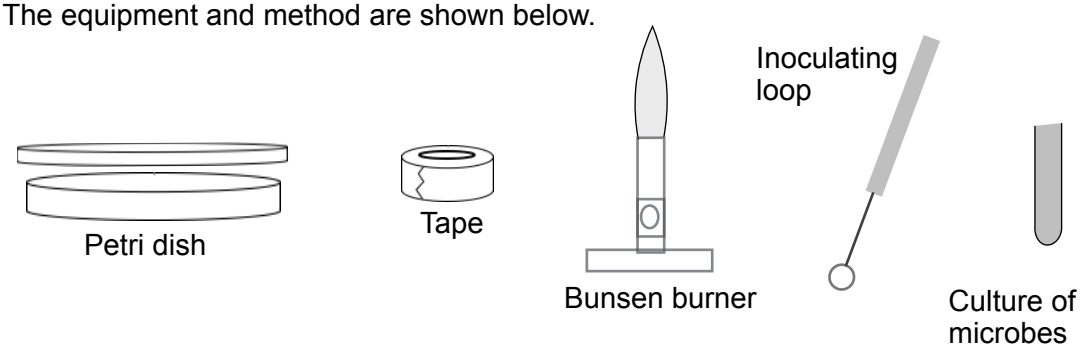
Do not write outside the box

1 A student was asked to grow an uncontaminated culture of microbes in agar jelly. The teacher gave the student a method.

The equipment and method are shown below.



1. Sterilise petri dish and agar before use
2. Pass inoculating loop through flame
3. Allow loop to cool
4. Open lid of Petri dish as little as possible
5. Use loop to spread/streak bacteria onto agar
6. Seal petri dish with tape
7. Incubate petri dish, agar and bacteria in oven at 25^{o}C

1 (a) Give a reason for step 1, 5 and 7.

Reason for step 1, sterilising petri dish and agar. **[1 mark]**

To kill unwanted bacteria/germs/microbes. [1]

Reason for step 5, allowing loop to cool. **[1 mark]**

So (the hot) loop doesn't kill the bacteria in the culture. [1]

Reason for step 7, incubating the petri dish with agar and bacteria. **[1 mark]**

To allow growth of bacteria. [1]

1 (a) (i) What is the purpose of the agar jelly in this procedure? **[1 mark]**

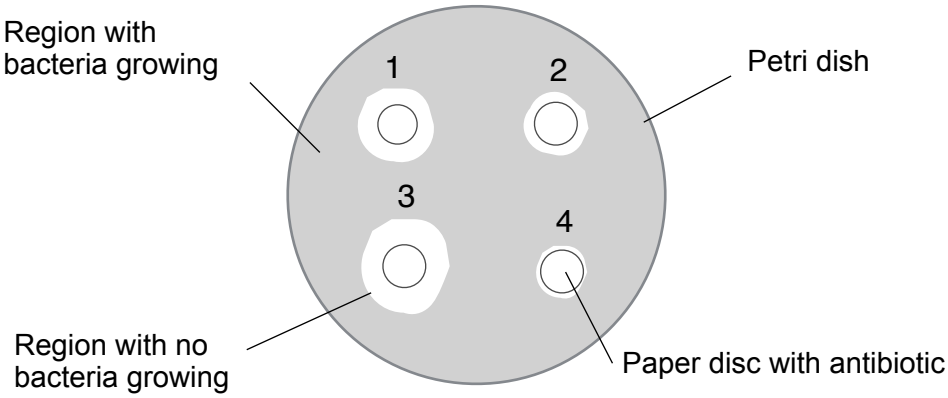
To provide nutrients/sugars. [1]

1 (b) The student did an experiment to test the effectiveness of four different antibiotic solutions.

She dipped a sterile paper disc into each of the antibiotics solutions and placed the disc onto agar in a petri dish which had growing bacteria in it.

She left the petri dish for two days in an incubator.

The diagram shows the results.



1 (b) (i) Which antibiotic is the least effective? Give a reason for your answer. **[2 marks]**

The antibiotic on disc 4 [1]

because it has the smallest region or least/lowest area of no growth [1]

1 (b) (ii) Explain why the disc size must be kept the same for each antibiotic. **[1 mark]**

So that only the type of antibiotic has an effect or disc size would affect the results [1]

1 (b) (iii) Give one possible source of error in this investigation. **[1 mark]**

Amount of antibiotic each disc soaks up or concentration of the antibiotic [1]

1 (c) The student decided to calculate the area of the region with no bacteria, using the formula to calculate the area of a circle.

This would NOT give an accurate measurement of the effectiveness of the antibiotics.

Suggest why. Use the diagram to help you. **[1 mark]**

The areas are not (perfect) circles [1]

End **(Total 9 marks)**