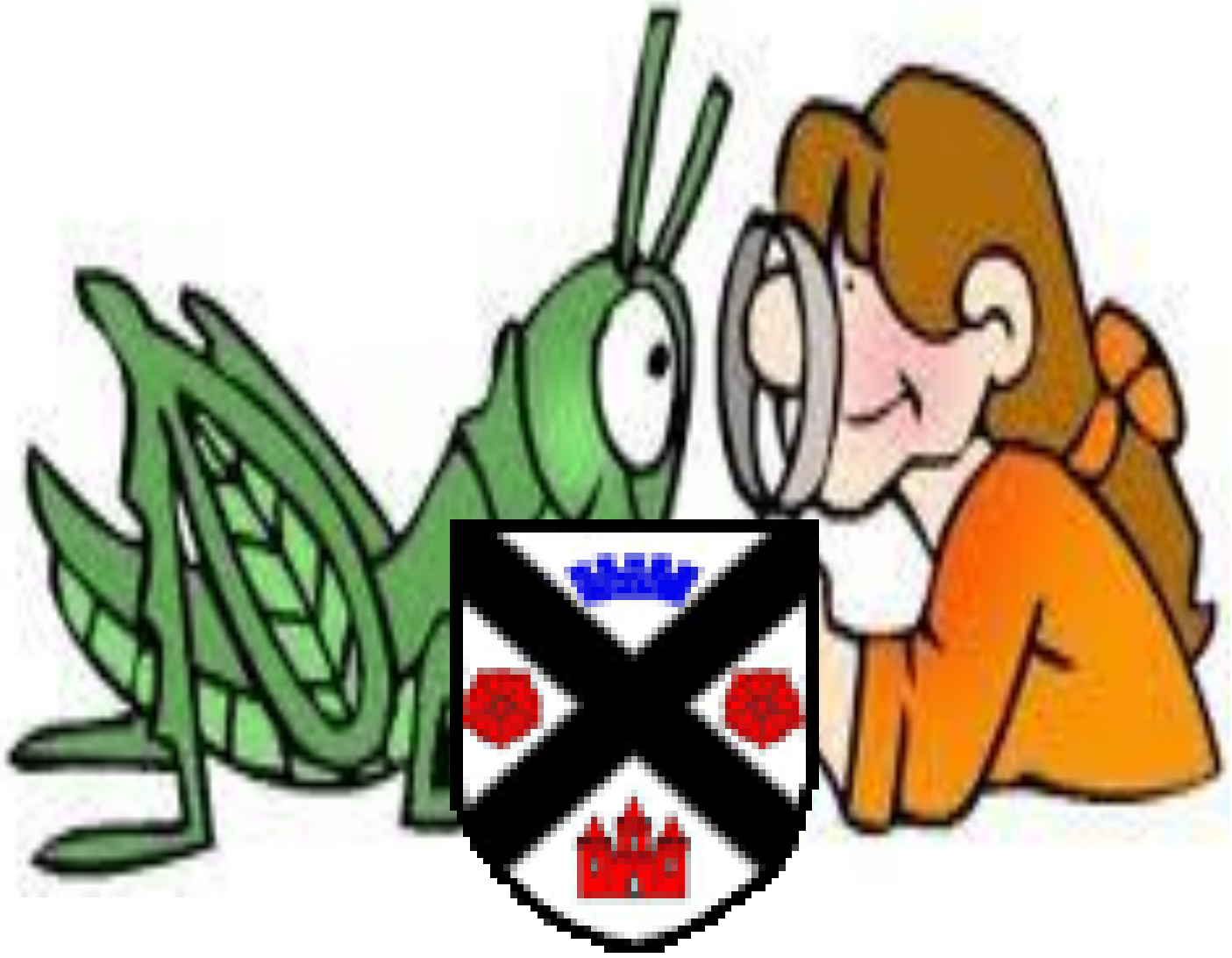
S1 Biology CfE
Pupil Summary Notes



Geniffer High School

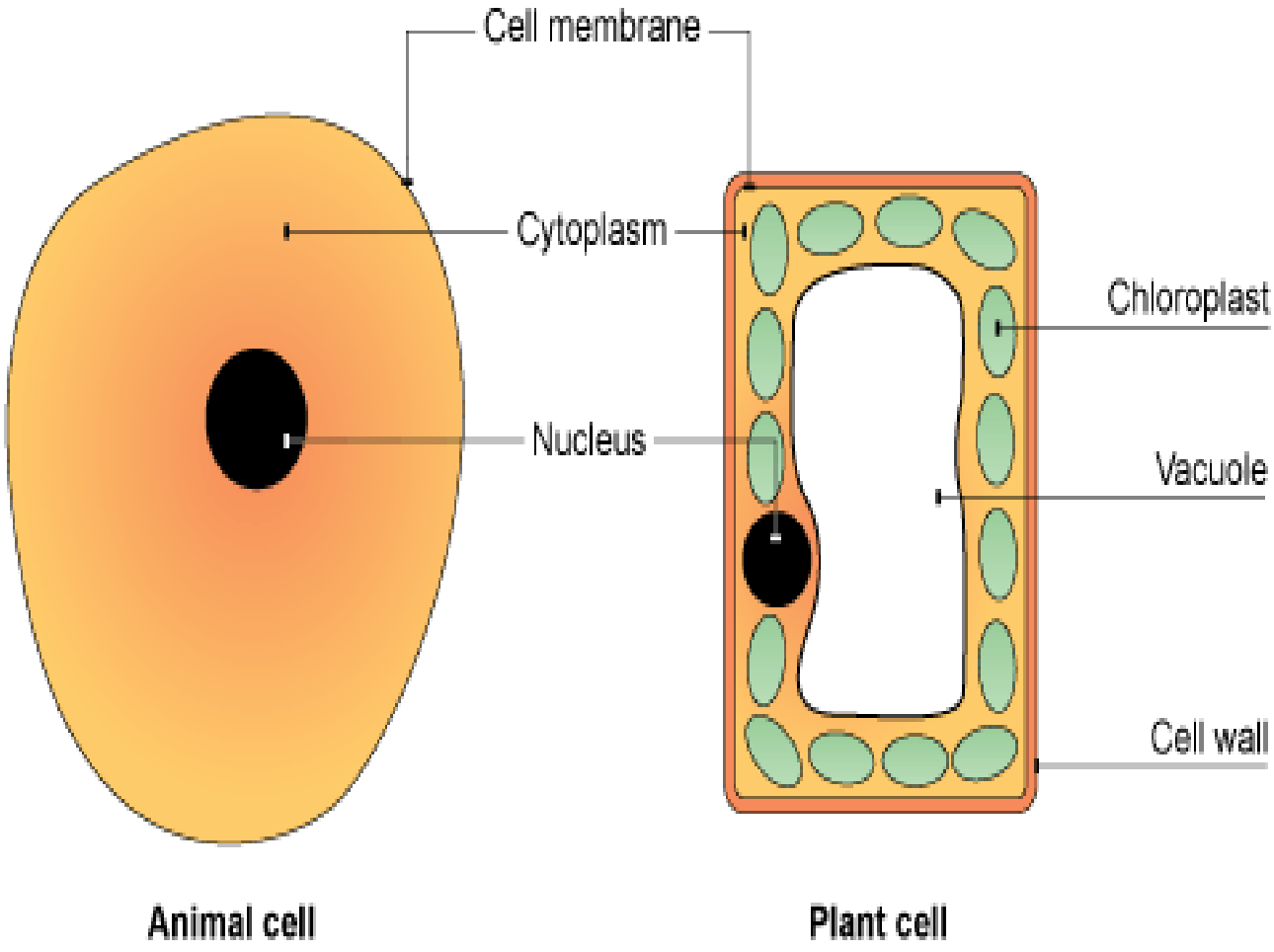
Name:_____

Becoming a Biologist

Using a microscope, I have developed my understanding of the structure and variety of cells and of their functions.

SCN 3-13a

- Cell are the basic unit of life
- **TASK** – Biologists use a microscope/bio viewer to identify the structure of cells
- Animal cells have a nucleus, cell membrane & cytoplasm
- Plant cells have a nucleus, cell membrane, cytoplasm, cell wall, vacuole & chloroplasts



Structure & Function

- Nucleus controls cells activities
- Cell membrane allows entry and exit of substances
- Cytoplasm is the site of chemical reactions
- Cell wall provides structure and support
- Vacuole contains cell sap
- Chloroplasts contain chlorophyll for photosynthesis

	Animal Cell	Plant Cell
Nucleus	✓	✓
Cell membrane	✓	✓
Cytoplasm	✓	✓
Cell wall		✓
Vacuole		✓
Chloroplasts		✓

Numeracy task

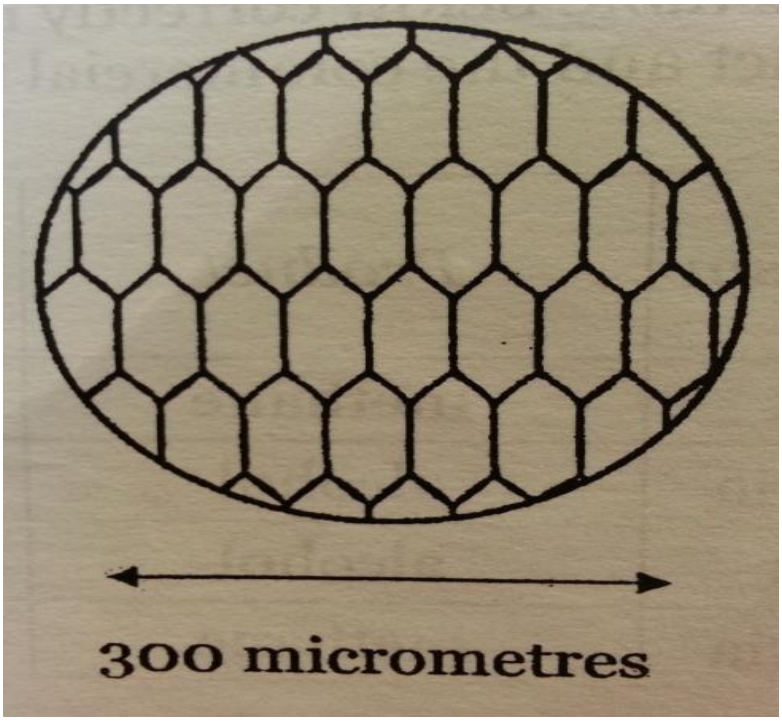
I can calculate the size of individual cells

To find out the average width of each cell in micrometers follow the steps below:

1. Count number of cells across the widest part of the field of view
2. Divide the diameter of the field of view by the number of cells across

Worked Example:

- The diagram below shows onion cells as observed under a microscope.



- The diameter of the field of view is 300 micrometers.

1. **Count number of cells across the widest part of the field of view**
    a. Number of cells across is 8
2. **Divide the diameter of the field of view by the number of cells across**
    a. Diameter of field of view is 300 micrometers
    b. 300 divided by 8 = 37.5

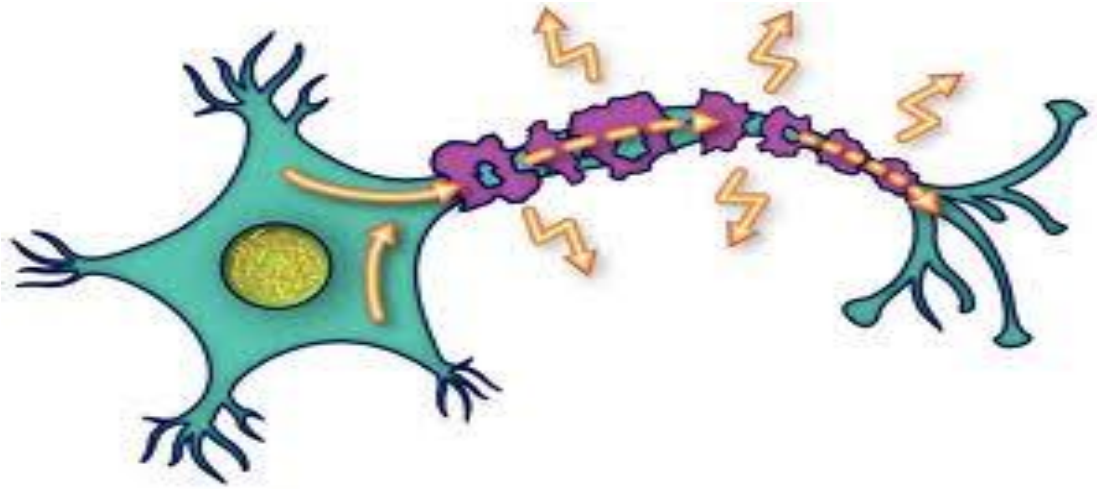
Your turn!

In the space below make up your own question and pass to your peer to answer it!

Variety of Cells & their Functions

- Red Blood cells do not contain a nucleus – giving more space to carry oxygen around the body

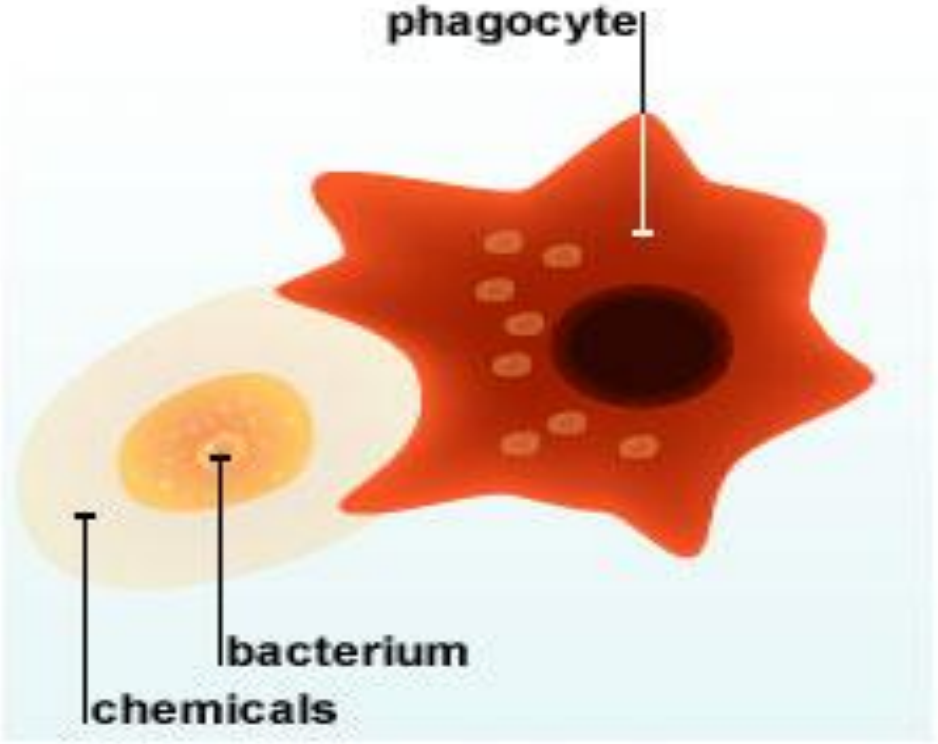
- Nerve cells have a long extension to transmit signals



- Sperm cells have a tail which allows them to swim towards the egg

- Egg cells are the largest cells in the body and contain a food store in their cytoplasm for growth

- Phagocytes contain vesicles of digestive enzymes to digest bacteria



I have explored the structure and function of organs and organ systems and can relate this to the basic biological processes required to sustain life.
SCN 3-12a

Processes Required for Life

- The 7 processes required for life are:
  - Respiration – releasing energy from food
  - Nutrition – getting food to stay alive
  - Growth – increase in dry mass
  - Movement – contraction of muscles
  - Excretion – getting rid of wastes
  - Sensitivity – protect the body from harm
  - Reproduction – producing offspring
- All cells in the body respire ALL of the time

Organs

- An organ is made from a group of different tissues which all work together to do a particular job
  - Heart
  - Lungs
  - Stomach
  - Small intestine
  - Brain
  - Skin
  - Reproductive organs (male and female)

Organ System

- An organ system is made from a group of different organs which all work together to do a particular job
  - Circulatory system
  - Respiratory system
  - Digestive system
  - Nervous system
  - Reproductive system

I have explored the role of technology in monitoring health & improving the quality of life.
SCN 3-12b

Using Technology to monitor Health

- We can use technology to monitor our health using different instruments

Heart

- Heart rate – pulsometer
- Blood Pressure – digital sphygmomanometer

Body Fat

- Body fat sensor

Temperature

- Digital thermometer

Using Technology to Improve Peoples' Lives

- Technology is used to improve the quality of peoples' lives

Pacemakers

- Pacemakers are used in the treatment of heart failure
- A pacemaker works by sending electrical impulses to the heart muscle cells, making them contract

Prosthetics

- Prosthetics are used for people who have missing limbs
- They have been designed to work and act like a normal limb

Stereotactic Radiation Therapy

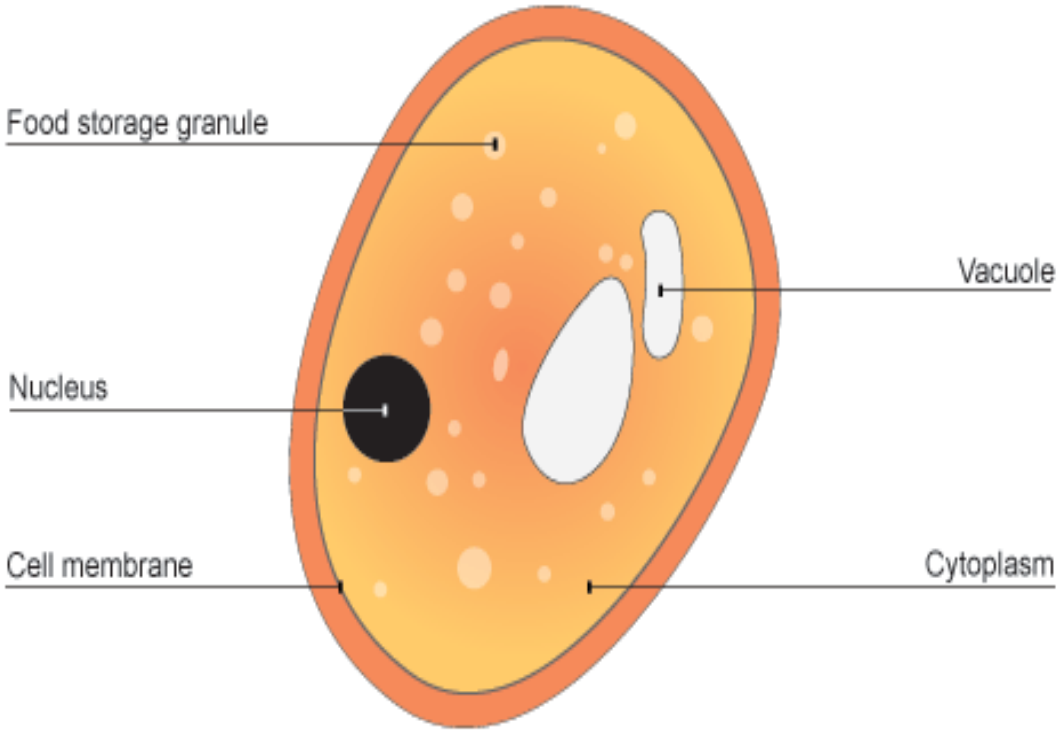
- Stereotactic radiation therapy is used to treat people with brain tumours
- It works by carefully positioning the lasers at different angles to ensure they meet at the centre of the tumour
- This means that only the tumour receives a high dosage of the treatment

I have contributed to investigations into the different types of microorganisms and can explain how their growth can be controlled.

SCN 3-13b

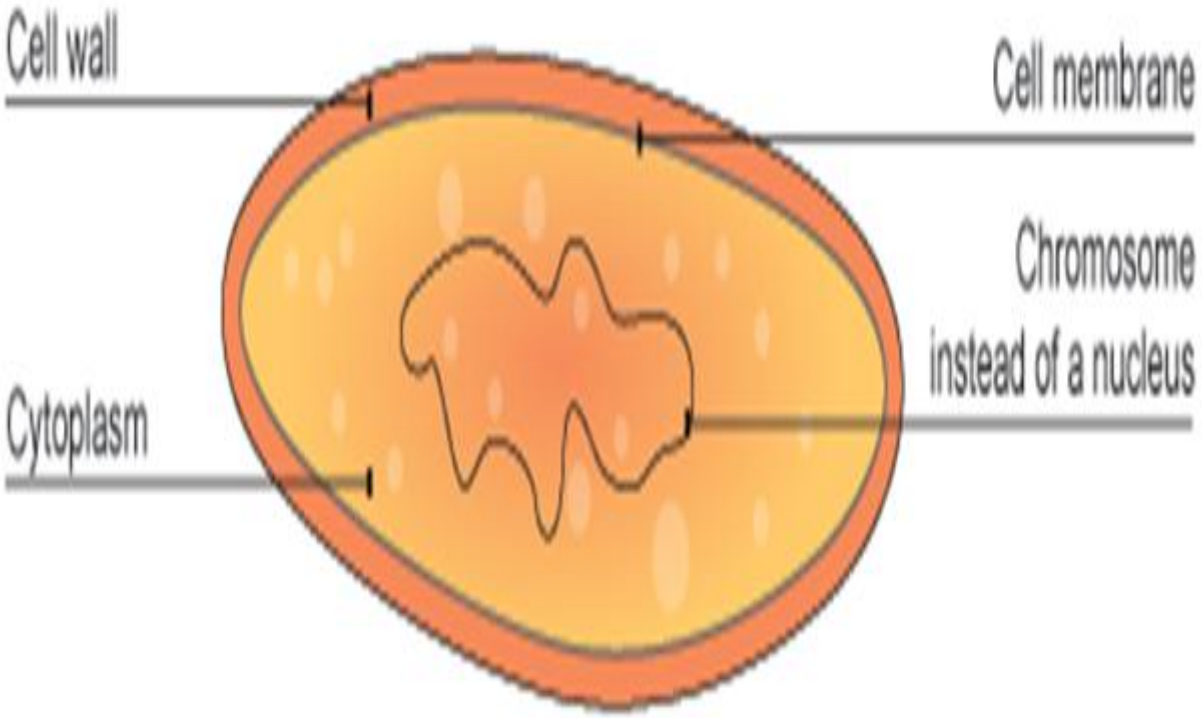
Yeast

- Yeast is a single celled fungus



- Yeast cells are used in:
  - Bread making
  - Alcohol production (beer & wine)
- Yeast can also be harmful and cause infections such as:
  - Thrush
  - Athletes foot
- Fungal infections can be treated using antifungals

Bacteria



- Bacteria cells are used in the production of:
  - Yoghurt
  - Cheese
- Bacteria can be harmful and cause infections such as:
  - Bacterial meningitis
  - Pneumonia
- Bacterial infections can be treated using antibiotics

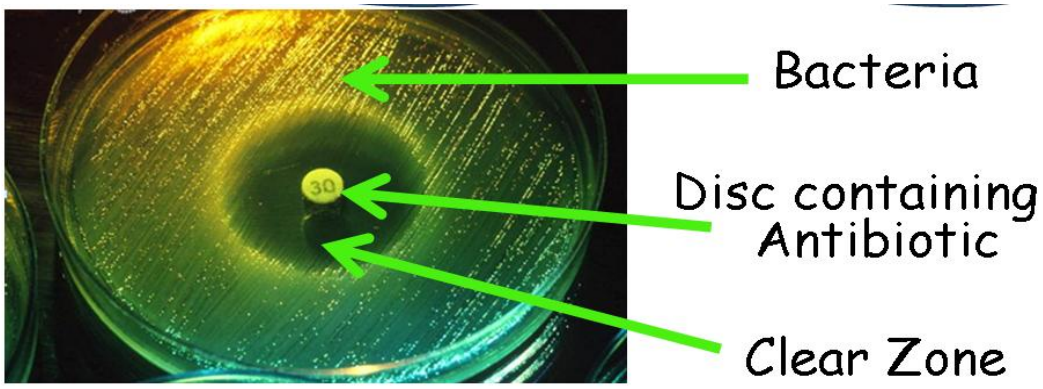
Bacterial Growth

- For Bacteria to grow they need a suitable:
  - Food Source
  - Temperature (approx body temperature)
  - Time

- Proper sewage disposal was one of the most important developments stopping people dying from diseases

- Ways in which we kill microbes or prevent them from growing include:
  - Pasteurisation
    - Heating milk to 70 °C to kill bacteria
  - Disinfectants
    - Kills bacteria
  - Soaps and antiseptics
    - Kills bacteria on our bodies
  - Cooking foods well
    - Kills off bacteria
  - Freezing and refrigerating
    - Slows growth of microbes in food

- Bacterial infections can be treated using antibiotics



Presence of a Clear Zone proves that the bacteria is sensitive to the antibiotic – the antibiotic is effective in preventing growth of the bacteria

- No clear zone indicates that the bacteria is resistant to the antibiotic

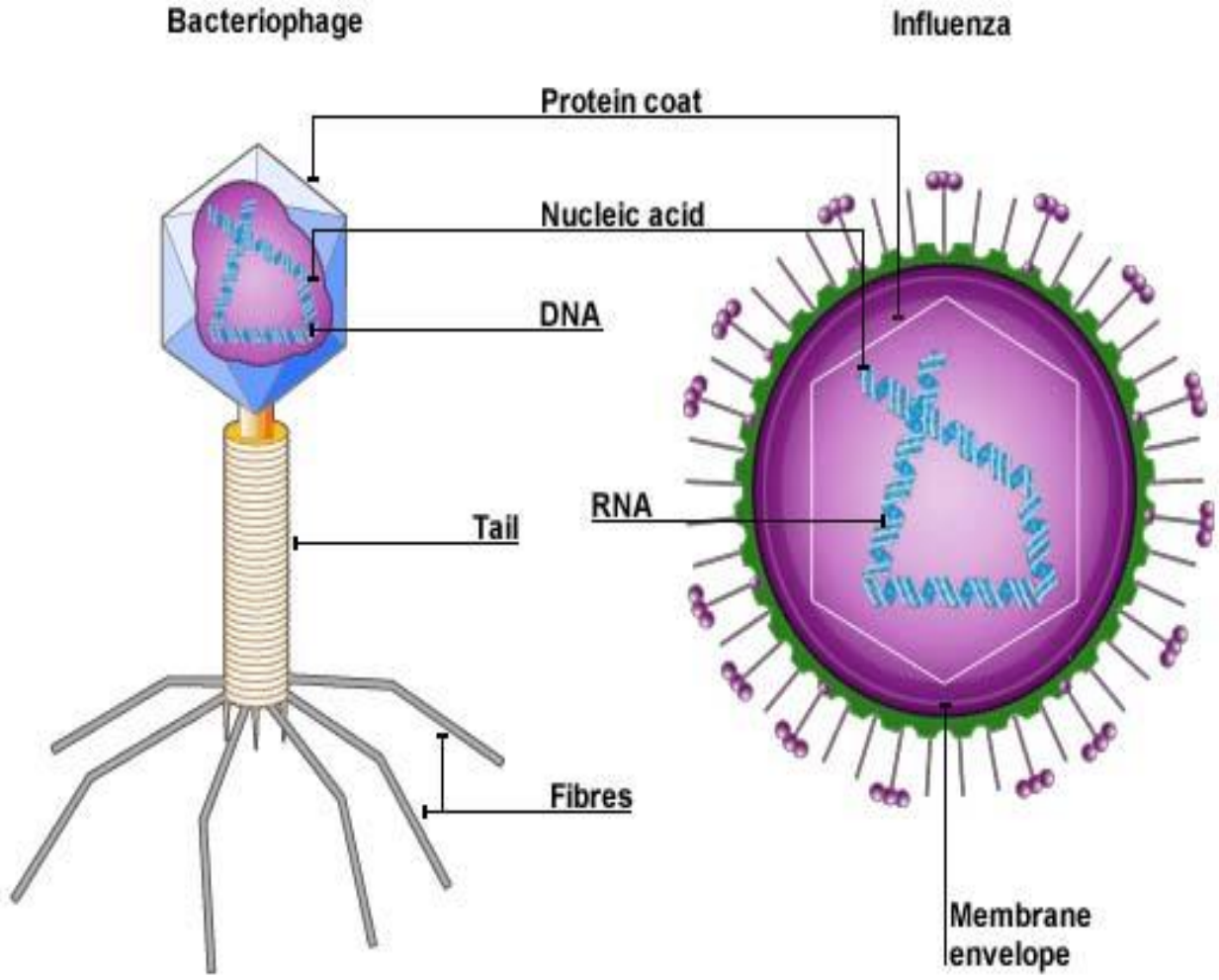
Having explored the conditions for bacterial growth, I can use this knowledge to inform my practice and control food safety risks.

HWB 4-33a

Think, Pair, Share!

If you were a food hygienist, what measures would you advise people at home preparing their own food to take.

Virus



- Viruses are used:
  - In the production of vaccines
  - In gene technology
- Viruses can be harmful and cause infections such as:
  - Influenza (Flu)
  - HPV
- Viruses can be prevented with the use of vaccines

I have explored how the body defends itself against disease and can describe how vaccines can provide protection.

SCN 3-13c

Defence against Disease

- The body defends itself against disease and foreign material in a number of different ways
- The immune system consists of the following:

Skin

- First line of defence
- Physical barrier

Mucous & Tears

- Mucus traps microorganisms and foreign material
- Tears flush out microorganisms and foreign material

Cellular

- Phagocytes engulf and digest bacteria and foreign material
- Lymphocytes produce antibodies against bacteria and viruses

Vaccines

- Vaccines are produced using inactive forms of the virus
- The body produces antibodies against the virus
- The vaccine does not make you ill, although mild side effects may occur
- If you come into contact with the virus your immune system produces antibodies against it very quickly (immunity)