

3. WHO HAS THE CLEANEST CLASSROOM?

**1 HOUR PLUS
A WEEK OF
10-MINUTE
DAILY
OBSERVATIONS
OVER TWO
WEEKS**

Children use the skills learned in the Monitoring microbes activity to test various classroom surfaces to model how scientists work in industry to ensure products are clean and safe for customer use. This activity builds upon the skills-focused task in Activity 3, which should be completed first.

TYPE OF ENQUIRY

Comparative test

OBJECTIVES

Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. (UKS2 Working Scientifically)

Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms. (Y6 living things)

SCIENCE VOCABULARY

microbe, microorganism, bacteria, germ, clean, dirty, grow, nutrient, food source, living thing

RESOURCES

(per group of four, unless otherwise stated)

- 4+ sterile Petri dishes with agar solution
- 4+ sterile swab sticks
- tape for sealing Petri dishes e.g. medical tape
- permanent marker pen or stickers to label each sample
- 2+ copies of **Activity Sheet 6** (optional)
- access to sink for hand washing

The agar plates will need to be sourced or prepared in advance of the lesson by an adult. See Activity 2 (page 9) for information on this preparation.

NB: If purchasing pre-made agar plates, please check the supplier's advice on shelf life (which can differ significantly) and storage requirements (some require refrigeration whilst others advise against it).

SAFETY GUIDANCE

Some agar agar powder packets are labelled 'may contain traces of nuts' so please check the packaging carefully.

Once sealed, Petri dishes should not be reopened. Growing microorganisms release invisible spores and can lead to respiratory irritation. The dishes should be disposed of in their sealed condition at the end of the investigation.

CLEAPSS recommend carrying out activities using agar plates with support from a secondary school partner for safe disposal. For more information, please visit the CLEAPSS website and search for the term 'agar plates'.

PRIOR KNOWLEDGE/EXPERIENCE

Children will have some experience of setting up simple practical enquiries and comparative tests.

ACTIVITY NOTES

In Activity 3, children developed their microbe growth monitoring skills. They will now carry out a comparative investigation. Explain that Synthomer's processes and products need to be free from bacteria to keep their ingredients infection free and safe for their customers to use.

Children should be encouraged to ask their own questions for investigation, such as:

- Which teacher has the cleanest classroom?
- Which group has the cleanest table?
- Which class has the cleanest cloakroom?
- How clean is the route to my classroom? (E.g. touching door handles and/or the surfaces they contact from the school gate to their desk.)

Once a question is selected, children make predictions based on their observations and existing knowledge of the locations/items selected for testing.



Children then take swabs of their chosen locations by rubbing a sterile swab stick onto the surface and then rubbing the swab across the surface of the agar solution as shown here:

With swabs taken, Petri dishes are sealed with tape and placed in a dark place at room temperature (20-25°C), such as a shady corner of the classroom or inside a cupboard. Limit exposure to cold temperatures and UV light from any windows.

Children may choose to record their findings using **Activity Sheet 6** or using a sketch or photo diary. Ten minutes per day for a fortnight is recommended for daily monitoring.

At the end of the monitoring period, children review the results they have collected to draw conclusions using their results and evidence. They consider the challenge they were set in the Synthomer letter and create a short report outlining their method for testing different surfaces to check for the presence of microbes. Children should consider what places like Synthomer might do if the swab of a surface showed signs of infection and how they might ensure strict cleaning procedures. After a short discussion, share how, if a company like Synthomer found signs of infection on a surface or in a product, they would stop using that area and product straight away, throw away any affected materials, and carry out a deep clean using strong cleaners that kill germs. After cleaning, they would test again to make sure the germs are gone and investigate how the problem happened so it doesn't happen again. To prevent this, workers follow strict cleaning rules, wear protective clothing, clean equipment frequently, keep records, and regularly test surfaces to make sure everything stays safe and clean.

Children may also discuss their own experiences of places cleaning procedures are used such as classrooms, the school kitchen, and medical settings.

QUESTIONS FOR THINKING

Some sample answers have been provided but other similar answers from the children will also be acceptable.

- What is a microbe?
 - *A microbe is a tiny living thing, such as a bacterium or fungus, that is so small you need a microscope to see it.*
- Where do microbes come from?
 - *Microbes are found naturally all around us: in the air, water, soil, and on our bodies. Microbes spread when we touch things.*
- How can we tell if things are really clean?
 - *Things may look clean, but most microbes are too small to see, so the only way to be sure is to clean them properly.*
- If microbes are everywhere, why can't we see them?
 - *We can't see most microbes because they are much smaller than our eyes can detect.*
- How can we clean things properly?
 - *We can clean things properly by washing with anti-bacterial cleaning products like soap or detergent; rubbing well and rinsing so microbes and dirt are removed.*

USING THE PRESENTATION

To conclude the lesson, use the STEM Careers slide in the presentation to highlight real-world jobs in STEM to nurture children's science capital. Share Guy's career profile to inspire pupils by helping them make connections between their classroom learning and the science that is used in exciting jobs.

INDUSTRY LINKS AND AMBASSADORS

A scientist or university student who works in a lab setting would be an excellent choice of ambassador to visit the classroom to help you enrich this activity. They may be able to demonstrate how they test different materials for microbe growth and bring photographs and equipment to show children. Depending on their working environment, they may even be able to supply and grow the agar plates for you.

STEM CAREERS



Guy studied to become an engineer at university and his first job was helping factories improve processes to be safer and use less fuel, water and materials.

He has had different jobs linked to safety and sustainability over 30 years working in 4 different countries and visiting many others, helping sites find better ways of working.

Guy often talks to people using his computer, which helps save fuel and waste by only travelling when he has to.

