

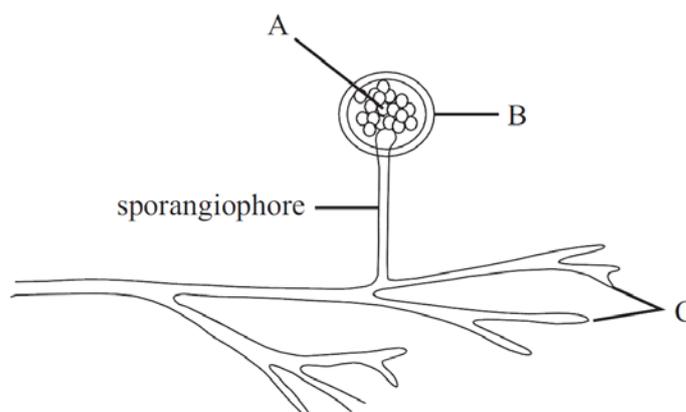
90927 Demonstrate understanding of biological ideas relating to micro-organisms COLLATED QUESTIONS

DIGESTION AND REPRODUCTION PROCESSES (2013:1)

- (a) Describe the processes of digestion and reproduction in bacteria and in fungi.
You may use labelled diagrams.
- (b) Compare and contrast these processes of digestion and reproduction in bacteria and in fungi.
In your answer:
- explain the process of digestion in bacteria and in fungi
 - explain the process of reproduction in bacteria and in fungi
 - discuss the similarities and differences between digestion and reproduction in bacteria and in fungi, making links between the structures of the organisms and the processes.

FUNGI (2011:1)

The diagram below shows the generalised structure of a mould, which is a type of fungus.



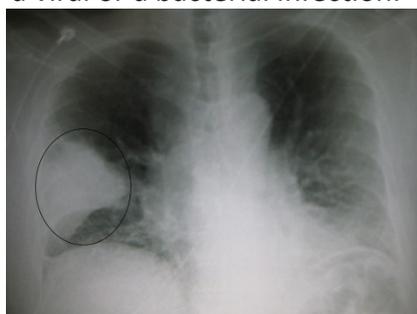
Each of the parts labelled A, B and C is important in reproduction or feeding.
Discuss the roles that parts A, B and C play in reproduction or feeding.

In your answer you should:

- name the parts A, B and C
- identify the role of each part in either reproduction or feeding
- explain how each of the parts A, B and C carries out its role in either reproduction or feeding
- relate the role of each part to the survival and / or reproduction of the fungus.

INFECTIOUS PNEUMONIA (2011:3)

Pneumonia is a condition in humans where the lungs become inflamed. It can occur for a wide range of reasons, but is often caused by either a viral or a bacterial infection.



The X-rays below show lungs unaffected by pneumonia (A) and lungs showing a pneumonia infection (B).

- (a) Describe how infectious pneumonia could be passed between people.
- (b) Describe what measures could be taken to reduce the risk of spreading infectious pneumonia.

(c) Discuss how the life processes of bacteria and viruses can cause infections, such as infectious pneumonia.

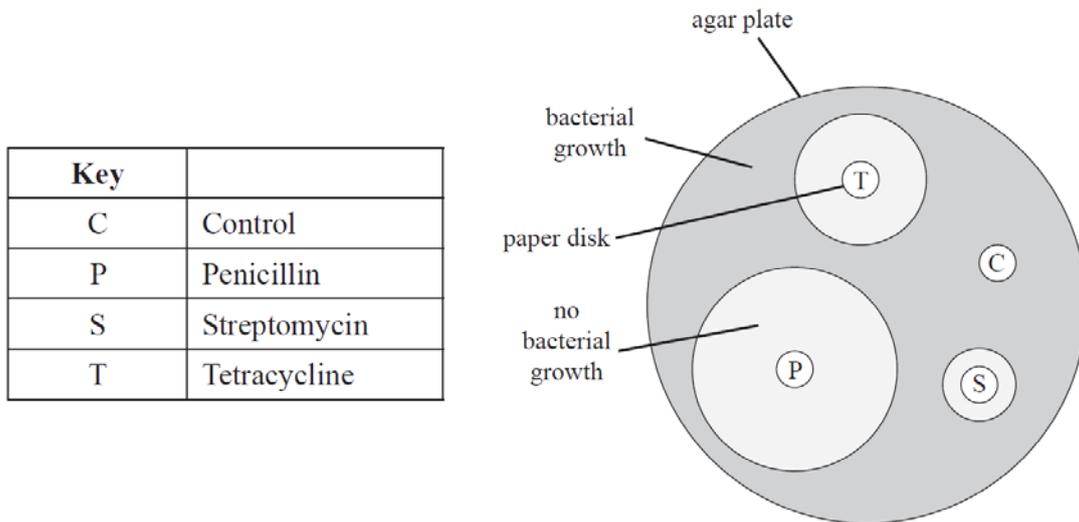
In your answer you should:

- describe how both bacteria and viruses reproduce
- compare and contrast bacterial and viral reproduction, and explain how each process causes disease
- consider the role of bacterial excretion in producing symptoms in bacterial pneumonia.

ANTIBIOTICS (2013:2)

Antibiotics are used routinely to treat infections. Not every antibiotic is effective against every species of bacteria. Scientists can carry out experiments to show how effective an antibiotic will be against specific bacteria. In this experiment, a culture of bacteria is spread over an agar plate using sterile techniques. Then, paper disks containing antibiotic are placed carefully onto the agar plate, which is then incubated for two days. The results of one test are shown below.

Effectiveness of three antibiotics against *E. coli*



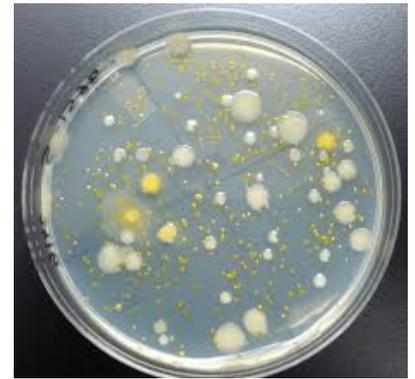
Discuss the experiment, explaining which antibiotic would be most effective against the *E. coli* infection and how this can be determined.

In your answer you should:

- describe which antibiotic was the most effective and explain how this can be determined
- explain the purpose of the control in this experiment
- explain why the agar plate should be sterile before the bacteria are placed on it
- explain how the agar plate is inoculated to get an even growth of bacteria.

CULTURING MICROBES (2012: 1)

A nutrient agar plate was left open on the bench in a laboratory. It was then sealed up and incubated at 25°C. The photo below shows the plate after a few days, with smaller images of similar colonies shown magnified under a microscope.



The plate shown has colonies of both bacteria and fungi.

Discuss the growth of colonies shown on the plate.

In your answer you should:

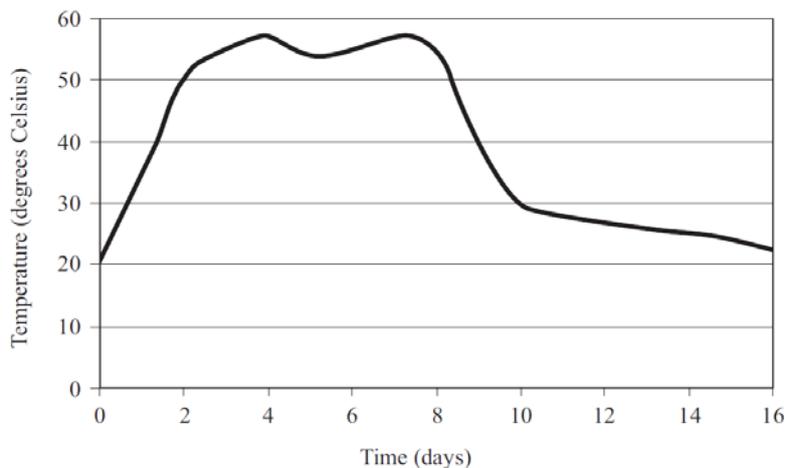
- describe the conditions needed for micro-organisms to reproduce
- describe how the micro-organisms arrived on the plate
- explain the relationship between the structures and functions of the micro-organisms, and how they look on the plate
- explain why bacteria and fungi have survived and reproduced on the agar plate, but viruses have not.

COMPOST AND NUTRIENT CYCLING: (2013:3)

Compost is decayed organic matter. Composting is the process carried out by saprophytic micro-organisms turning organic matter such as vegetable matter and manure into compost. A successful compost heap requires good air flow. Compost, carbon dioxide, water, and heat are produced.



Temperature changes in compost over the first few days



- Describe the term saprophyte.
- Refer to the graph and explain the temperature changes that occur in the compost. Link these temperature changes to the life processes of the micro-organisms and the process of composting.
- Discuss the role of composting in the cycling of carbon.
In your answer, consider why good air flow is needed in composting, and link this to a life process.

PRESERVING FOOD (2012: 2)

Fruit and vegetables can be canned so that they can be stored for a long time. Analysis of food canned over 45 years ago shows it to be safe to eat.

When food is canned, the can and its contents are heated to very high temperatures and then quickly sealed with a sterilised lid to exclude any air.

- Discuss at least TWO ways in which contamination with micro-organisms is reduced in the canning of food.
In your answer you should relate each of these ways to the life processes of micro-organisms.
- Explain why canned food must be refrigerated once opened.
In your answer you should refer to the life processes of micro-organisms.

FOOD STORAGE (2011:2)

Milk can be found in many forms. For long-term storage, milk is heated and turned into milk powder. The picture below shows two forms of milk – liquid milk (left) and milk powder (right).



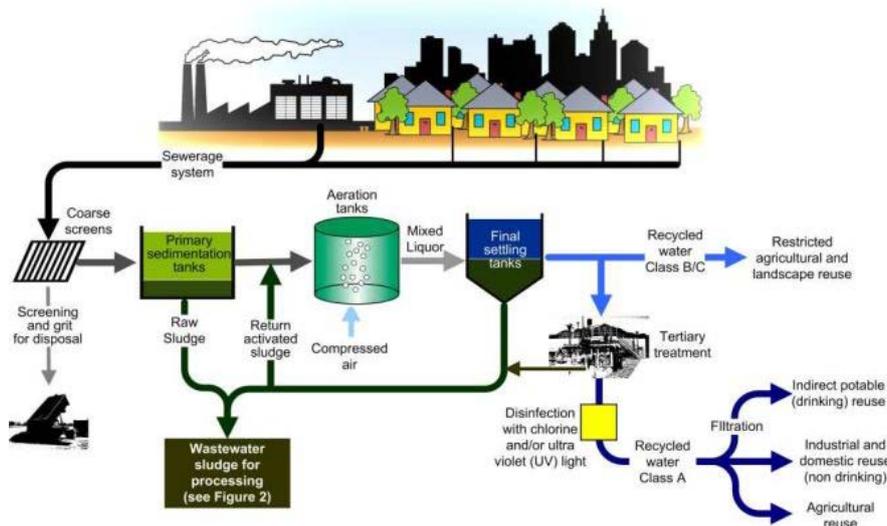
Discuss why the milk powder can be stored for a longer time than liquid milk.

In your answer you should:

- describe the difference between the two milk products in terms of water content
- consider the effect that this difference in water content has on storage temperature requirements
- relate both water content and temperature of storage to the long-term storage and spoilage of the two products
- relate the water content and temperature to the life cycle of bacteria.

SEWAGE TREATMENT (2012:3)

Sewage contains water-borne waste from toilets and household waste water, along with some industrial waste and storm water. The main aim of sewage treatment is to remove or reduce solid waste and organic material. Once this is done, the water can be safely discharged into rivers or the sea. The diagram below shows a typical sewage treatment plant.



- (a) Explain why sewage treatment is important.
- (b) During secondary treatment, sewage enters an aeration tank. The tank contains bacteria, and has air pumped into it.

Discuss the role of bacteria in the aeration tanks during treatment of sewage.

In your answer you should:

- describe the role of the bacteria in the sewage plant and explain how this relates to their life processes
- explain the significance of air being added into the aeration tank
- consider the raw materials that enter the tanks and the products generated from the bacterial action.

DECOMPOSERS (2010: 1)

Fungi are decomposers and play an important role in cycling nutrients such as carbon and nitrogen.

Discuss how fungi receive the nutrients they require to survive and LINK this to the cycling of nutrients in the environment.

Your discussion should include:

- **Identification** of the fungal structures AND a description of their function
- An **explanation** of how fungi decompose material
- An **explanation** of how fungi are involved in the cycling of nutrients such as carbon and nitrogen.

You may use diagrams to support your answer.

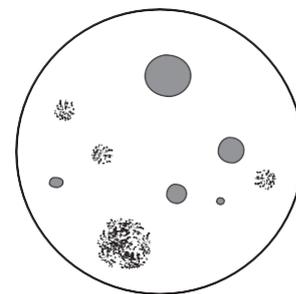
CULTURING MICRO-ORGANISMS (2010; 2)

When a person has treatment for a sore throat, a swab may be taken and then cultured on a nutrient agar plate. The micro-organisms that grow often appear similar to those indicated on the diagram.

Discuss the processes involved in the culturing of micro-organisms from a swab of someone's throat.

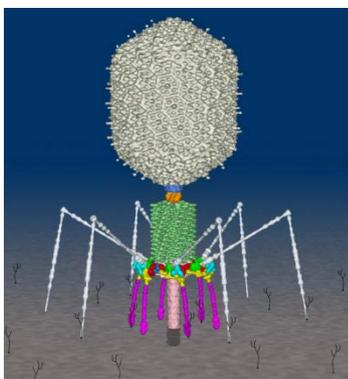
In your answer:

- Describe the steps involved in culturing micro-organisms.
- Describe the differences you would observe between fungal and bacterial colonies growing on nutrient agar.
- Discuss** how a laboratory ensures that the results from a swab are reliable and valid. In your answer:

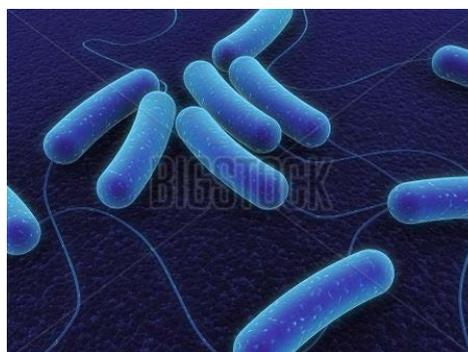


- Explain why material used for culturing micro-organisms must be sterile before starting.
- Explain why you would always use a control.

LIFE PROCESSES (2010: 3)



Virus



Bacteria

Review the pictures and consider this statement: *'Bacteria are living cells, viruses are not.'*

Compare and **contrast** these two types of micro-organisms in order to prove this statement is correct. In your answer:

- **Describe** the **structure** of both bacteria AND viruses.
- **Explain** the life processes of feeding AND reproduction for bacteria AND viruses.
- **Consider** conditions that influence the population growth of bacteria and viruses.

You may use diagrams to support your answer.

FERMENTATION (2009: 1)

The application of organisms to meet human needs and demands is called biotechnology, with many foods being produced using micro-organisms.

Fermentation is a process used by some micro-organisms to convert carbohydrates to energy. This is a type of anaerobic respiration, and is used in food biotechnology.

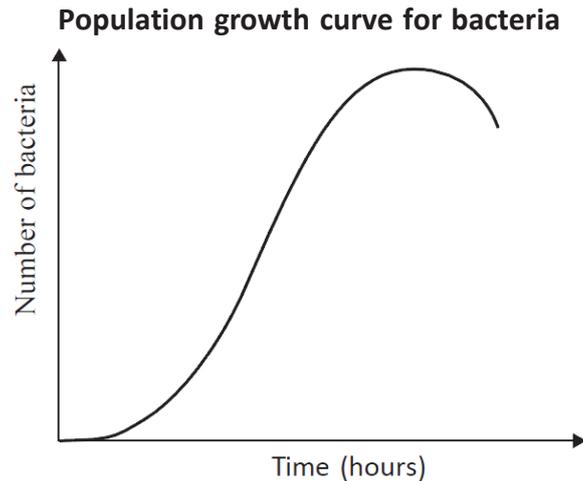
Identify ONE type of micro-organism that uses this process and **discuss** how that micro-organism is used in the production of a **named** food.

In your answer:

- **Identify** the **micro-organism** AND the **food** it is used to produce
- **Explain** the micro-organism's **role** in the manufacture of the named food
- **Explain** the **conditions** required for micro-organisms to carry out fermentation
- **Link** the **process of fermentation** to the **survival** of the named micro-organism.

BACTERIAL GROWTH (2009: 2)

Poorly-cooked chicken is often a source of food poisoning. The graph below shows how the number of bacteria changes over time when raw chicken is left out on the bench.



Discuss why the curve shown in the graph is observed in populations of bacteria over time. In your answer you should:

- **Explain** the **conditions** that lead to the type of population growth curve **shown in the graph**
- **Explain** how bacteria **reproduce**
- **Consider** how bacterial reproduction can be limited and the risk of getting food poisoning reduced.

You may use diagrams to support your answer.

ANTIBIOTICS (2009: 3)

A student had not been feeling well so decided to go to the doctor. The doctor concluded that the student had the flu, a viral infection that needed to run its course. The student was advised to go home to bed and drink plenty of fluids. The doctor **did not** prescribe **antibiotics**. **Discuss** the **reasons** why antibiotics were not prescribed to the student. In your answer:

- **Describe** what an antibiotic is
- **Explain** how antibiotics **function**
- **Explain** the **problems** resulting when antibiotics are used too often or incorrectly.