# Hand Shaking Experiment (10-15 mins)

This activity is included in the KS3 pack. It allows students to observe the growth of microbes found on their hand before and after handwashing.

## Before you begin you will need:

* + The lesson pack for KS3 Hand Hygiene. Available on the website link [here](http://www.e-bug.eu/en-gb/ks3-hand-hygiene).
  + Student worksheets for each participant (KS3) and student handouts for each group of participants
  + Hand washing facilities available (soap, warm water, a means to dry hands)
* Prepare 2/3 Petri dishes of nutrient agar (or slice of bread and storage bag) per student

**Risk Assessment:** Petri dishes - lids must be secured with two small strips of clear tape. Plates must be inverted before incubation. When plates are examined 2 days later, students must not open the plates. Plates must be autoclaved before disposal. Bread - If slices of bread are used instead of nutrient agar plates, bags must not be opened to provide a closer look at the surface of the bread; this could release fungal spores which could be inhaled and cause respiratory distress. The three bags should be placed, unopened, in the normal waste or in a food waste-recycling collection.

Ensure no allergies or sensitivities to soap or hand sanitiser.

## Use the introduction in the lesson plan to discuss:

* Why, if there are millions of disease-causing microbes in the world that live everywhere, aren’t we ill all the time?
* Current handwashing practices
* How microbes can spread from our hands to our faces and to other classmates through touch

## Use the following steps as a guide to implement this activity:

In the KS3 lesson plan, we suggest using a Petri dish of nutrient agar or slices of white bread to conduct this experiment. For training purposes, we have outlined using white bread below. Please refer to the KS3 hand hygiene lesson plan and health and safety guidance if you plan to demonstrate with Petri dishes.

### Advanced preparation:

1. Label one plastic bag (or Petri dish) clean, and the other dirty.
2. Make a fingerprint or handprint on one slice of bread (or Petri dish) and place this in the bag labelled ‘dirty’.
3. Wash and dry your hands thoroughly following the six hand washing steps repeat step two on the other slice of bread and place this in the bag labelled clean.
4. Seal the plastic bags or secure the Petri dishes with tape and do not open. Leave them in a warm dark place for 48 hours before the training session

### Results:

1. Examine the plates and as a group discuss what you can see. Remember not to open the bags or remove the lids from the Petri dishes as you may release this could release fungal spores which could be inhaled and cause respiratory distress.
2. On the dirty slice of the bread (or Petri dish) you should observe a range of different bacterial and fungal colonies; each colony type represents a different bacterial or fungal strain – some natural body flora and some contamination from areas they have touched.
3. On the clean slice of bread (or side of the Petri dish) you should observe a distinct decrease in the number of different types of colonies observed. This is because hand washing has removed many of the organisms ‘picked up’ through touch. The organisms left growing on the plate are the body’s natural flora, but these are usually one type of microbe.

**Use the plenary or discussion questions to check participant’s understanding after the activity is**

**completed.**

A picture containing text, Petri dish, dishware

Description automatically generated

**Dirty section**

Colony 1 large round cream colonies with a white centre

Colony 2 small yellow colonies

Colony 3 very small cream colonies with irregular shape

Colony 4 small cream round oval colonies

Colony 5 small round white colonies

**Clean section**

Colony 1 small round white colonies

Colony 2 small cream round oval colonies

TS1 provides the full answers and expected results to the experiment, some of which are provided below.

### Observations

1. Which side of the Petri dish contained the highest number of microbes? Clean

2. Which side of the Petri dish contained more different colonies of microbes? Dirty

3. How many different colony types were there on the: Clean - 2 Dirty - 5

### Conclusions

1. Some people may see more microbes on the clean side of the Petri dish than the dirty side. Why?

There may be more microbes on the clean side than the dirty side but if students have washed their hands correctly there should be a lower number of different types of microbes. The increase in the number of microbes is probably due to microbes from the water or the paper towel used to dry their hands.

2. Which colonies would you consider the friendly microbes and why?

The microbes on the clean side as they are probably the natural microbes found on our hands that help make it more difficult for harmful microbes to colonise.