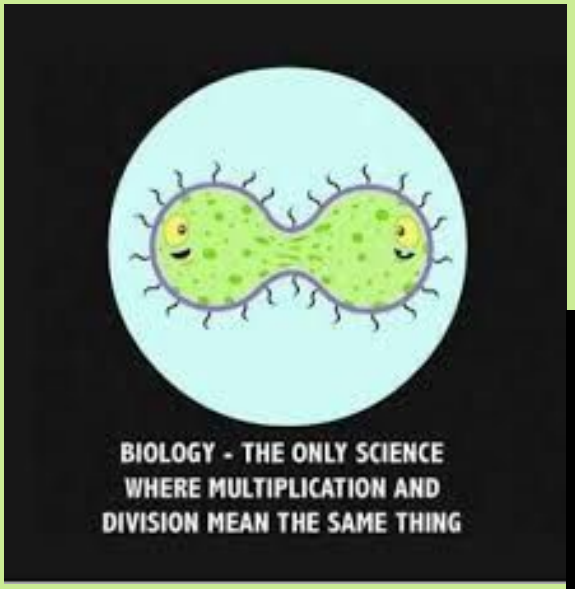
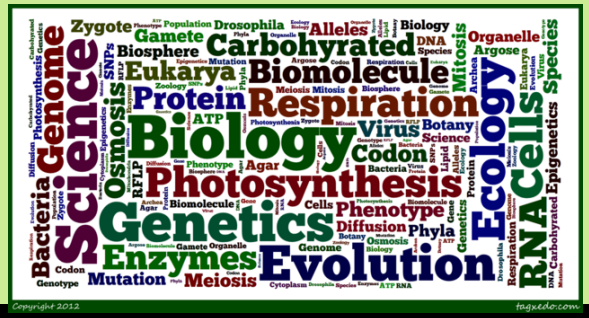
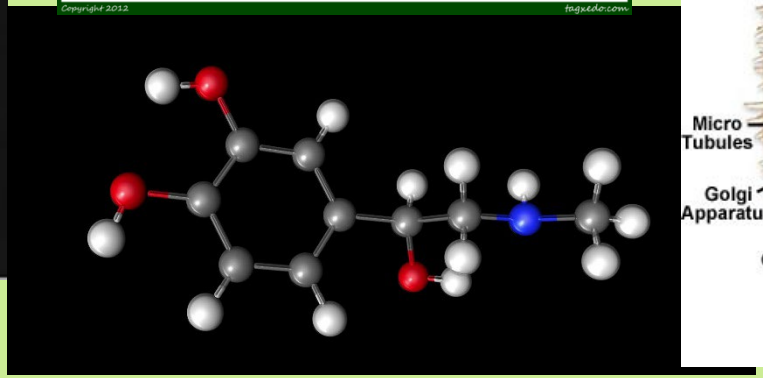
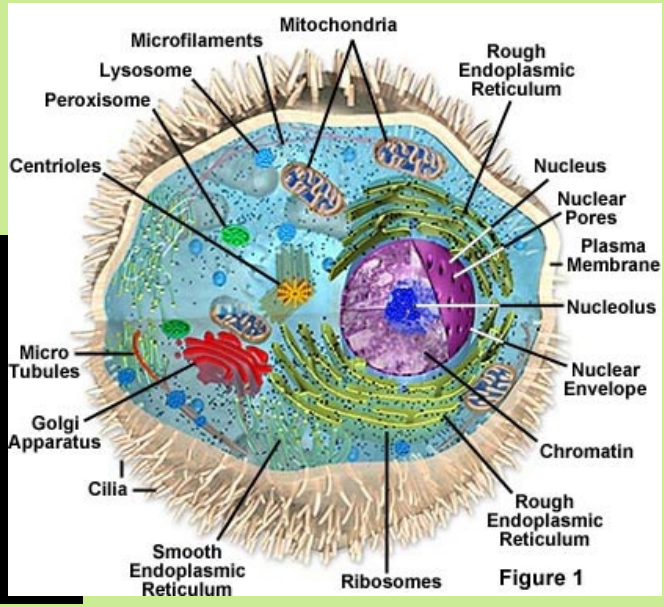
Welcome to A level Biology

Exam board: AQA









Your teachers

- Miss Hazelby – 2 lessons per week

shazelby@forgevalley.sheffield.sch.uk

- Miss Isle – 2 lessons per week

kisle@forgevalley.sheffield.sch.uk

- Miss Mahmood – 1 lesson per week

zmahmood@forgevalley.sheffield.sch.uk

Or

- Mrs May – 1 lesson per week

jmay13@forgevalley.sheffield.sch.uk

How is the course assessed?

- Your understanding and learning will be assessed through written exams at the end of Y12 and/or Y13.
- There will be three papers at the end of Y13 for the A-level and two papers at the end of Y12 for the AS level which test your knowledge as well as your practical skills.
- You will also have your practical abilities assessed by your teacher which will be reported on your final certificate as the Practical Endorsement for Biology.

Overview of topics

1 Biological molecules

2 Cells

3 Organisms exchange substances with their environment

4 Genetic information, variation and relationships between organisms

5 Energy transfers in and between organisms (A-level only)

6 Organisms respond to changes in their internal and external environments (A-level only)

7 Genetics, populations, evolution and ecosystems (A-level only)

8 The control of gene expression (A-level only)

All links back to and builds upon GCSE biology – summer work is very important to ensure a strong foundation of knowledge.

Summer work

https://app.senecalearning.com/dashboard/join-class/swe3lwk5ug

https://www.forgevalley.school/page/?title=Transition+to+Forge+Valley+Sixth+Form&pid=132

https://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402/changes-for-2021

Paper 1	Paper 2
What's assessed • Any content from topics 1–4, including relevant practical skills	**What's assessed** • Any content from topics 1–4, including relevant practical skills
Assessed • written exam: 1 hour 30 minutes • 75 marks • 50% of AS	**Assessed** • written exam: 1 hour 30 minutes • 75 marks • 50% of AS
Questions • 65 marks: short answer questions • 10 marks: comprehension question	**Questions** • 65 marks: short answer questions • 10 marks: extended response questions

8.3.1 Independent thinking

	Practical skill
PS 1.1	Solve problems set in practical contexts
PS 1.2	Apply scientific knowledge to practical contexts

8.3.2 Use and application of scientific methods and practices

	Practical skill
PS 2.1	Comment on experimental design and evaluate scientific methods
PS 2.2	Present data in appropriate ways
PS 2.3	Evaluate results and draw conclusions with reference to measurement uncertainties and errors
PS 2.4	Identify variables including those that must be controlled

8.3.3 Numeracy and the application of mathematical concepts in a practical context

	Practical skill
PS 3.1	Plot and interpret graphs
PS 3.2	Process and analyse data using appropriate mathematical skills as exemplified in the mathematical appendix for each science
PS 3.3	Consider margins of error, accuracy and precision of data

8.3.4 Instruments and equipment

	Practical skill
PS 4.1	Know and understand how to use a wide range of experimental and practical instruments, equipment and techniques appropriate to the knowledge and understanding included in the specification

Paper 1	Paper 2	Paper 3
What's assessed • Any content from topics 1–4, including relevant practical skills	**What's assessed** • Any content from topics 5–8, including relevant practical skills	**What's assessed** • Any content from topics 1–8, including relevant practical skills
Assessed • written exam: 2 hours • 91 marks • 35% of A-level	**Assessed** • written exam: 2 hours • 91 marks • 35% of A-level	**Assessed** • written exam: 2 hours • 78 marks • 30% of A-level
Questions • 76 marks: a mixture of short and long answer questions • 15 marks: extended response questions	**Questions** • 76 marks: a mixture of short and long answer questions • 15 marks: comprehension question	**Questions** • 38 marks: structured questions, including practical techniques • 15 marks: critical analysis of given experimental data • 25 marks: one essay from a choice of two titles

Required activity
1. Investigation into the effect of a named variable on the rate of an enzyme-controlled reaction
2. Preparation of stained squashes of cells from plant root tips; set-up and use of an optical microscope to identify the stages of mitosis in these stained squashes and calculation of a mitotic index
3. Production of a dilution series of a solute to produce a calibration curve with which to identify the water potential of plant tissue
4. Investigation into the effect of a named variable on the permeability of cell-surface membranes
5. Dissection of animal or plant gas exchange or mass transport system or of organ within such a system
6. Use of aseptic techniques to investigate the effect of antimicrobial substances on microbial growth

7. Use of chromatography to investigate the pigments isolated from leaves of different plants, eg leaves from shade-tolerant and shade-intolerant plants or leaves of different colours
8. Investigation into the effect of a named factor on the rate of dehydrogenase activity in extracts of chloroplasts
9. Investigation into the effect of a named variable on the rate of respiration of cultures of single-celled organisms
10. Investigation into the effect of an environmental variable on the movement of an animal using either a choice chamber or a maze
11. Production of a dilution series of a glucose solution and use of colorimetric techniques to produce a calibration curve with which to identify the concentration of glucose in an unknown 'urine' sample
12. Investigation into the effect of a named environmental factor on the distribution of a given species

1. Follows written procedures	(a) Correctly follows written instructions to carry out the experimental techniques or procedures.
2. Applies investigative approaches and methods when using instruments and equipment	(a) Correctly uses appropriate instrumentation, apparatus and materials (including ICT) to carry out investigative activities, experimental techniques and procedures with minimal assistance or prompting. (b) Carries out techniques or procedures methodically, in sequence and in combination, identifying practical issues and making adjustments where necessary. (c) Identifies and controls significant quantitative variables where applicable, and plans approaches to take account of variables that cannot readily be controlled. (d) Selects appropriate equipment and measurement strategies in order to ensure suitably accurate results.
3. Safely uses a range of practical equipment and materials	(a) Identifies hazards and assesses risks associated with those hazards, making safety adjustments as necessary, when carrying out experimental techniques and procedures in the lab or field. (b) Uses appropriate safety equipment and approaches to minimise risks with minimal prompting.

4. Makes and records observations	(a) Makes accurate observations relevant to the experimental or investigative procedure. (b) Obtains accurate, precise and sufficient data for experimental and investigative procedures and records this methodically using appropriate units and conventions.
5. Researches, references and reports	(a) Uses appropriate software and/or tools to process data, carry out research and report findings. (b) Cites sources of information demonstrating that research has taken place, supporting planning and conclusions.

Things to have ready for September!

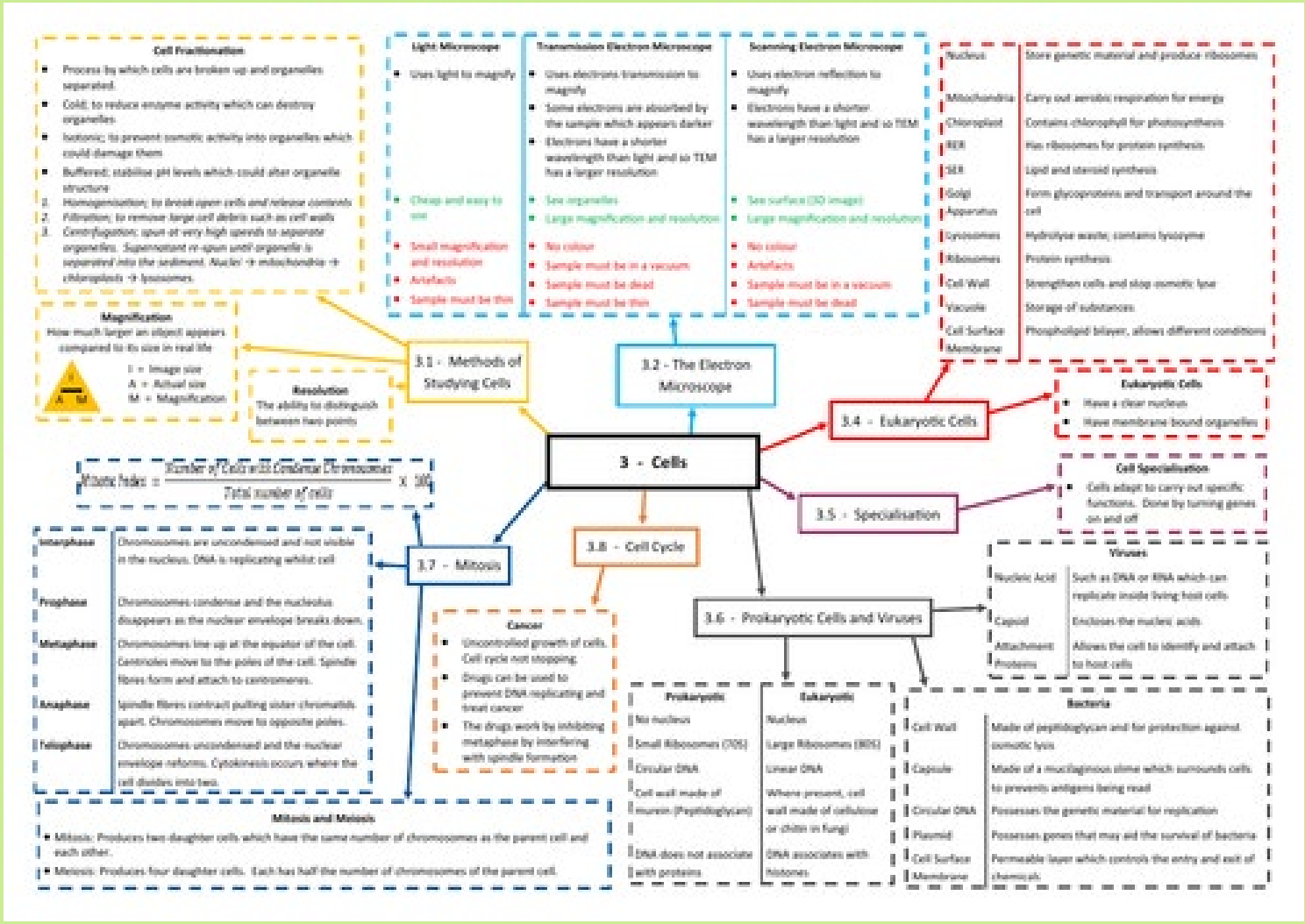
- Get yourself a folder with 10 dividers for each of the chapters that you will study in Y12.
- Equipment – pencil case, scientific calculator etc, A4 lined paper, ruler.
- We will provide you with a required practical folder.
- You can get a physical copy of the Y12 book in September (£10 deposit – repayable when returned) we also have a pdf version online.

Expectations

- You must be organised! There is a lot of work so you need to stay on top of things and organise your notes in your folders.

Expectations

- Consolidate notes after each lesson (mind map, flash cards).

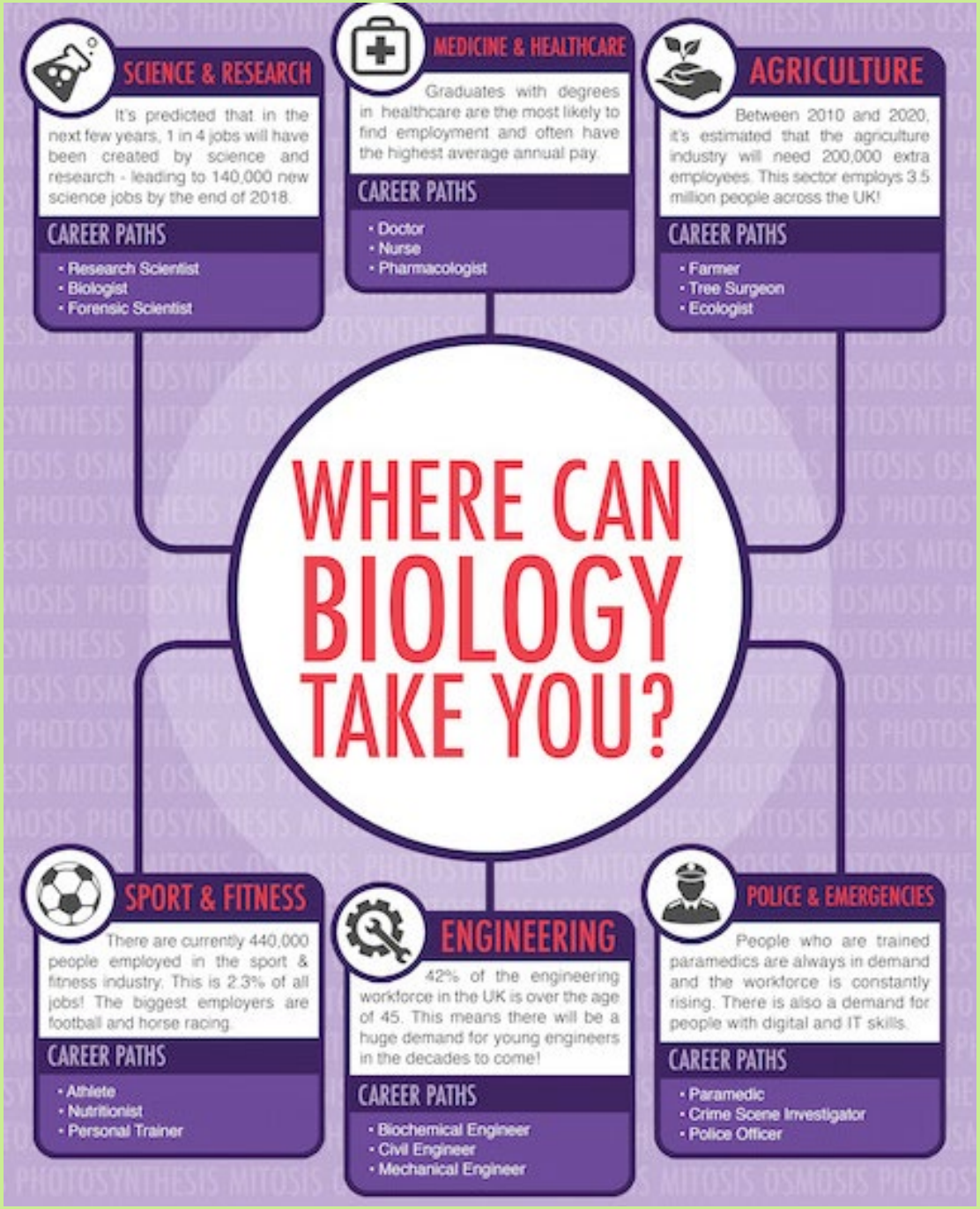


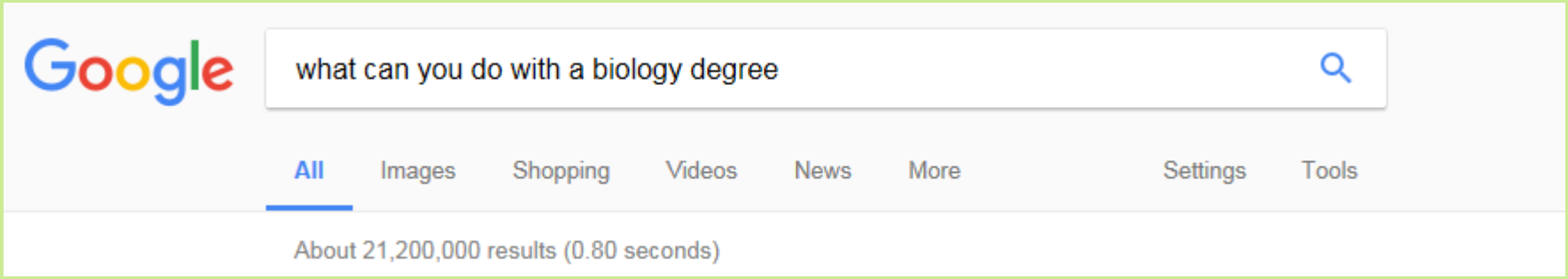
Expectations

- Complete all homework on time, you must email your teacher if you need help before the deadline!
- 5 hours of lessons per week should be matched with 5 hours of work outside lessons (includes consolidating notes and homework).
- Use your frees to do work!
- Email your teacher if you are absent and ask for catch up work, this is your responsibility!!

https://www.youtube.com/watch?v=LyDfhCLx8HI

Careers


WHERE CAN BIOLOGY TAKE YOU?
SCIENCE & RESEARCH
It's predicted that in the next few years, 1 in 4 jobs will have been created by science and research - leading to 140,000 new science jobs by the end of 2018.
CAREER PATHS
• Research Scientist
• Biologist
• Forensic Scientist
MEDICINE & HEALTHCARE
Graduates with degrees in healthcare are the most likely to find employment and often have the highest average annual pay.
CAREER PATHS
• Doctor
• Nurse
• Pharmacologist
AGRICULTURE
Between 2010 and 2020, it's estimated that the agriculture industry will need 200,000 extra employees. This sector employs 3.5 million people across the UK!
CAREER PATHS
• Farmer
• Tree Surgeon
• Ecologist
SPORT & FITNESS
There are currently 440,000 people employed in the sport & fitness industry. This is 2.3% of all jobs! The biggest employers are football and horse racing.
CAREER PATHS
• Athlete
• Nutritionist
• Personal Trainer
ENGINEERING
42% of the engineering workforce in the UK is over the age of 45. This means there will be a huge demand for young engineers in the decades to come!
CAREER PATHS
• Biochemical Engineer
• Civil Engineer
• Mechanical Engineer
POLICE & EMERGENCIES
People who are trained paramedics are always in demand and the workforce is constantly rising. There is also a demand for people with digital and IT skills.
CAREER PATHS
• Paramedic
• Crime Scene Investigator
• Police Officer



Job options

Jobs directly related to your degree include:

- Biotechnologist
- Higher education lecturer
- Microbiologist
- Nanotechnologist
- Nature conservation officer
- Pharmacologist
- Physician associate
- Research scientist (life sciences)
- Research scientist (medical)
- Secondary school teacher
- Soil scientist
- Zoologist

Jobs where your degree would be useful include:

- Acupuncturist
- Dentist
- General practice doctor
- Health promotion specialist
- Science writer
- Sustainability consultant

Any questions?

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Investigating the relationship between enzyme concentration and rate of reaction

Method:

1. Use a syringe to measure 5 cm^3 of milk solution.
2. Place the milk solution into a test tube.
3. Use a syringe to measure 2 cm^3 of buffer solution and stir the solution.
4. Draw a cross on the test tube.
5. Use a syringe to measure 2cm^3 of the 1% trypsin solution.
6. Place the trypsin solution into the same test tube as the milk solution.
7. Start the stop clock and stir.
8. Record the time taken for the protein to be broken down by the enzyme (when you can see the cross through the solution) and record your results in a suitable table.