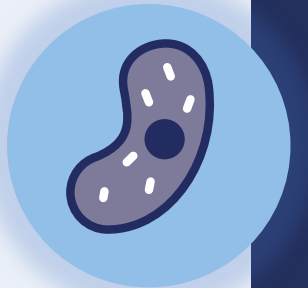


# Aseptic Technique

**Answer the questions below.**

1. Describe the difference between eukaryotic and prokaryotic cells.  
**Eukaryotic cells contain a nucleus and membrane-bound organelles, prokaryotic cells contain DNA in a plasmid or loops in the cytoplasm.**
2. Describe the function of mitochondria in eukaryotic cells.  
**They are the site of aerobic respiration, which releases energy for the cell.**
3. Give an example of a eukaryotic and a prokaryotic cell.  
**Plant and animal cells are eukaryotic, bacteria are prokaryotic.**
4. Describe the difference between unicellular and multicellular organisms.  
**Unicellular organisms are made up of one cell only, whereas multicellular organisms can be made up of any number of cells organised into tissues, organs and systems.**
5. State an example of a unicellular organism.  
**Bacteria, yeast, amoeba**



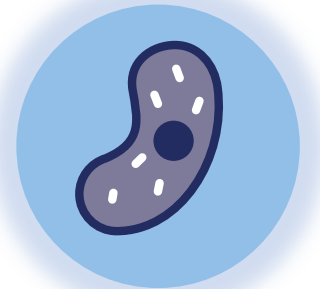
# Aseptic Technique

B3.1.3

Science  
**Mastery**

B3.1.1 Prior Knowledge Review  
B3.1.2 Eukaryotic and Prokaryotic Cells  
➤ **B3.1.3 Aseptic Technique**  
B3.1.4 Growth of Bacteria  
B3.1.5 Microscopes  
B3.1.6 Observing Cells  
B3.1.7 Diffusion

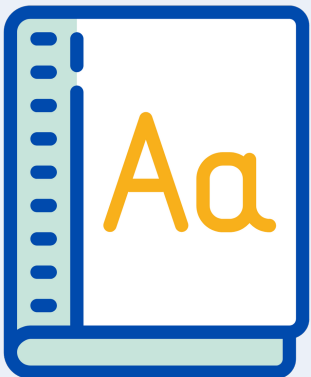
B3.1.8 Diffusion in Living Things  
B3.1.9 Osmosis  
B3.1.10 Osmosis Investigation  
B3.1.11 Active Transport  
B3.1.12 Cell Division  
B3.1.13 Cancer  
B3.1.14 Stem Cells



## Following this lesson, students will be able to:

- State the stages of aseptic technique when growing bacteria
- Describe the function of the agar medium
- Explain why the Petri dish is not secured with an airtight seal when growing bacteria

## Key Words:



**aseptic**

**antibiotic**

**culture**

**agar medium**

**inoculating loop**

**sterilisation**

# This is the fix-it portion of the lesson

The **fix-it** is an opportunity to respond to gaps in knowledge, especially those identified by the previous lesson's exit ticket.

- The teacher should customise this slide as needed, to facilitate
  - **reteach, explanation, demonstration** or **modelling** of ideas and concepts that students have not yet grasped or have misunderstood.
  - **practise** answering specific questions or of key skills.
  - **redrafting** or **improving** previous work.

## Exit ticket

1. Which of these is an example of a prokaryotic cell?
  - ☐ A. Animal cell
  - ☐ B. Plant cell
  - ☒ C. Bacterial cell
2. What is the relative size of eukaryotic cells and prokaryotic cells?
  - ☐ A. Prokaryotic cells are larger than eukaryotic cells
  - ☒ B. Eukaryotic cells are larger than prokaryotic cells
  - ☐ C. Prokaryotic cells and eukaryotic cells are roughly the same size
3. Which statement best explains the difference between eukaryotic and prokaryotic cells?
  - ☒ A. Eukaryotic cells contain DNA within a nucleus, prokaryotic cells contain DNA in loops and plasmids
  - ☐ B. Eukaryotic cells contain DNA in loops and plasmids, prokaryotic cells contain DNA within a nucleus
  - ☐ C. Prokaryotic cells contain mitochondria to provide them with energy so they can move

## General Definition

Noun:

- The ideas, customs and social behaviours of a group or society.
- The arts

From the Latin *cultura*

## Scientific Definition

The growing of microorganisms (such as bacteria) for scientific study.

# Culture

**'Understanding languages and other cultures builds bridges'.  
Suzy Kassem**

## Synonyms

Traditions  
Customs  
The arts

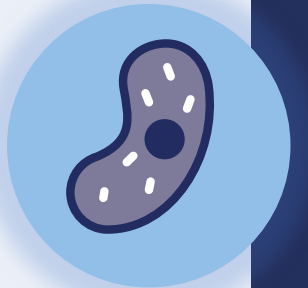
## General Examples

Social media has become a big part of popular culture.

People can visit places to learn about other cultures.

## Scientific Examples

We can grow a culture of mould on a piece of bread.

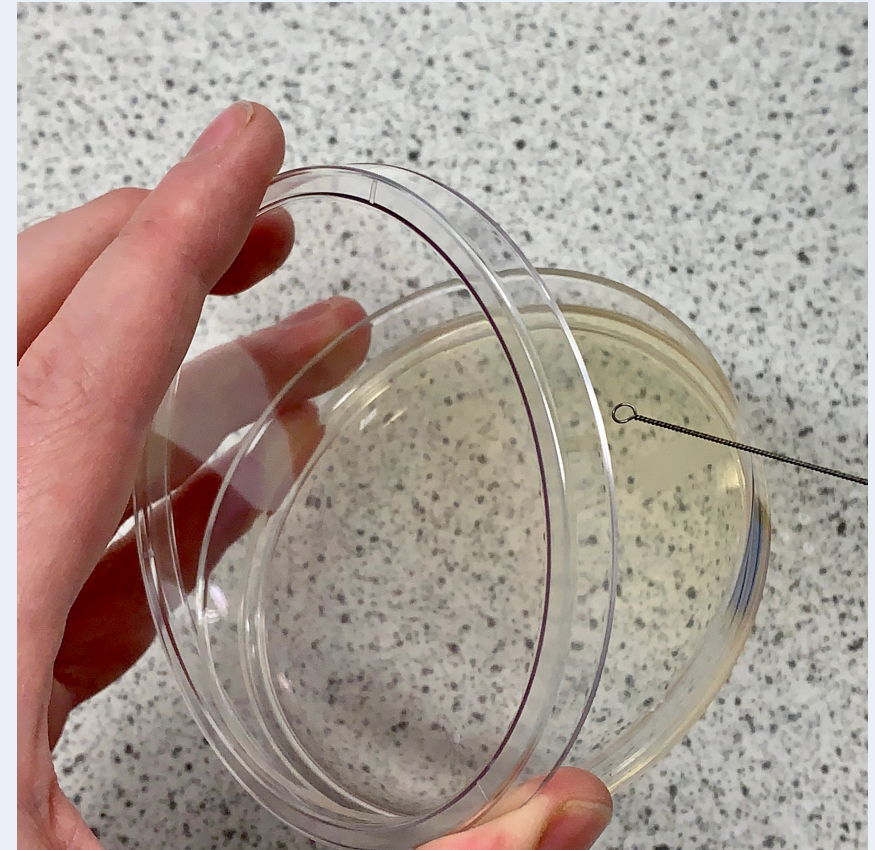


# Aseptic Technique

Petri dishes are often used to produce cultures of **bacteria** and other microorganisms

The **aseptic technique** must be used to prepare these cultures

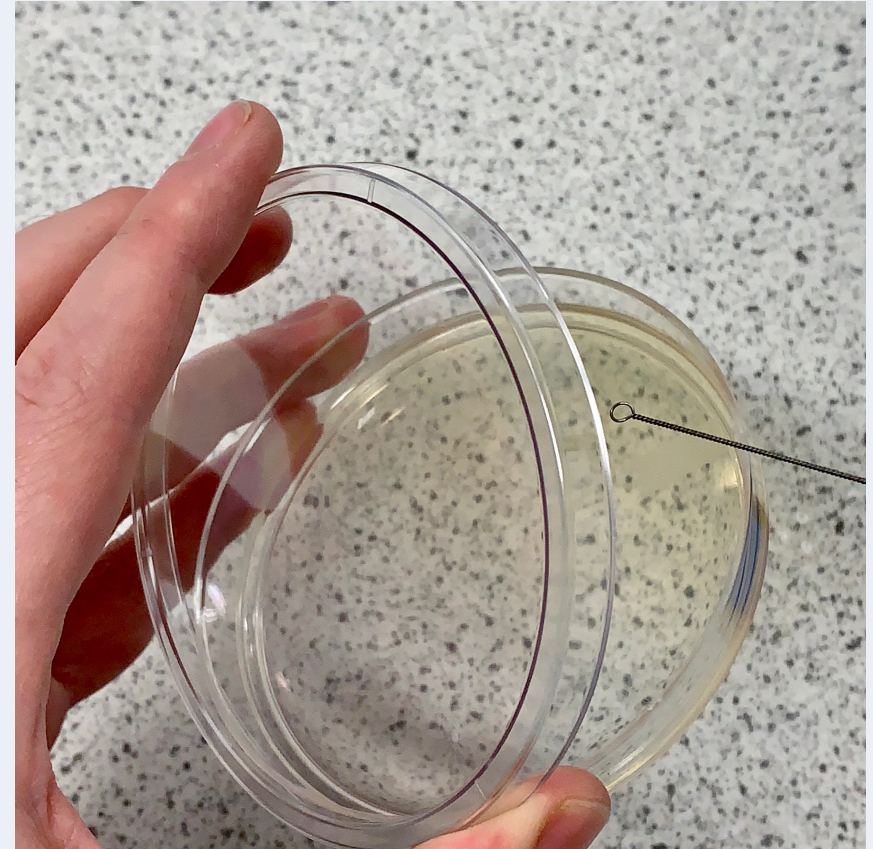
This method ensures that the equipment is not **contaminated** and allows one microorganism to be investigated at a time





# Aseptic Technique

1. Petri dishes and culture media (**agar**) must be sterilised before use
2. Agar in Petri dishes must be set
3. **Inoculating loops** are used to transfer the bacteria to the agar but must first be sterilised by passing them through a flame
4. The lid of the Petri dish should be secured with tape and stored upside down
5. In school laboratories the culture should be incubated at 25 °C.



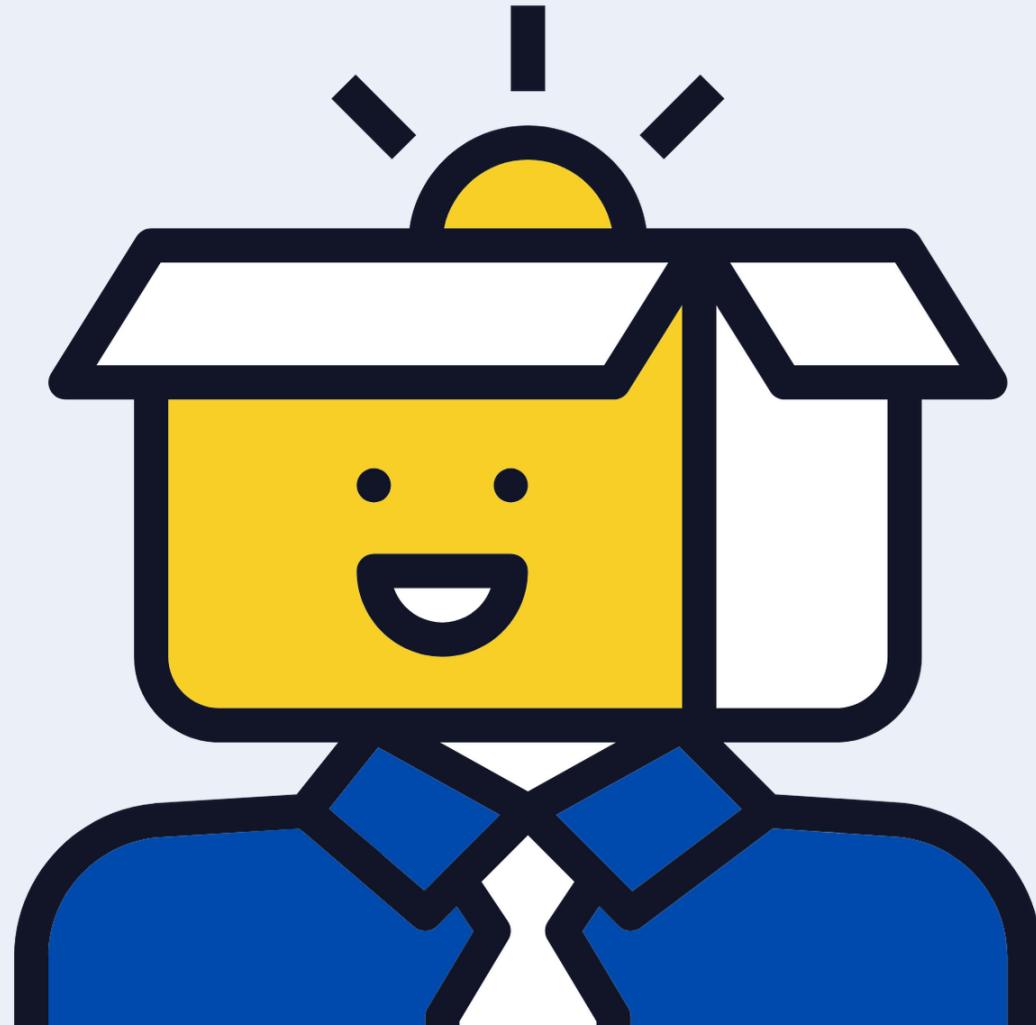
## Answer the following questions:

1. Why is the aseptic technique used?  
**To ensure cultures are not contaminated with unwanted microorganisms (e.g. bacteria or fungi)**
2. What is an inoculating loop used for?  
**Transferring the bacteria or microorganism to the agar**
3. Why is the inoculating loop passed through a flame first?  
**To sterilise it by destroying any other microorganism, preventing contamination**
4. What temperature should cultures be incubated at?  
**25°C in school laboratories.**



# Think outside the box!

What would happen if the Petri dish was sealed **on all sides** by adhesive tape?



# Drill

1. Explain why the aseptic technique used.
2. State what is an inoculating loop used for.
3. Explain why the inoculating loop passed through a flame first.
4. State the temperature at which should cultures be incubated.
5. State the function of the agar in the petri dish.
6. Explain why it is important **not** to secure the Petri dish with tape on all sides.
7. Explain why the lid of the Petri dish should be secured with tape and stored upside-down.

# Drill answers

1. To ensure cultures are not contaminated with unwanted microorganisms (e.g. bacteria or fungi)
2. To transfer the bacteria to the agar
3. To kill any other microorganisms already present, preventing contamination
4. 25°C
5. To provide nutrients
6. Bacteria need oxygen to (aerobically) respire
7. To stop contamination from microorganisms in the air and to prevent condensation of water which may damage the culture

# I: Explain scientific method

Example question:

**Explain** why it is important to:

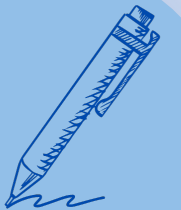
- Not place the inoculation loop on the bench to cool
- Place the petri dish at 25°C in a school laboratory instead of 35°C, which would allow bacteria to grow faster

Model answer:

- So that there is a lower risk of contamination with other bacteria/microorganisms
- So that there is a lower risk of growth of pathogens/dangerous microorganisms which could make students unwell

To 'explain' your answer should:

- Begin with a **scientific statement**.
- Use 'this means that', 'because' or 'so' **to link your statement to the question**.



# We: Explain scientific method

Example question:

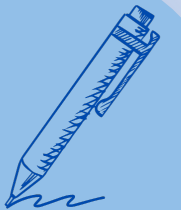
When growing one type of bacterium on a culture medium, **explain** why it is important to sterilize the culture medium and all the apparatus before use.

Model answer:

- to kill other microorganisms
  - or to prevent contamination
- to prevent other microorganisms affecting the results

To 'explain' your answer should:

- Begin with a **scientific statement**.
- Use 'this means that', 'because' or 'so' **to link your statement to the question**.





# We: Explain scientific method

Example question:

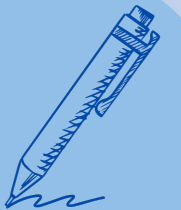
A student investigated the effectiveness of four different antibiotics. The student used the aseptic technique to ensure that only **one type** of bacterium grew on the agar. **Explain** two aseptic techniques the student should have used.

Model answer:

- **Sterilise** petri dishes and culture (agar) before use so that they are not contaminated
- **Sterilise** the inoculating loop first by passing it through a flame so that it is not contaminated
- Lid of agar dish must be **secured with tape** and stored **upside down** so that there is no contamination of microorganisms into the air and to prevent condensation of water which may damage the culture

To 'explain' your answer should:

- Begin with a **scientific statement**.
- Use 'this means that', 'because' or 'so' **to link your statement to the question**.



## Answer the questions below.

1. Which best explains why the aseptic technique is used?
  - ☒ A. To ensure that there is no contamination when preparing a culture
  - ☐ B. To ensure that the Petri dish is clean
  - ☐ C. To ensure that all microorganisms are allowed to grow
  
2. Which is **not** a feature of the aseptic technique?
  - ☐ A. Sterilising the inoculating loop using a flame
  - ☒ B. Securing the Petri dish lid by making an airtight seal
  - ☐ C. Sterilising the agar before use
  
3. What is the function of the agar in a Petri dish?
  - ☒ A. To provide nutrients
  - ☐ B. To sterilise the petri dish
  - ☐ C. To destroy any microorganisms

### Lesson B3.1.3

What was good about this lesson?

What can we do to improve this lesson?

[Send us your feedback by clicking this link](#)  
or by emailing [sciencemastery@arkonline.org](mailto:sciencemastery@arkonline.org)  
Thank you!