

BACKGROUND INFORMATION

Many diseases are airborne and can spread in tiny droplets of water or aerosols that people cough or sneeze into the air. Aerosols in a sneeze can travel at more than 100 kilometres per hour and cover a distance of more than four metres! [1, 2]

Each droplet represents thousands of potentially harmful microbes that could cause infection. The simplest way to stop them spreading is to cover our coughs and sneezes with our hands or a tissue. This can help to stop the spread of microbes.

However, these microbes will remain on our hands until we wash them. Placing a tissue over our mouth and nose when we sneeze traps the microbes in the tissue. We can then throw the tissue and harmful microbes in the bin making sure they do not spread.

The aim of this activity is to raise awareness of pathogens, their transmission and the need for good respiratory hygiene and hand-washing.

MATERIALS TO RUN THE ACTIVITY

- *Sneeze Zone* start mat*
- Tape measure
- A1 flip chart paper (10 sheets)
- Sugar paper cut into squares or circles
- Three different coloured pens (red, blue and black)
- Tissues
- Spray bottle
- Water
- Gloves
- Worksheet
- Lab coats
- Safety goggles
- Green food colouring*
- Whiteboard or flip chart

* These items are optional

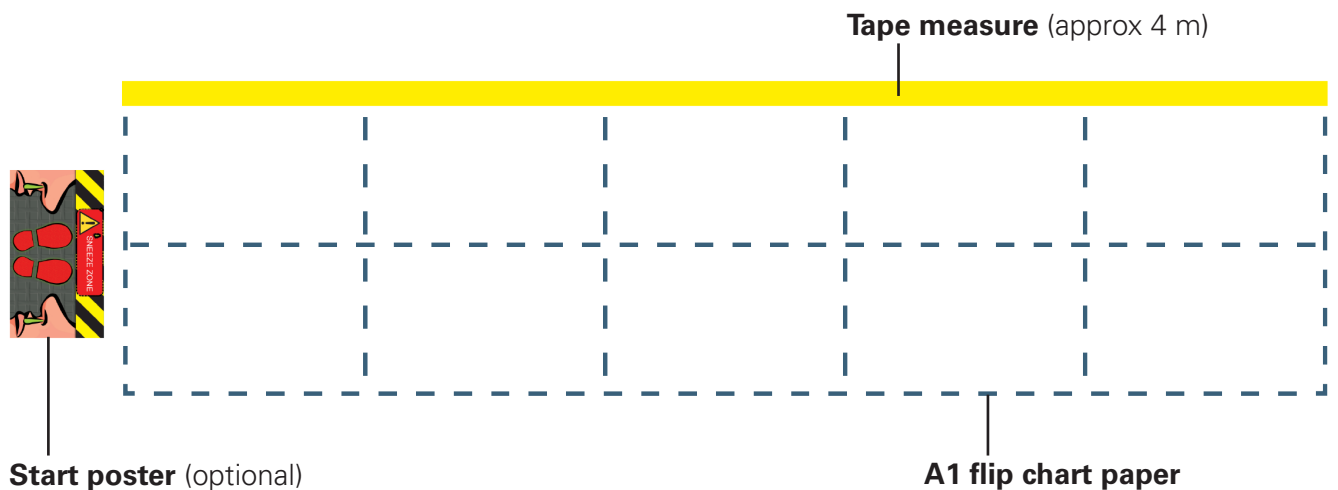
Space needed: (up to 4 metres length)

ACTIVITY PREPARATION

1. Make a *Sneeze Zone*

The activity takes place in the *Sneeze Zone*. Here students measure the distance and impact of a sneeze, simulated using water in a spray bottle.

The *Sneeze Zone* can be created either on the floor or on a set of tables pushed together. To construct the *Sneeze Zone* stick together 10 pieces of A1 flip chart paper as shown below. Place a tape measure along one side of the mat and secure with sticky tape. Secure the *Sneeze Zone* start mat at the top of the *Sneeze Zone* as indicated below.



2. Create your own snot (optional)

For impact, you can add green food colouring to the water in the spray bottles. However, ensure that students wear lab coats and gloves to prevent them staining their clothes.

RUNNING THE ACTIVITY

Stage 1: Sneeze only

Everyone should draw a round face or a stick person on a sugar paper square. This represents a person. If there are just five students, make two people each. Place the “people” on the *Sneeze Zone* start mat.

One student must now use the “nose” (water sprayer) to sneeze twice (spray the water). The group should measure how far the water droplets travelled using the ruler on the *Sneeze Zone* start mat and record this on their sheets.

SNEEZE ZONE

Teacher's notes

Count how many people on the mat were affected by the sneeze. Do this by checking the sugar paper for any water marks. If there are any marks, students should draw a **red circle** around them and record this on their sheet. Wipe away the water droplets from the mat.

Stage 2: Sneeze with hand

Repeat the steps above but this time get students to put a gloved hand in front of the "nose". Measure the distance the water travelled and count how many people were affected this time. Draw a **blue circle** around the water marks (if any). Record your data and wipe away the water droplets.

Question to students: Why were less people affected this time?

Placing a hand over your mouth when you sneeze creates a barrier that stops the microbes from spreading. However, it is important to remember that the microbes are now on your hands so it is important to wash your hands so you do not spread them any further.

Stage 3: Sneeze with tissue

Repeat the process for a final time but this time get students to put tissues in front of the "nose" and "sneeze" twice. Measure the distance travelled by the water and count how many people were affected this time. Get the students to draw a **black circle** around the water marks (if any) and record the data on their sheets. Wipe away the water droplets.

Questions to students: Were any people affected this time? Why not?
What should they do with the tissue now?

This time the tissue acted as barrier and instead of covering your hands the microbes are now contained within the tissue. Some bacteria and viruses can survive on surfaces for over 24 hours so it is really important that any dirty tissues are put in the bin so the microbes cannot spread any further.

COMPLETING THE WORKSHEETS

Students should complete the data tables on their worksheets during the activity so they can feed back their results.

For a focused discussion you can record the class results on a flip chart or whiteboard. This can be used to encourage discussion about the results and help the students answer the questions on their worksheet.

SNEEZE ZONE
Worksheet

OBSERVATION TABLE

		Student 1	Student 2	Student 3	Student 4	Student 5
Sneeze	Length (cm)					
	No. affected					
Sneeze with hand	Length (cm)					
	No. affected					
Sneeze with tissue	Length (cm)					
	No. affected					

1. What was the highest number of people affected by one sneeze?

2. What happens when a hand is put over the mouth and nose when you sneeze?

3. What happens when a tissue is put over the mouth and nose when you sneeze?

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. What is better for preventing the spread of infection sneezing into your hand or sneezing into a tissue? Why?

1/1 yourgenome.org

REFERENCES

[1] Naked Scientists, 2009. How fast is a sneeze? *Garage science blog*. Available at: www.thenakedscientists.com/HTML/experiments/exp/how-fast-is-a-sneeze/ [Accessed 8th September 2010].

[2] MythBusters, 2010. Snot meter. *Discovery channel videos*. Available at: www.discovery.com/tv-shows/mythbusters/videos/snot-meter/ [Accessed 8th September 2010].

These videos make excellent support resources for this activity, showing the speed and range of a real sneeze. They do all the messy stuff so you don't have to!

FURTHER INFORMATION

Additional sources of information on the web for teachers and students to increase their knowledge of pathogens:

Wellcome Trust Big Picture: Influenza special issue

This downloadable issue of the Big Picture looks at the nature of influenza, drugs and vaccines that can fight it, the current H1N1 pandemic, how it compares to previous strains and what international and national bodies are doing about it.

<https://bigpictureeducation.com/influenza-special-issue>

Wellcome Trust Big Picture: Epidemics

Online articles on issues surrounding disease epidemics looking at how individuals and governments should respond to the possibility of new outbreaks, the role pharmaceutical companies have to play in disease control and who should be a priority for vaccines when there is not enough medicine to go around? The website also has an excellent online picture gallery of a range of different infectious microbes including fungi, bacteria and viruses.

<https://bigpictureeducation.com/epidemics>

ONLINE RESOURCES

Additional resources and activities for the classroom help support this activity:

Sneeze game online

An interactive game from the Wellcome Trust where you have to infect as many people as possible with a single sneeze.

www.moleclues.org/games/sneeze

SNEEZE ZONE

Teacher's notes

E-bug

E-bug is an online antibiotic and hygiene teaching resource aimed at Key Stage 2 and 3 students. It is created by the Health Protection Agency (HPA) and involves a consortium of 18 partner EU countries. It has a range of games, interactive quizzes, disease fact sheets and much more.

www.e-bug.eu