



## National Curriculum Links

### Key Stage 2

#### Science

Working Scientifically

Animals Including Humans (*Upper KS2 only*)

#### PSHE

Core Theme 1: Health and Wellbeing

#### English

Reading and Comprehension

#### Estimated Teaching Time

50 minutes

## 2.2 Spread of Infection Respiratory Hygiene

The Spread of Infection section aims to teach students how poor hand hygiene, respiratory hygiene and improper care with food can lead to the spread of microbes and disease.

In 2.2 Respiratory Hygiene, students get to observe on a large and fun scale how far germs are carried when they sneeze. Through a set of trial experiments, students learn that covering their mouths with a tissue when they cough and sneeze helps prevent the spread of infection.

### Learning Outcomes

#### All students:

- Will learn that infection can spread through sneezing and coughing
- Will understand that covering the mouth when sneezing or coughing can prevent the spread of infection

#### More able students:

- Will know that coughing or sneezing in your hand can still spread infection





e-Bug

## 2.2 Spread of Infection

### Respiratory Hygiene

#### Key Words

Contagious  
Experiment  
Prediction  
Results  
Symptom  
Transmission

#### Materials Required Per Student

- ☐ A copy of [SW 1](#)

#### Per Group

- ☐ A sneezing runway
- ☐ Blue sneezer spray bottle
- ☐ Red sneezer spray bottle
- ☐ Green sneezer spray bottle
- ☐ Measuring tape
- ☐ Giant or gloved hand
- ☐ Giant tissue

#### Health and Safety

- Students may require aprons and gloves
- Ensure that the food colouring is **EXTREMELY** dilute
- Ensure that all spray bottles have been thoroughly cleaned and rinsed prior to use
- Students may need to wear safety goggles

#### Available Web Resources

- A demonstration of this activity



#### Background Information

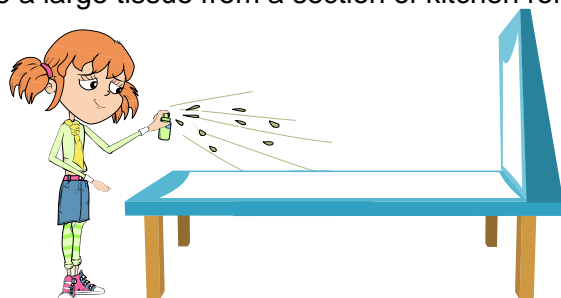
The most common mode of spreading infection is through aerosols, such as coughs and sneezes. They can also be spread via a more direct route, for example through human contact (touching, kissing, dirty hands, sharing toothbrushes, cups) and by eating contaminated food.

Colds and flu are the most common illnesses in the classroom and perhaps among the most contagious. Colds and flu are caused by viruses and, as such, cannot be cured 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. Colds also cause runny noses! Many sore throats associated with colds and flu are due to the viruses in the throat making it feel raw, breathing in through the mouth causes the throat to feel dry and continual coughing causing an aching feeling.

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 virus particles rush out and contaminate the surface on which they land; this could be our food or hands.

#### Advance Preparation

1. Create a sneezing runway by placing 3 – 4 desks in a row with a vertical back board and covering them with white paper (lining wallpaper is a cheap alternative) as illustrated below.
2. Fill one spray bottle per group with water and food colouring. A different colour for each group makes the activity more exciting for the students.
3. Create a large cut out hand from cardboard for each group with a longer arm section for holding or alternatively cover a student's hand with a disposable glove.
4. Create a large tissue from a section of kitchen roll.





## 2.2 Spread of Infection

### Respiratory Hygiene

# Lesson Plan

#### Introduction

1. Begin the lesson by telling the students that they are going to learn how harmful microbes can be passed from person to person by sneezing and coughing. Ask students what they think people mean when they say 'You gave me the cold' or 'I caught the flu from you'.
2. Explain to students that many diseases are airborne and are spread in tiny droplets of mucus and water coughed and sneezed into the air by people. Tell them that diseases spread in this way range from the common cold and flu, to rarer, more serious infections such as meningitis or tuberculosis (TB) which can make you very ill. The microbe images found on the website, [www.e-bug.eu](http://www.e-bug.eu), in section 1.1 may help students visualise these harmful microbes.
3. Continue to discuss the cold and flu, explaining that they are caused by viruses and not bacteria. Explain that it is very important for everyone's health that people cover their mouth and nose with a tissue when they cough and sneeze. There are sometimes large outbreaks of flu when 1000s of people in a country get the infection.
4. Ask students to try and remember the last time they had the cold or flu. Ask them to write down the names of everyone else they knew who had the cold and flu at the same time. Ask them to identify, if they can remember, who developed the symptoms first. Do they think they may have caught the cold or flu from these people?

#### Main Activity

1. Divide the class into groups of 4 – 5 students
2. Each group should be provided with the sneezing runway, a sneezing bottle, a measuring tape or ruler, a giant hand or glove and a giant tissue. Provide each student with [SW 1](#). 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, students in 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) students should predict how far and wide the sneeze will go and fill this in on their results sheet ([SW 1](#)). After 'sneezing' students should measure and record how far and how wide each student's sneeze spreads 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 student in each group should be the 'sneezer' and the second student should hold the giant or gloved hand about 2 – 5cm away from the spray bottle. Students 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 student in each group to be the 'sneezer' and ask another student to hold the tissue directly in front of the spray nozzle. Students in the group should fill in both predicted and actual outcomes on [SW 1](#) and draw a graph of the results.





## 2.2 Transfer of Infection

### Respiratory Hygiene

# Lesson Plan

#### Plenary

1. Discuss with students the outcome of their results. Ask them to look at the hand and notice that the spray 'microbes' are still on it.
2. Show them that when they place the hand on the paper, sprayed side down, the microbes transfer to the paper. Explain that sneezing in your hand can spread the microbes to things that we touch, so it is better to sneeze into the tissue and then throw it away and wash your hands as soon as possible.
3. Discuss with students why some countries use the message 'sneeze in your sleeve'.

*As was observed from the activity, microbes can still be passed from person to person through touch if we cover our coughs and sneezes with our hands. The Centre for Disease Control (CDC) in the USA recommend that in the absence of a tissue we sneeze on our sleeve because we are less likely to transmit harmful microbes to other people by doing this.*

#### Extension Activity

1. Students should create some simple rules or an easy message to reduce the spread of coughs, colds and flu in their school, for example:
  - Coughs and sneezes spread diseases
  - Cover your coughs and sneezes with a tissue
  -
2. Transfer these messages to poster format, creating simple effective posters to place around the school or classroom.





# 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

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

\_\_\_\_\_

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

\_\_\_\_\_

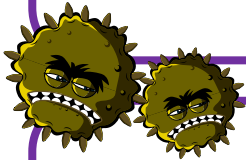
### Tissue in front of sneeze

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

\_\_\_\_\_

4. 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?

\_\_\_\_\_

