Edexcel IAL Biology A-level

6.1-6.4 - Microbiology

Flashcards

What are aseptic techniques?

What are aseptic techniques?

A range of techniques used to culture microorganisms under sterile conditions in order to minimise contamination

List the basic aseptic techniques

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- Wipe surfaces with antibacterial cleaner
- Set up Bunsen burner nearby - convection currents prevent microbes from entering culture
- Flame inoculating loop and neck of bottles before use
- Minimise time that vessels containing bacteria are open
- Sterilise all equipment e.g. use of an autoclave
- Wear protective clothing

Outline how to culture microorganisms

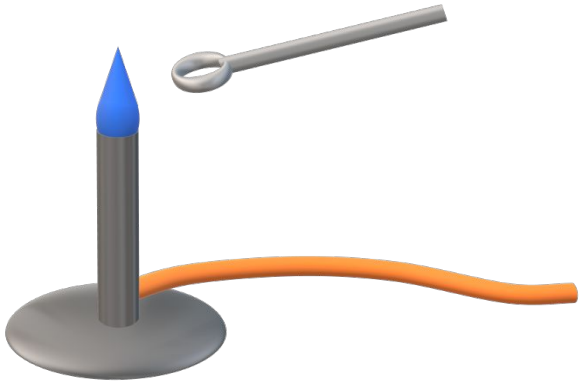
Outline how to culture microorganisms

- Transfer bacteria to an agar plate using a sterile inoculating loop or pipette
- Tape on lid at two ends, invert dish and incubate
- In the school laboratory, ensure dish is not airtight and do not incubate above 25°C to avoid growth of pathogens

How should you sterilise an inoculating loop?

How should you sterilise an inoculating loop?

Pass it through a blue bunsen burner flame



What are inoculating loops used for?

What are inoculating loops used for?

Inoculating loops are used to transfer microorganisms

What is an autoclave?

What is an autoclave?

A machine that uses hot steam to sterilise equipment

Why are microorganisms not cultured at temperatures above 25 degrees in schools?

Why are microorganisms not cultured at temperatures above 25 degrees in schools?

To prevent pathogens that are harmful to humans from growing

Why should you place a lid on an agar plate?

Why should you place a lid on an agar plate?

- To prevent microorganisms from the air from contaminating it
- To prevent the microorganisms being cultured from contaminating other areas

Give four safety precautions to take when culturing microorganisms

Give four safety precautions to take when culturing microorganisms

- Wear protective equipment (safety glasses, lab coat, etc.)
- Wash hands before and after the practical
- Clean all work surfaces
- Keep eyes and face away from culture medium

What is dilution plating?

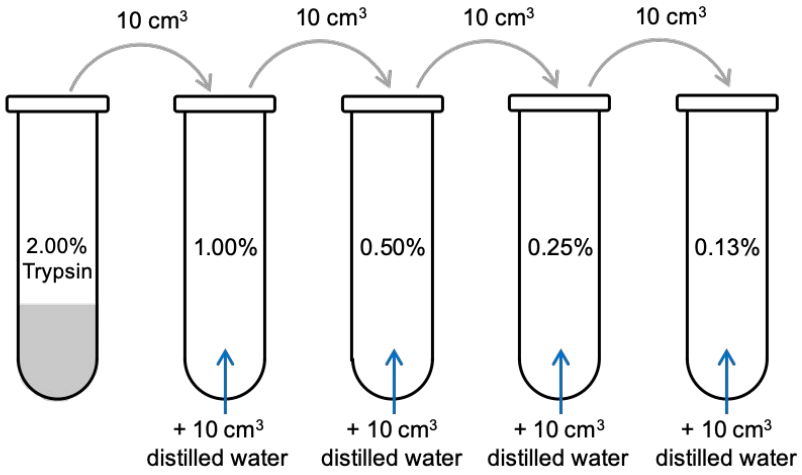
What is dilution plating?

Using serial dilutions to produce dilute cell cultures from an original sample. This allows the number of microorganisms to be counted and quantified

What is a serial dilution?

What is a serial dilution?

A sequence of dilutions, in which the dilution factor is constant, used to dilute a stock solution. This can be used to dilute cultures for dilution plating



What is microbiological turbidity?

What is microbiological turbidity?

The cloudiness of a solution which is based on the amount of microorganisms in a solution and can be measured quantitatively to analyse microbial growth

How can microbiological turbidity be measured?

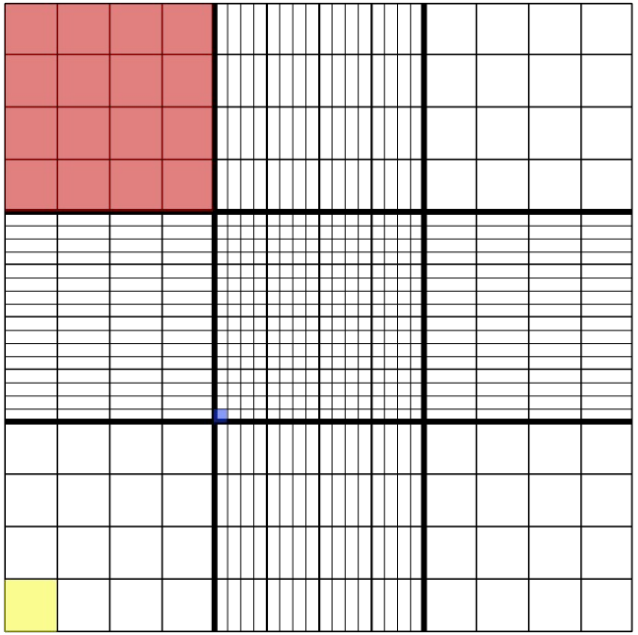
How can microbiological turbidity be measured?

Turbidity is measured by passing light through a sample and measuring how much has been absorbed by the sample using a detector on the other side of the sample

What is a haemocytometer?

What is a haemocytometer?

Glass microscope slide with a grid divided into 9 squares, each 1mm^2. Central area for counting contains 25 large squares, each divided into 16 smaller squares.



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How can the number of original bacteria be estimated from the number of colonies present?

How can the number of original bacteria be estimated from the number of colonies present?

Each bacterium will divide many times to produce a single colony. Therefore the amount of colonies should be equal to the number of original bacteria

Why is counting colonies an inaccurate method of determining the original number of bacteria?

Why is counting colonies an inaccurate method of determining the original number of bacteria?

- Colonies may clump together
- Often there will be lots of colonies so counting may be difficult

Name the four phases of a bacterial growth curve.

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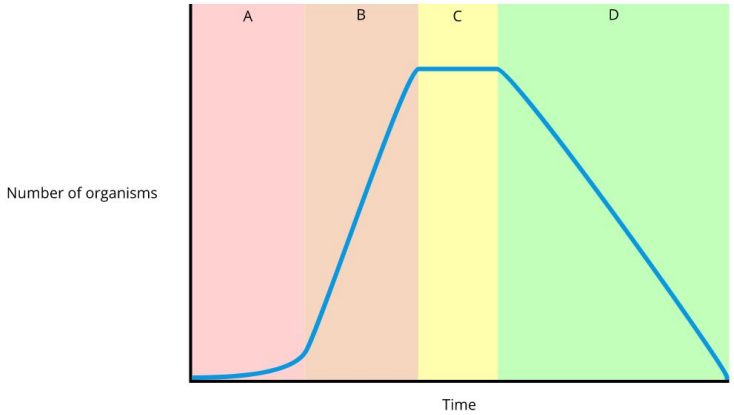
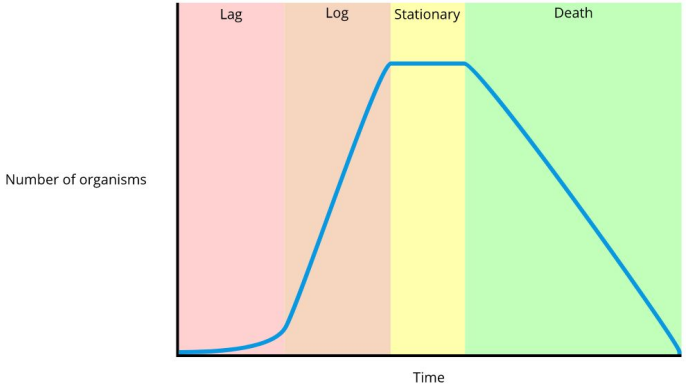
1. Lag phase
2. Log phase
3. Stationary phase
4. Death phase

Name the sections of this chart showing bacterial growth



Name the sections of this chart showing bacterial growth

A	Lag phase
B	Log phase
C	Stationary phase
D	Death phase



What happens during the lag phase?

What happens during the lag phase?

Microorganisms need to adjust to the environment before reproducing so population size only increases slowly

What happens during the log phase?

What happens during the log phase?

After every round of division, population size doubles (exponential growth)

What happens during the stationary phase?

What happens during the stationary phase?

Reproduction rate = Death rate, so population size stabilises at its maximum

What happens during the death phase?

What happens during the death phase?

Microorganisms die due to buildup of toxic waste products and lack of nutrients

What is the formula needed to calculate the amount of microorganisms in a sample during the exponential growth phase?

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$$\text{Number of organisms} = 2^{(\text{Number of generations})}$$

How is the doubling time of a bacterial colony in the exponential growth phase calculated?

How is the doubling time of a bacterial colony in the exponential growth phase calculated?

Doubling time = Total time in exponential phase / Number of generations