



Spreading Bugs



**A complete guide to running
the Spreading Bugs session**

Introduction

This session gives an overview of the spread of infection including how microbes are spread through sneezing and how proper hand washing with soap can break the chain of infection. The session aims to teach participants how poor hand hygiene and respiratory hygiene can lead to the spread of microbes and disease.

Learning outcomes

Aim to understand that:

- Microbes, including antibiotic resistant bacteria, spread very easily from you to other people
- Everyone carries microbes on their skin, mouth and gut, and healthy people can carry antibiotic resistant bacteria
- The best way to stop your colds and flu spreading to others is catching your coughs and sneezes in a tissue or into your sleeve if you have no tissue (not your hands), try to always have a clean tissue with you
- The best way to stop harmful microbes spreading to family and friends is by washing our hands
- How, when and why to wash our hands

Key words

Soap	Transmission
Hygiene	Infectious
Transfer	Contagious
Antibiotic resistance	

Available web resources

Video demonstrations of activities 1 and 2.

PH3 - 6 steps of handwashing poster.

'Spreading Bugs' poster.

Materials required

Activity 1: A sneezing runway, green sneezer bottle, green food colouring, measuring tape, gloves, tissues.

Activity 2: 2 washing up bowls, water, a box containing GloGerm gel and a UV light, kitchen roll, bin liners, hand soap.

Activity 3: A copy of PH3, water, a sink or washing up bowl, hand soap.

Activity 4: Small plastic bowls, water, washing up liquid, pepper, cocktail sticks.

Activity 5: 2 washing up bowls, water, glitter, kitchen roll, bin liners, hand soap.

Background information

Colds, flu and other respiratory tract infections are the most common infections in the community and are the most easily spread. They are mostly caused by viruses and, as such, cannot be treated by antibiotics. Generally bed rest and drinking plenty of fluids are recommended, however, if symptoms persist then a visit to the local doctor is required. Symptoms of colds and flu include headache, sore throat and fever. People with colds can also have runny noses!

The most common mode of spread is indirect, through coughs and sneezes. Microbes can also be spread via a more direct route, through human contact (touching, kissing) and eating contaminated food. Sneezing is a way in which our body tries to get rid of any harmful microbes and dust we might inhale. The harmful microbes and dust get caught on the nose hair and tickle our nose. The nose sends a message to the brain which then sends a message back to your nose, mouth, lungs and chest telling them to blow the irritation away. In the case of colds and flu, millions of viral particles rush out and contaminate the surfaces on which they land; this could be our food, hands or things we touch.

Workplaces are a haven of microbes which spread rapidly from person to person via touch and some of these will be harmful. Washing our hands is the best way to stop the spread of harmful microbes and prevent people getting sick.

Our hands naturally secrete oil which helps keep our skin moist and stops it getting too dry. This oil provides a perfect place for microbes to grow and multiply and also helps microbes 'stick' to our skin. Our skin and hands are also covered by our good bacteria – such as harmless species of *Staphylococcus*. Washing our hands regularly helps remove other microbes we collect from our surroundings (e.g. home, school, garden, animals, pets, food). Some of these other microbes can make us ill if we eat them or get into our chest or under our skin.

Washing hands in water alone eliminates visible dirt and grime, however, soap is required to break up the oil on the surface of the hands which traps microbes. Warm water (rather than cold) increases compliance of hand washing and can improve the performance of some soaps.

Hand gels can be used in addition to hand washing with soap and water but should not be used as a substitute because hand gels are not effective against norovirus.

Hands should be washed:

- Before, during and after preparing food, especially raw meat and dirty vegetables
- After using the toilet
- After touching/handling pets or animals or animal waste
- After coughing, sneezing or blowing your nose
- If you're ill or have been around ill people
- After changing babies nappies

Introduction

Ask the group 'if there are millions of disease-causing microbes in the world that live everywhere, why aren't we ill all the time?' Provide participants with **PH1** (The Chain of Infection) and **PH2** (Breaking the Chain). Use the Chain of Infection PowerPoint presentation available on the [e-Bug Senior Teacher Hand Hygiene webpage](#) to help explain this. The '**Spreading Bugs**' poster can be used to show how microbes can be spread and why, when and how we should wash our hands.

Highlight that there are many different ways in which microbes can be transmitted to people. Ask participants if they can think of any. Examples include through the food we eat, the water we drink and bathe in, the things we touch and from sneezing (for adults through blood when sharing needles or from dirty tattoo parlours, or during sexual contact).

Explain to participants that many diseases are airborne and spread in tiny droplets of water, carried around in the air, which are coughed and sneezed into the air by people. Tell them that diseases spread in this way range from colds and flu, to rarer, more serious infections like chicken pox, also measles, pneumonia and chest infections.

Continue to discuss colds and flu and that it is likely that everyone has had one, explaining that they are caused by a virus and not bacteria and, as such, cannot be cured by antibiotics. Explain that it is very important for everyone's health that people cover their mouth and nose when they cough and sneeze as this can reduce the spread of infection.

Ask participants: How many of you have washed your hands today? Ask why they washed their hands (because they looked dirty or to wash away any microbes that might be on their hands), and what would happen if they didn't wash away the microbes (they might get ill).

Tell the participants that we use our hands all the time, and that they pick up millions of microbes every day. Although many of these are harmless some could be harmful.

Explain to the class that we spread our microbes to our friends and others through touch, and this is why we wash our hands.

Explain to students that they are going to do an activity to show them how microbes are spread through sneezing and an activity on how best to wash their hands to remove any harmful microbes.

The following pages describe 5 hygiene activities. Choose 2 or 3 of the most appropriate activities for your group from the recommended and optional.

Recommended Activities

The following three activities are recommended.

Activity 1 – The Snot Gun (10-20 mins)

Advance preparations:

1. Create a sneezing runway by placing 3 – 4 tables in a row with a vertical back board and covering them with white paper.
2. Fill one spray bottle per group with water and green food colouring.
3. Have disposable gloves ready for the activity.
4. Have large kitchen roll sheets ready for the activity.

Instructions:

1. Divide the participants into groups of 4 – 5
2. Each group should be provided with the sneezing runway, a sneezing bottle, a glove and a giant tissue. Provide each participant with **PW1**. Ensure they have read and understood the instructions before starting the activity.
3. To demonstrate the distance a sneeze and microbes in the sneeze travel, members of each group should take turns holding the bottle at the end of the runway and simulate a sneeze by squeezing the trigger once over the paper. Before ‘sneezing’ (squeezing the trigger) members should predict how far and wide the sneeze will go and fill this in on their results sheet (**PW1**). After ‘sneezing’ participants should measure and record how far and how wide each of their sneeze has spread and fill this on their results sheet.
4. The next step is to observe what happens when we put our hand over our mouth when we sneeze; the microbes stay on our hands and can spread to anything we touch. One member of each group should be the ‘sneezer’ and the second member should hold a gloved hand about 2 – 5cm away from the spray bottle. Participants should fill both predicted and actual outcomes on their results sheet.
5. Finally, we want to observe what happens when we cover our mouth with a tissue during sneezing. Ask a different participant in each group to be the ‘sneezer’ and ask another participant to hold the tissue directly in front of the spray nozzle. Members of the group should fill in both predicted and actual outcomes on **PW1**.
6. Discuss with participants, what happened when a hand or tissue was used? What should we do next with the hand or tissue? (*wash/throw in the bin*).

Learning outcomes achieved:

1. Microbes, including antibiotic resistant bacteria, spread very easily from you to other people when you cough and sneeze.
2. The best way to stop your colds and flu spreading to others is catching your coughs and sneezes in a tissue or your sleeve if you don't have a tissue.
3. The best way to stop harmful microbes spreading to family and friends is by washing our hands.

Activity 2 – Horrid Hands (10-15 mins)

1. Explain to the participants that microbes are everywhere and they get on to our hands from the things that we touch. We then pass these on to other people. Washing our hands is the best way to remove these microbes.
2. Explain when we should wash our hands – before and after preparing food, after using the toilet, after touching animals and after coughing or sneezing.
3. Ask the participants to line up one behind the other like a queue. If there are more than 5 participants, form 2 queues so that there are no more than 5 participants per queue.
4. Squeeze a little GloGerm gel into the participant at the front of the line's hands and ask them to rub in the 'pretend microbes'.
5. The person at the front should then turn around and shake hands with the person behind them, and so on, until they have all shaken hands with the person behind them in the queue.
6. Use the UV light to show the participants how the germs got passed down the line – point out how dirty their hands are and how the germs spread because they didn't wash their hands. The person at the back of the queue should still have germs on their hands.
7. Ask participants to rinse their hands in the washing up bowls as they would usually and give kitchen roll to each person to dry their hands.
8. The UV light can be used again to see how many germs remain.
9. Demonstrate the proper way to wash hands with soap and ask them to follow your movements: do the six step technique – palm to palm, back of the hands, in between the fingers, back of the fingers, the thumbs, and tips of the fingers (illustrated on [PH3](#)).

Alternative to UV gel: see Activity 5.

Learning outcomes achieved:

1. Microbes, including antibiotic resistant bacteria, spread very easily from you to other people
2. Everyone carries microbes on their skin, mouth and gut, and healthy people can carry antibiotic resistant bacteria
3. the best way to stop harmful microbes spreading to family and friends is by washing our hands
4. how, when and why to wash our hands

Activity 3 – 6 Steps of Hand Washing (5-10 mins)

1. Provide participants with **PH3**.
2. Go through **PH3** together as a group to show the 6 steps of hand washing.
3. Get participants to practice washing their hands correctly.
4. Explain to the participants that you should spend the same amount of time washing your hands as it takes to sing 'Happy Birthday' twice or another song they will remember to use.

Learning outcomes achieved:

1. The best way to stop harmful microbes spreading to family and friends is by washing our hands
2. How, when and why to wash our hands

Optional Activities

Activity 4 – Pepper Experiment (10-15 mins)

This activity aims to show why washing with soap and water is better than using water alone. If cocktail sticks are used, course leaders should help participants to ensure safety. The bowls must be rinsed after each group for this to work. It is recommended to practice this experiment before the session.

1. Set up the activity by filling a bowl with water and sprinkling pepper on the surface.
2. Tell participants that the surface of the water in the bowls represents their hands, and that the pepper represents harmful microbes that need to be washed away.
3. Dip the end of a cocktail stick (or participants can use their finger) into a plain bowl of water and then into the pepper water. Gently swirl the cocktail stick around and explain that using water to wash your hands only moves the microbes around.
4. Dip the cocktail stick into a bowl of washing up liquid and then into the pepper water.
5. The pepper 'microbes' will move towards the edges of the bowl as the soap hits the surface of the water.
6. Tell the participants that this shows why using soap when you wash your hands is important, because it breaks up the oils on the surface of your hands that microbes stick to and then they can be rinsed away under running water.
7. Rinse the pepper water bowls, dry with kitchen towels and reset between groups.
8. Hand out **PH4** and ask participants to do the experiment themselves.

Discussion:

The experiment with and without soap should have been different. When the soap was on the cocktail stick the pepper should have moved towards the edges of the bowl. Our hands have oil on the surface which microbes stick to. When we use soap, the oil is removed and the microbes can be washed away – just like the pepper was pushed to the edge of the bowl with the soap!

Learning outcomes achieved:

1. The best way to stop harmful microbes spreading to family and friends is by washing our hands

Activity 5 – Glitter Microbes (10-15 mins)

This activity is the same principal as Activity 2, however instead of using UV gel you can use glitter to show the spread of microbes.

Activity 6 – Germ Defence (10-15 mins)

This activity is a website called [Germ Defence](#) that acts as a tool to help you reduce the likelihood of getting colds, flu and stomach upset. The simple steps will help prevent you from catching colds, flu and stomach upsets and from passing them onto people you live with.

National Institute for Health and Care Excellence (NICE) have recommended Germ Defence as a good public health learning tool and research has shown that by using Germ Defence you are likely to have less illnesses, and if you do get ill it won't be for as long.

The Germ Defence website can be accessed here:

www.pips.ecs.soton.ac.uk/player/play/germdefence

Discussion

Discuss what the group have learnt today with open questions and refer to the 'Spreading Bugs' poster.

What have you learnt today?

How has the activity changed the way you wash your hands?

When is it important to wash your hands?

Lead the discussion to reflect back on the learning objectives.

1. Microbes spread very easily from you to other people.
2. The best way to stop your coughs, colds and flu spreading to other is catching your coughs and sneezes in a tissue or sleeve if you do not have a tissue.
3. Always keep a clean tissue with you in your pocket or bag.
4. The best way to stop harmful microbes spreading to family and friends is by washing our hands.
5. To use soap when washing hands, and to wash all parts of our hands, including thumbs. Remember not to splash and dash! Use the song you have chosen to time your hand washing.

Extension questions.

1. Based on what we have done today, what have you learned about the spread of microbes?

Microbes can pass very easily from person to person through sneezing and touch. This can also include antibiotic resistant bacteria.

2. If we don't wash our hands after sneezing into them, what might happen?

We can still transfer the harmful microbes found in a sneeze to other people when we touch them.

3. Which method is best for preventing the spread of infection: sneezing into your hand or sneezing into a tissue? Why?

Sneezing into a tissue because the microbes get trapped there and we can then throw the tissue away. If you do not have a tissue, sneeze into your sleeve.

4. What do we need to make sure we do with tissues after use?

Throw them away to prevent further transmission of microbes.

5. When do we need to wash our hands?

After sneezing, coughing, going to the toilet, touching pets/animals, touching raw meat.

Action Plan

Ask participants to complete an action plan for this session (found at the back of this session booklet).

Ask participants to either choose one of the action plans from below or to make up their own if they are confident enough.

1. Reduce the spread of microbes by:

- a. Carry tissues or toilet paper with you all the time, agree where to keep this
- b. Choose a song to use when washing hands
- c. Use soap every time you wash your hands, and wash every part of your hands
- d. Wash hands after sneezing, going to the toilet, touching food and animals
- e. Throw tissues in the bin after use

Acknowledgements

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Spreading Bugs

**BEAT THE
BUGS**

How do we spread bugs?

- Microbes spread easily through coughs and sneezes, food and water, animals and touch.
- Every day thousands of microbes get onto our hands from the things we touch and we transfer these microbes onto other places or people.
- The best way to stop the spread of harmful microbes to others is by catching your cough and sneezes in a tissue and washing our hands.
- The best way to wash your hands is with soap and warm water.

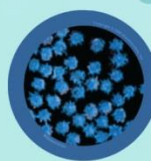


What is a sneeze?

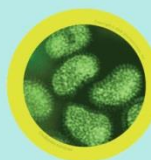
Sneezing is a way in which our body tries to get rid of all the harmful microbes and dust.

The microbes and dust get caught on the nose hair and tickle our nose.

The nose sends a message back to the brain which then sends a message back to your nose, mouth, lungs and chest telling them to blow the irritation away.



Rhinovirus
(Common Cold)



Orthomyxovirus
(Flu)

Why should you wash your hands?

- To remove harmful microbes.
- To stop you catching infections
- To stop you giving infections to others.
- To stop the spread of antibiotic resistant bacteria.



When should you wash your hands?

- ✓ Before, during and after preparing food.
- ✓ After using the toilet.
- ✓ After touching animals.
- ✓ After coughing, sneezing or blowing your nose.
- ✓ If you are ill or have been around ill people.



Sneezing FACTS

- A sneeze can travel the length of a double decker bus!
- You cannot sneeze without closing your eyes.
- You produce 2 pints of snot every day and most of this you swallow without thinking.
- Some doctors use the colour of your snot to tell how ill you are.
- Antibiotics will not help a runny nose as colds are caused by viruses and antibiotics cannot kill viruses.



How should you wash your hands?



Palm to palm



The back of the hands



In between fingers



The back of the fingers



The thumbs



The tips of the fingers

The Chain of Infection

People at risk from infection

We are all at risk from infection, but some are at greater risk:

- People on medication e.g. chemotherapy
- The very young/elderly
- People with underlying diseases e.g. HIV/AIDS, diabetes

Source of Infection

Someone or something carrying the harmful microbes that causes the infection. There are many different sources of infection, these can include

- People already infected
- Pets or animals
- Contaminated food

Way out for microbes

Harmful microbes need a way to get out of an infected person or source before they can spread to someone else. Routes include:

- Sneezing, coughing, saliva
- Bodily fluid
- Juices from raw meat and poultry

Way in for microbes

Harmful microbes need a way to enter the body before they can cause an infection. This can be through:

- The food we eat
- Inhalation of aerosols
- Open cuts or sores
- Things we put in our mouths

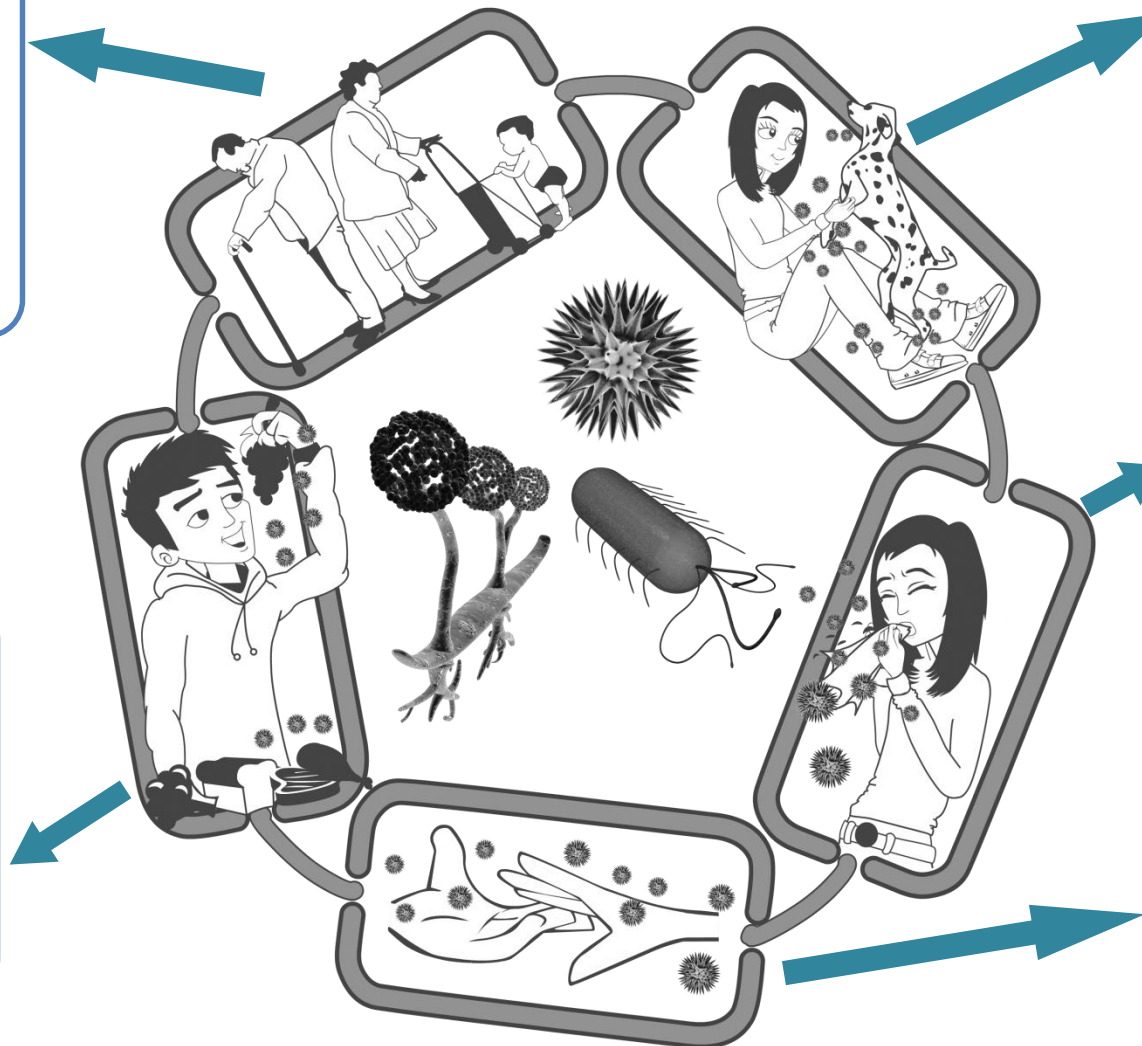
Spread of Infection

Harmful microbes need a way to be passed from a source to a person. This can be through:

- Direct touch/contact
- Sexual transmission

Harmful microbes are also spread via:

- Hands, hand contact surfaces (e.g. door handles, keyboards, toilets)
- Food contact surfaces
- Air



Breaking the Chain of Infection

People at risk from infection

Everyone

- Take appropriate vaccinations

High risk people

- Keep away from people who are infectious
- Take extra care about cleanliness
- Take extra care when cooking and preparing food

Source of Infection

- Isolate infected people
- Take care with raw food
- Wash pets regularly
- Dispose of nappies and soiled clothing appropriately

Way out for microbes

Prevent any

- Coughs and sneezes
- Faeces
- Vomit
- Bodily fluid

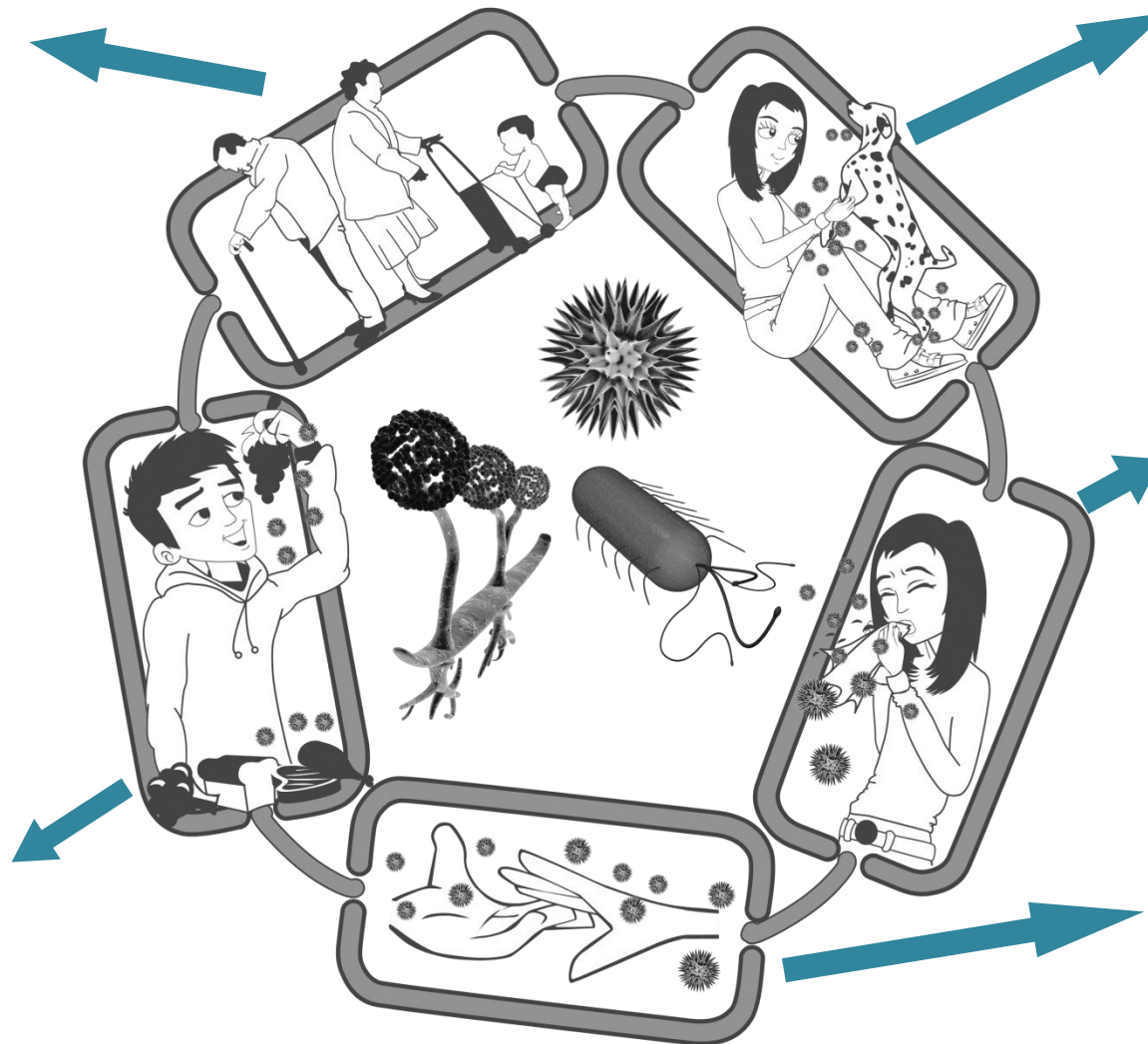
Getting onto surfaces or hands

Way in for microbes

- Cover cuts and open sores with a water proof dressing
- Cook food properly
- Take care to drink only clean water

Spread of Infection

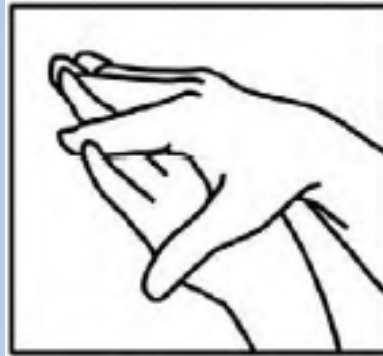
- Wash hands thoroughly and regularly
- Cover cuts and open sores
- Take appropriate precautions during sexual activity



The 6 Steps of Hand Washing



Palm to palm



The back of the hands



In between the fingers



The back of the fingers



The thumbs



The tips of the fingers

Pepper Soap Water Experiment

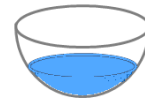
Ingredients

- 1 Bowl (a cereal bowl will be fine)
- Some water
- A sprinkle of black pepper or other spice
- Some hand soap or washing up liquid
- Cocktail sticks (optional)
- A Towel
- A Pen
- A Notebook
- A Camera (optional)



Method

1. Fill the bowl with **water**, but not right to the top.



2. **Sprinkle** some black pepper or spice onto the surface of the water. It should **float** on top.



3. **Dip** your finger (or cocktail stick) into the centre of the water and **watch** what happens to the pepper. Take a **photo** to record what has happened.



4. **Dry** your hand, and then dip your finger (or cocktail stick) into the **soap**.

5. Dip your soapy finger into the **water**. Watch what happens to the pepper. Take a **photo** to record what has happened.

What happened with and without the soap?



Super Sneezes

My Observations

How far did your sneeze travel?

		Student 1	Student 2	Student 3	Student 4	Student 5
Sneeze	Length (cm)					
	Width (cm)					
Sneeze with hand	Length (cm)					
	Width (cm)					
Sneeze with tissue	Length (cm)					
	Width (cm)					

Hand in front of sneeze

What did you think would happen when you put the hand over the mouth to sneeze?

What actually happened? (Where and how far did the sneeze travel?)

Tissue in front of sneeze

What did you think would happen when you put the tissue over the mouth to sneeze?

What actually happened? (Where and how far did the sneeze travel?)

My Conclusions

1. If we don't wash our hands after sneezing into them what might happen?

2. What should we do with a tissue after sneezing into it?

3. Which is best for preventing the spread of infection, sneezing into your hand or into a tissue? Why?



Name: _____

Action Plans

Spreading Bugs

My favourite activity was:

After this session I will (please circle):

1. Carry tissues with me
2. Sing a song when washing hands
3. Use soap to wash hands
4. Always wash hands after going to the toilet

Or write your own:

BEAT THE BUGS

The title 'BEAT THE BUGS' is written in large, bold, white letters with a blue outline. Below the letters are stylized green and purple shapes representing bacteria and virus particles.

This pack contains an educational hygiene resource for community groups.

This session can be used independently or as part of a six week course and has information, suggested lesson plans and possible activities for you to use in your community groups to help you inspire and inform individuals.

This project was led in collaboration with the Primary Care Unit, Public Health England, and Kingfisher Treasure Seekers.

