. You may be able to see differences in the shades of the universal indicator, which could be used to assess the level of infection.



How does infection spread?

Disease-causing microorganisms can be transferred in several ways:

- touching
- coughing
- sneezing.

The lifespan of a germ outside the body differs, depending on the surface.

On tissues they survive for around 15 minutes.

This is why treatment of infectious diseases is so important.



Medicinal chemist

Meet John, a medicinal chemist, who works on the discovery and development of drugs to treat infectious diseases such as malaria and tuberculosis.

A FUTURE IN CHEMISTRY
MAKING THE DIFFERENCE

Medicinal chemist





Activity 2

Chemicals against infection

▶ See student workbook

Chemicals against infection

You will be given a set of cards to sort. Half of the cards show treatments that can be used to deal with infectious diseases and the other half show situations where that treatment can be used. These include treatments developed by scientists, as well as natural treatments.

Use the information provided in your workbook to help you to match up each type of treatment with a correct use of that treatment.



Answers

Treatment	Use of treatment
Gold nanoparticles	Killing <i>E. coli</i> bacteria
Titanium oxide nanoparticles	Killing bacteria
Iron oxide nanoparticles	Drug delivery
Zinc oxide nanoparticles	Killing <i>staphylococcus</i> (MRSA)
Honey	Antibacterial wound dressings
Tea tree oil	Killing <i>staphylococcus</i> (MRSA)
Carbon nanotubes	Bacteria-detecting bandages
Ajoene (from garlic)	Treating bacterial lung infections in cystic fibrosis



How can you help to combat infections?

Ways to reduce the transmission of infectious diseases include:

- washing hands
- using tissues
- wearing face masks
- socially distancing from other people
- wiping down surfaces that people may have touched.



Associate scientist

Meet Holly, an associate scientist specialising in pharmaceuticals, who works on the development of new medicines to treat diseases.

A FUTURE IN CHEMISTRY
MAKING THE DIFFERENCE

Associate scientist specialising
in pharmaceuticals



Acknowledgements

This resource was originally developed by the University of Reading to support outreach work delivered as part of the Chemistry for All project.

To find out more about the project, and get more resources to help widen participation, visit our Outreach resources hub: rsc.li/3CJX7M3.

Unless explicitly stated, all images are © Royal Society of Chemistry.

The Royal Society of Chemistry gratefully acknowledges the permissions granted to reproduce copyright material in this resource. Every effort has been made to contact the holders of copyright material, but if any have been inadvertently overlooked, the Royal Society of Chemistry will be pleased to make the necessary arrangements at the first opportunity.

