

Name -

### **Growth of Bacteria Practical Markscheme**

State the aim of this experiment:

**To investigate the different types of bacteria found in different locations around the lab**

Apparatus:

- Nutrient agar plate
- Swabs
- Tape
- Marker

Method:

1. Ensure the workbench has been cleaned with disinfectant
2. Wash hands with antibacterial handwash.
3. Label the agar plate with your initials and the location you will swab.
4. Carefully swab your chosen location using the cotton swab.
5. 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.
6. 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.
7. Incubate the plate at 25 °C for 48 hours.
8. Compare the types and number of bacterial colonies grown on your plate with those of other groups that swabbed different locations.

Results:

Include a sketch of your agar plate and a description of the colonies found.

**Diagram and description of the number and types of colonies grown. Shape and colour of colonies identified. Species identified if possible using ppt slide.**

Conclusion

Things to include:

- Which location swabbed contained the most microorganisms? Why do you think this is?
- Which location swabbed contained the fewest microorganisms? Why do you think this is?

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**Identified the areas with the most and fewest bacteria. Moist, warm areas are more likely to have more bacteria growing than dry, cool areas. Usually laptops contain the most!**

## **Maths Skills Practice**

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Calculate the number of bacteria that would be present at the end of each scenario, assuming each started with 1 bacterium. You can write your answer out or write it in standard form.

1. Bacteria B with mean division time of 15 minutes, left for 8 hours.

**15 minutes = 0.25 hours**

**8 hours/0.25 hours = 32 divisions**

$$\begin{aligned}\text{Final number of bacteria} &= 1 \times 2^{32} \\ &= 4294967296 \text{ (or } 4.29 \times 10^9\text{) bacteria}\end{aligned}$$

2. Bacteria C with mean division time of 20 minutes, left for 2 hours.

**20 minutes = 0.333 hours (use 1/3 on the calculator)**

**2 hours/0.333 hours = 6 divisions**

$$\begin{aligned}\text{Final number of bacteria} &= 1 \times 2^6 \\ &= 64 \text{ bacteria}\end{aligned}$$

3. Bacteria D with mean division time of 30 minutes, left for 6 hours.

**30 minutes = 0.5 hours**

**6 hours/0.5 hours = 12 divisions**

$$\begin{aligned}\text{Final number of bacteria} &= 1 \times 2^{12} \\ &= 4096 \text{ bacteria}\end{aligned}$$

4. Bacteria E with mean division time of 12 minutes, left for 3 hours.

**12 minutes = 0.2 hours**

**3 hours/0.2 hours = 15 divisions**

$$\begin{aligned}\text{Final number of bacteria} &= 1 \times 2^{15} \\ &= 32768 \text{ bacteria}\end{aligned}$$