Required Practical Guide – Growth of Bacteria

Practical activity: Growth of bacteria
Aim: To investigate the different types of bacteria found in different areas.
Notes and guidance
Goggles should be worn at all times during this practical. Microbiology practicals can be incredibly hazardous if not carried out correctly. Consult CLEAPSS GL269 for more information. B3.1 Core Practical Aseptic Technique should be carried out before this one to give students hands-on experience of microbiology in a relatively safe and controlled environment. Discuss this practical with your technician as far in advance as possible. Ensure you plan so that students can study their completed plates a suitable length of time after the experiment. For instance, do not do this experiment just before a school holiday.
Risk Assessment Notes
A risk assessment must be completed for this practical. The risk assessment should be specific to the class involved and written only by the teaching member of staff. For more guidance refer to CLEAPSS. It is good practice for students to wear safety spectacles during all class practicals and demos. Students should wash their hands thoroughly before and after conducting this experiment. Microbiology practicals can be incredibly hazardous if not carried out correctly. Consult CLEAPSS GL269 for more information. If you are not comfortable with aseptic technique and microbiology work, please consult with your technician colleague and CLEAPSS about whether it is safe to carry out this practical. Agar plates should never be incubated at human body temperature. Never allow unsupervised student access to inoculated plates. Never reopen the plates after they have been incubated.

Equipment Per Group	Alternative Methods/Computer Simulations
Apparatus: • Nutrient agar plate seeded with bacteria • Disinfectant spray • Forceps • Clear tape • Antibacterial hand wash • Wax pencil • Ruler	Video demos of this experiment can be found online if practical resources are not available. It can be a great experience for students to learn how to seed their own agar plate with bacteria. There are many ways to do this detailed in CLEAPSS document GL269. Perhaps the easiest is to use bacteria in nutrient broth solutions, which can be transferred to the plates with a sterilised glass pipette and then spread with an L-shaped spreader or inoculating loop sterilised in a Bunsen flame.
Method	**Questions To Ask Students During The Practical**
1. Ensure the workbench has been cleaned with disinfectant 2. Set up the Bunsen burner on the heatproof mat and light it. Keep it on a yellow flame. 3. Wash hands with antibacterial handwash. 4. Turn the Bunsen burner to the blue flame. 5. Label the agar plate with your initials and the location you will swab. 6. Carefully swab your chosen location using the cotton swab. 7. Open the agar plate at one side and carefully spread the bacteria across the agar using the swab. Spread the bacteria in a zig-zag pattern to cover as much of the agar as possible. Close the lid of the agar plate when this is complete. 8. Turn the Bunsen burner flame back to the yellow flame.	• Why is it important to wash our hands and workspaces thoroughly before and after the practical? ***(Before to avoid contaminating the plates with extra bacteria and after to ensure no potentially dangerous bacteria from the plates is left on our hands or workspaces.)*** • Why should agar plates always be labelled with a date? ***(Old plates should always be sterilised and disposed of as potentially dangerous bacteria can grow.)*** • Why do we open the agar plates angled away from our face? ***(To avoid breathing onto the plates as this can introduce new bacteria.)*** • Why do we tape the lid shut with two pieces as opposed to taping all the way around the edge? ***(To avoid creating an airtight seal, which could lead to the growth***

9. Secure the lid with tape, although not all the way round as this will prevent oxygen from entering the plate which affects the growth of the bacteria. 10. Incubate the plate at 25 °C for 48 hours. 11. Compare the types and number of bacterial colonies grown on your plate with those of other groups that swabbed different locations.	***of dangerous anaerobic bacteria.)*** • Why do we not incubate the agar plates at human body temperature? ***(This would encourage the growth of bacteria which thrive in the human body, which would of course be dangerous to humans.)***

Clearing up

Put all used equipment into the provided disinfectant bath. Put all plates to be incubated into their own tray. Return clean equipment and chemical bottles to the tray the equipment was delivered in. Report any breakages or spills to the technician immediately.

Agar plates should be left in one tray and given to your technician colleague for incubation. Never leave seeded agar plates unsupervised in a room to which students have access.

All students must wash their hands thoroughly with soap after this practical.

All workspaces must be cleaned thoroughly with antibacterial cleaning products.

Questions To Ask Students During The Analysis

- Why do we never open used agar plates? ***(Even if students carefully followed correct aseptic technique, it is always possible that other bacteria could have been introduced that could have grown into something dangerous during incubation.)***
- How should used agar plates be disposed of? ***(Sterilised/incinerated – discuss with your technician colleague to see how it is done at your school!)***

Technician Notes

Microbiology work can be incredibly dangerous. If you are not experienced with aseptic technique, consult CLEAPSS. It is strongly advised that at least one technician in your school attend a training course to ensure they can carry out microbiology-related tasks safely.

Use the CLEAPSS method to prepare the seeded agar plate. http://science.cleapss.org.uk/Resource/Making-a-seeded-pour-plate-for-testing-anti-microbial-chemicals.vid

Never incubate agar plates at human body temperature (37 °C).

Once the plates are finished with, ensure they are incinerated or properly sterilised with an autoclave or pressure cooker before disposal.