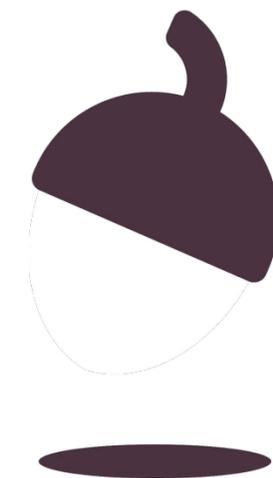


Combined Science - Biology - KS4
Cell Biology

Aseptic technique

(Downloadable student document)

Miss Wong



OAK
NATIONAL
ACADEMY

Structure of bacterial cell



Binary fission



Binary fission

Asexual reproduction

Bacterial cells will undergo binary fission, a process that produces identical cells of the bacteria.

The process starts with the cell replicating the subcellular structures and its genetic material. Then the genetic material would line up in the middle of the cell. Spindle fibres will pull the chromosomes to opposite ends of the cell. The cell membrane, the cytoplasm and the cell wall separates to form two cells with the same genetic material.



Pause the video to complete your task

Arrange the following sentences in the right order.

Two identical cells are formed.

Chromosomes separates and are pulled to opposite ends.

The cell membrane, cytoplasm and cell wall separates.

The chromosomes line up in the middle of the cell.

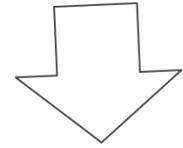
The cell replicates the DNA and other structures.

Resume once you're finished

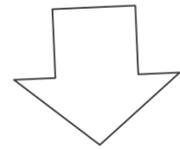


Answers

The cell replicates the DNA and other structures.



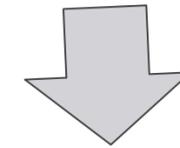
The chromosomes line up in the middle of the cell.



Chromosomes separate and are pulled to opposite ends.



The cell membrane, cytoplasm and cell wall separate.



Two identical cells are formed.



Aseptic technique



The aseptic technique

Equipment needed:

- Inoculating loop
- Petri dish with agar (agar plate)
- Sticky tape
- Bunsen burner
- Bacteria sample



Pause the video to complete your task

Complete the method in your books.

Prepare an _____ that provide the source of energy for the bacteria.

Sterilise the inoculating loop by _____. Collect the bacterial sample and _____.

Repeat three times. _____ the lid to make sure no other bacteria enter the agar plate.

Resume once you're finished



Answers

Prepare an agar plate that provide the source of energy for the bacteria.
Sterilise the inoculating loop by placing it into the Bunsen flame for ten seconds. Collect the bacterial sample and spread the bacteria using a zig-zag motion. Repeat three times. Tape the lid to make sure no other bacteria enter the agar plate.



Exam questions



Exam question

OCR, specimen J247/04

Erythromycin is an antibiotic drug. It is important to get the dose of erythromycin right.

Too much erythromycin can be harmful.

However, recently some strains of bacteria have developed resistance to low concentrations of erythromycin.

To see how effective erythromycin is, it is tested using bacteria grown on agar plates. This method is used:

- A petri dish is used that has the bacteria growing evenly over the surface.
 - A disc of filter paper is soaked in erythromycin.
 - The disc is placed on the agar in the centre of the petri dish using sterile forceps.
 - The dish is incubated at 37°C.
- i. Why did the scientists incubate the dish at 37°C rather than at higher or lower temperature. **[2]**
- ii. Why is the filter paper disc moved using sterile forceps? **[1]**



Answers

i) any higher and the bacteria might be killed / bacterial enzymes denatured (1)

or

any lower and the erythromycin would diffuse slower / bacteria would reproduce more slowly so takes longer to get the results (1)

ii) prevent contamination by other microbes (1)



Exam style questions

The diagram shows a microorganism called *E. coli*.

1. *E. coli* can be cultured in a laboratory. Scientists use a technique to ensure the culture is pure. Name that technique being used. (1)
2. The bacteria is spread across an agar plate. The agar plate contains sugars. Explain why the agar plate must contain sugars. (2)
3. The agar plate with bacteria is placed inside an incubator at a temperature of 27 degrees Celsius. Explain why. (2)
4. The bacterial colony will develop when placed in the incubator. Name the process that leads to the growth of a larger bacterial colony and comment on the genetic material of all the bacterial cells. (2)
5. Is *E. coli* a prokaryotic or eukaryotic organism? Explain. (2)



Answers

1. Aseptic technique (1)
2. Sugars are for energy release in respiration. (2)
3. It provides enough energy for the cells to divide but not too high to not too high to denature the enzymes. (2)
4. Binary fission. All cells have identical genetic material. (2)
5. Prokaryotic cell. There is no nucleus. (2)



Independent practice



Independent practice

1. Name the equipment used to spread the bacteria.
2. Name the equipment used to grow bacteria on.
3. Name the equipment used to sterilise the inoculating loop.
4. Explain why the inoculating loop is placed in a Bunsen flame for a few seconds?
5. Explain why the bacteria is spread across for multiple times.
6. Suggest a suitable temperature for the growth of bacteria in the plate. 25-28 degrees Celsius.
7. Explain why a temperature of above 30 degrees Celsius not suitable for culturing bacteria.
8. What does aseptic mean?



Independent practice

1. Inoculating loop.
2. Agar plate.
3. Bunsen burner.
4. To sterilise the inoculating loop or to kill the bacteria on the loop.
5. To ensure the bacteria is spread evenly across the plate.
6. 25-30 degrees Celsius.
7. The bacteria will be killed as the enzymes are denatured.
8. Free from contamination of other unwanted micro-organisms.

