



# OCR A level Biology A





# The Importance of Biology



Sharks and oysters set to thrive in warmer UK waters



Breakthrough Alzheimer's drugs too pricey for NHS



Scientists discover natural cancer-fighting sugar in sea cucumbers



Why are disposable vapes being banned and how harmful is vaping?

Clever worms form superorganism towers to hitch rides on insects

Nematode towering behavior is recorded in the wild for the first time, a rare example of collective hitchhiking in nature





# Introduction to A level Biology

‘Biology is my favourite subject, not only is it fascinating, but its importance as a subject is unquestionable. The teachers and support you receive is exceptional and there is no other subject I would rather do’ **Year 13 student.**





# Course Overview Year 1

| 1. Development of practical skills<br>(Across both years)                                                                                                                                                                                                                | 2. Foundations in Biology                                                                                                                                                                                                                                                                                                                           | 3. Exchange and Transport                                                                                                        | 4. Biodiversity, Evolution and Disease                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Planning, implementing, analysis, evaluation and research.</li><li>• Development of skills in use of specific apparatus and techniques.</li><li>• These skills are delivered across 12 Practical Activity Groups (PAG)</li></ul> | <ul style="list-style-type: none"><li>• Different types of cells (Eukaryotic and Prokaryotic)</li><li>• Production of new cells through mitosis and meiosis</li><li>• The internal structure of a cell.</li><li>• Cell surface membrane</li><li>• Cell communication</li><li>• DNA and it's structure</li><li>• Enzymes and how they work</li></ul> | <ul style="list-style-type: none"><li>• Exchange Surfaces</li><li>• Transport in Animals</li><li>• Transport in Plants</li></ul> | <ul style="list-style-type: none"><li>• Communicable diseases, disease prevention and the immune system</li><li>• Biodiversity</li><li>• Classification and Evolution</li></ul> |

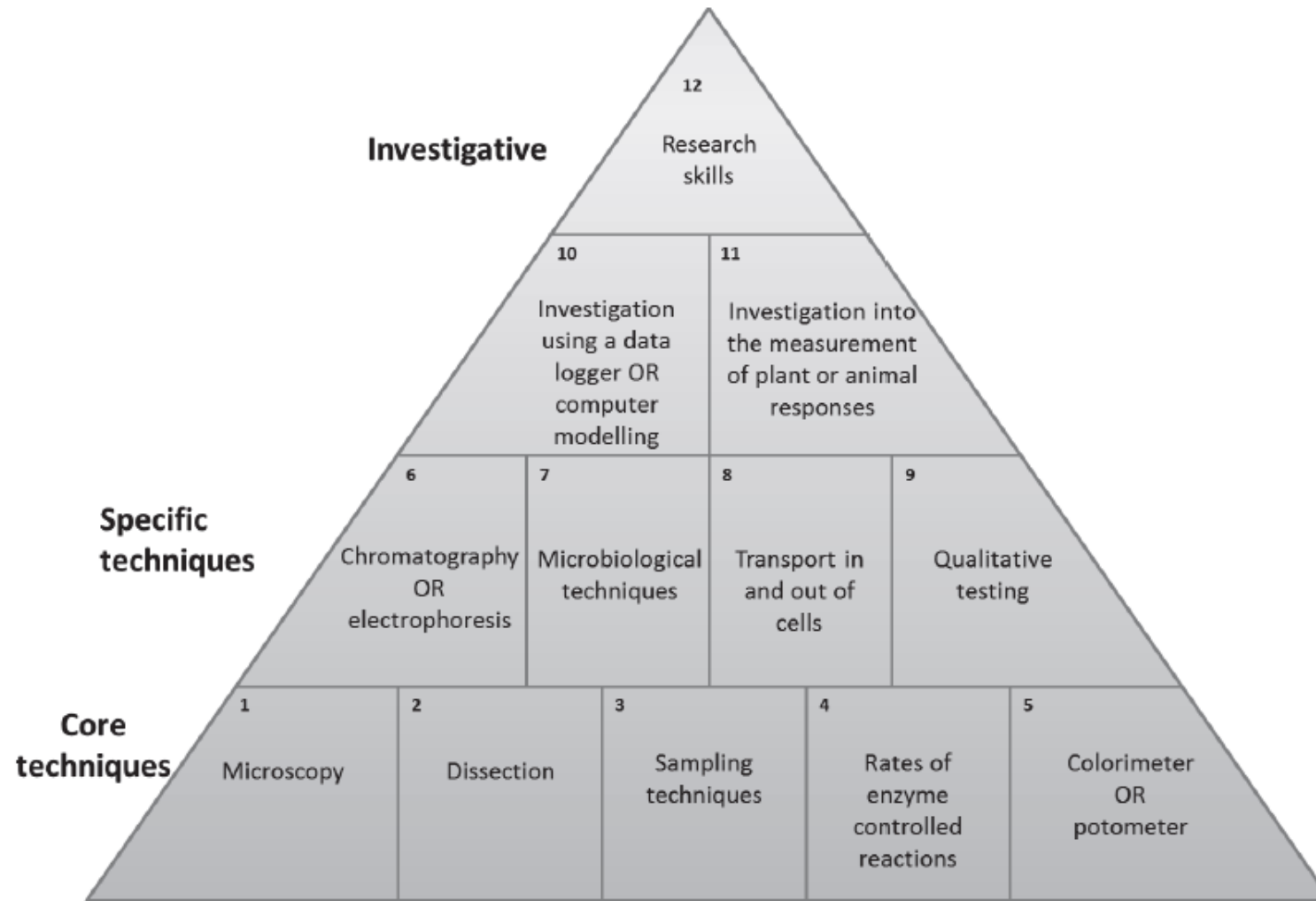


# Course Overview Year 2

|                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Development of practical skills<br>(Across both years)                                                                                                                                                                                                                | 5. Communication, homeostasis<br>and energy                                                                                                                                                                                               | 6. Genetics, evolution and<br>ecosystems                                                                                                                                                                                              |
| <ul style="list-style-type: none"><li>• Planning, implementing, analysis, evaluation and research.</li><li>• Development of skills in use of specific apparatus and techniques.</li><li>• These skills are delivered across 12 Practical Activity Groups (PAG)</li></ul> | <ul style="list-style-type: none"><li>• Communication</li><li>• Homeostasis</li><li>• Excretion</li><li>• Neuronal &amp; hormonal communication</li><li>• Plant and animal responses</li><li>• Photosynthesis &amp; respiration</li></ul> | <ul style="list-style-type: none"><li>• Cellular control</li><li>• Patterns of inheritance</li><li>• Manipulating genomes</li><li>• Cloning and biotechnology</li><li>• Ecosystems</li><li>• Populations and sustainability</li></ul> |



# Practical work



- The practical component is assessed in the final exam.
- Students also receive a practical endorsement if they show competency in the skills required. The practical endorsement may be given as an entry requirement by Universities.



## Structure of year 12 teaching

- 2 teachers for 5 hours per week.
- Lessons typically involve coverage of theory, opportunities for discussion, application of knowledge, problem solving and practical activities.
- Independent study is vital.
- Regular topic tests and assessment tasks at key points during the modules – related back to targets to ensure maximum progression.



| Component             | Marks | Duration           | Weighting | Content                  |
|-----------------------|-------|--------------------|-----------|--------------------------|
| Biological processes  | 100   | 2 hours 15 minutes | 37%       | Modules 1, 2, 3 and 5    |
| Biological diversity  | 100   | 2 hours 15 minutes | 37%       | Modules 1, 2, 4 and 6    |
| Unified Biology       | 70    | 1 hour 30 minutes  | 26%       | Content from all modules |
| Practical endorsement | -     | -                  | -         | -                        |

- 3 Written examination papers
- Practical Skills Endorsement through 12 specific practical activities completed throughout the year - Pass/Fail
- Note that this goes **alongside** the A level Biology grade, it has NO impact on the outcome of the grade, however it could *potentially* be required by Higher Education providers.



# Residential Field Trip



FSC Castle Head, Cumbria

Consolidate understanding of the basic principles of ecology and biodiversity, and develop sampling strategies.



## Courses at University



Psychology  
Medicine  
Biosciences  
Neuroscience  
Biomedical Science  
Biochemistry and Molecular  
cell biology  
Optometry  
Physiotherapy  
Veterinary Medicine



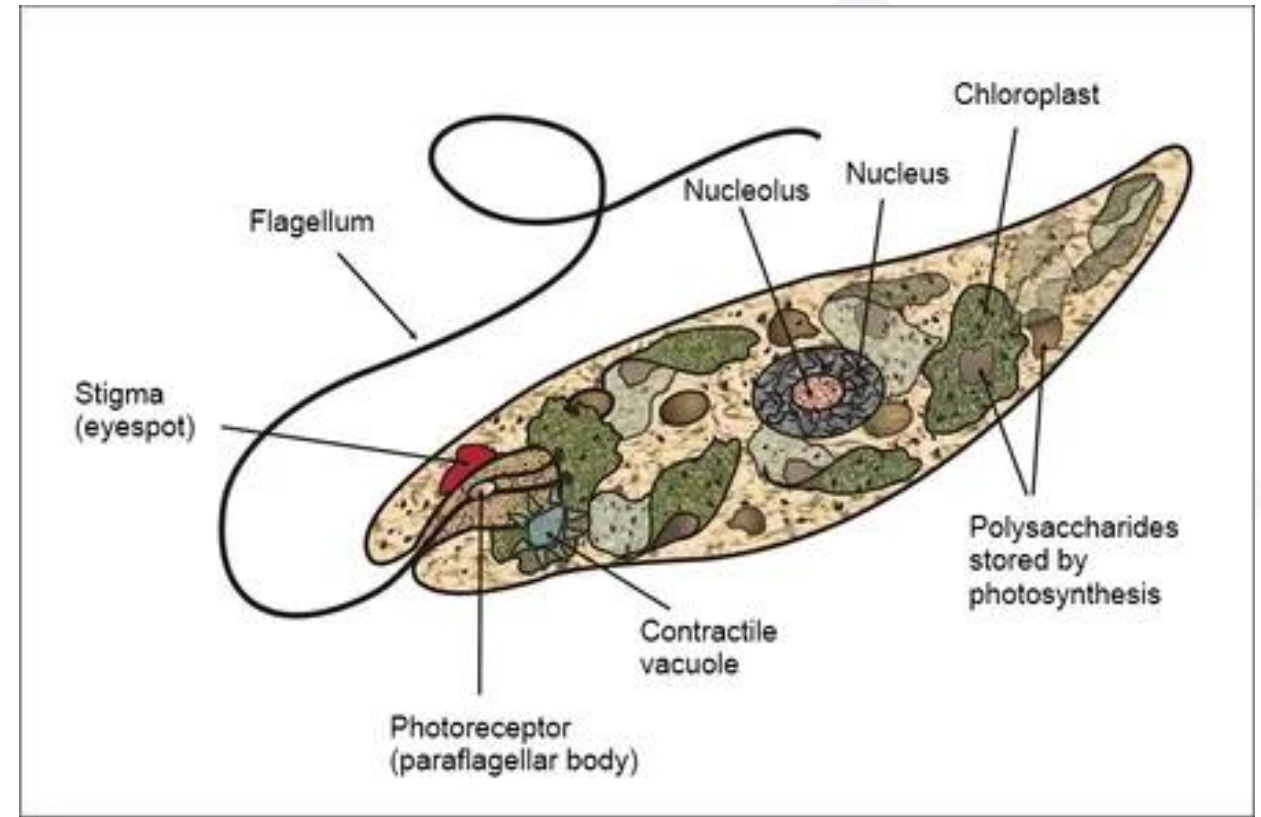
- Research scientist
- Pharmacologist
- Biologist
- Ecologist
- Nature conservation officer
- Biotechnologist
- Forensic scientist
- Government agency roles
- Science writer
- Teacher



## Practical activity - Euglena

Using microscopes, you will work in pairs to **observe**, **measure** and **draw** Euglena.

Complete your work on the A4 sheet provided, and attempt all of the task.



Single celled Eukaryotic organism – autotroph - flagellated



## Method

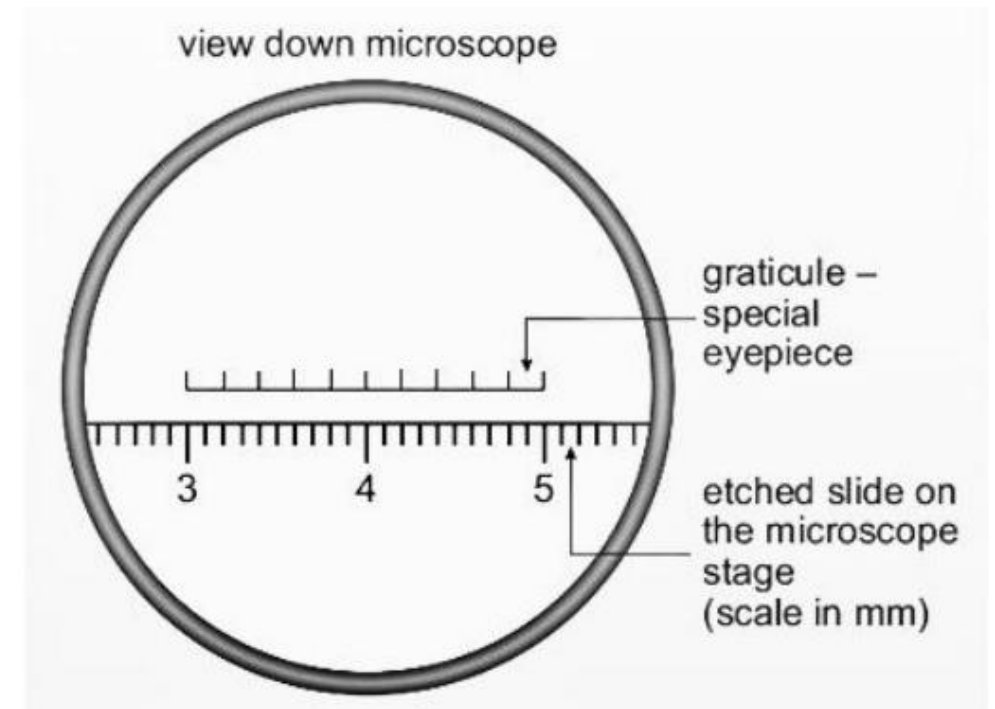
- Place 1 drop of Euglena onto the dimple slide (ensure the correct way round!)
- Carefully lower a coverslip SLOWLY onto the dimple slide
- Use a paper towel to soak up any excess
- Place the slide on the microscope stage and focus under the low power object lens. Use the aperture under the stage to adjust the light levels to show a clear contrast. Draw your observations of the low power plan.
- Increase the magnification to ultimately view on the x40 objective lens, draw your observations, ENSURE you include the graticule (ruler) on your drawings to show relative size. Use the table on the next slide to calculate the actual size of the Euglena



# Calibrating the graticule

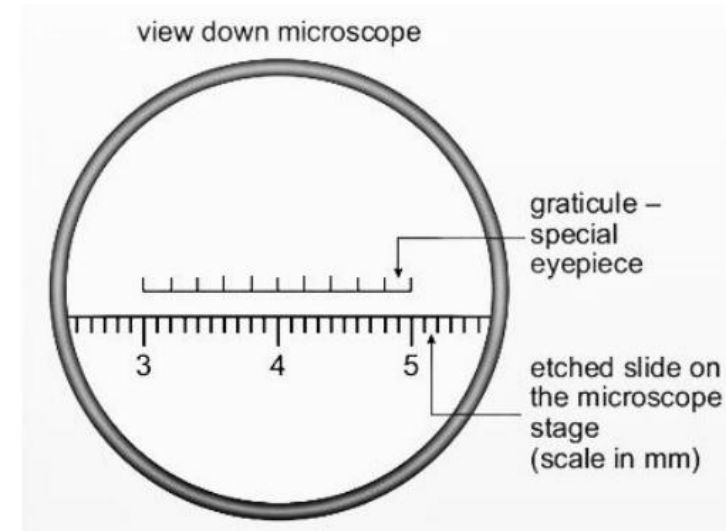
An eyepiece graticule can be fitted to a microscope - this acts like a ruler, allowing structures to be measured under the microscope.

A stage graticule (aka stage **micrometre**) is a microscope slide with an accurate measuring scale – this is used to calibrate the value of the eyepiece divisions at different magnifications. Often it is 1mm long in 10 $\mu$ m divisions



The following process is used to calibrate an eyepiece graticule:

1. Set up the microscope to the required magnification to view the sample.
2. Place a stage graticule on the stage.
3. Line up the two scales (the stage and eyepiece graticules) similar to the diagram.
4. Count the number of divisions on the eyepiece graticule equivalent to each division on the stage micrometre.
5. As the length equivalent to each division on the stage micrometre are known, it is possible to calculate the length of one eyepiece division.



So above you can see that 10 eye piece graticule units are equal to 20 stage micrometre unit.

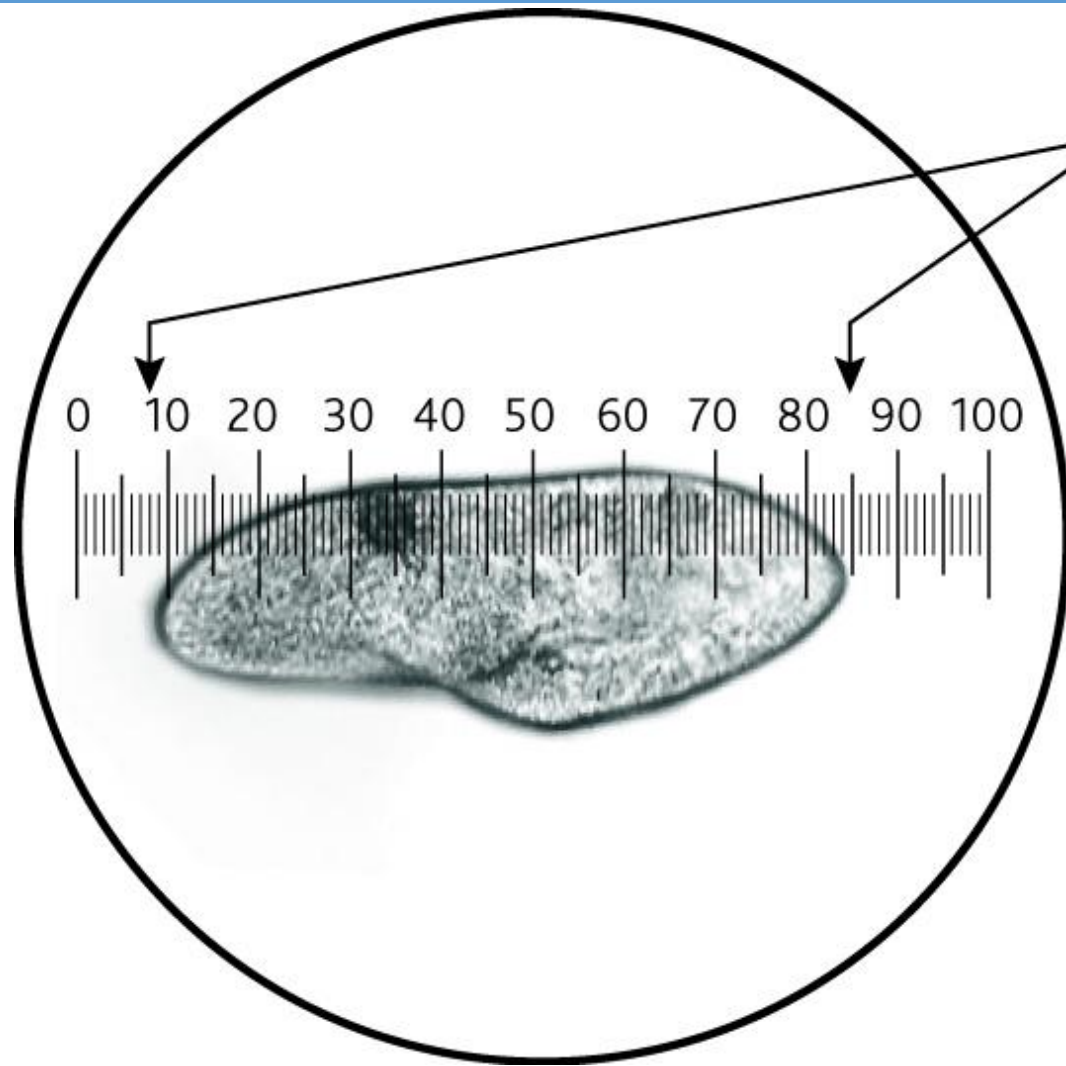
Each stage micrometer unit is equal to  $10\text{ }\mu\text{m}$   
so  $20 = 200\text{ }\mu\text{m}$

So one eye piece unit =  $200/10 = 20\text{ }\mu\text{m}$

If a cell then has a width of 5 eyepiece units is  
real width is  $5 \times 20\text{ }\mu\text{m}$



## Eyepiece graticule; how big is one 'unit'?



the paramecium extends from 8 to 85 EPGUs (ignoring the cilia), that is 77 EPGUs: as each EPGU corresponds to  $2.5\text{ }\mu\text{m}$  (the conversion number) the actual length of the paramecium is  $192.5\text{ }\mu\text{m}$  (from  $77\text{ EPGUs} \times 2.5\text{ }\mu\text{m}$ )

Paramecium seen under the eyepiece graticule ('high' power x400)



## Typical values for light microscopes:

Present new  
information

| Magnification of eyepiece lens | Magnification of objective lens | Total magnification | Value of each eyepiece division (EPU) ( $\mu\text{m}$ ) |
|--------------------------------|---------------------------------|---------------------|---------------------------------------------------------|
| X10                            | X4                              | X40                 | 25                                                      |
| X10                            | X10                             | X100                | 10                                                      |
| X10                            | X40                             | X400                | 2.5                                                     |



## Summer work

To ensure that you are fully prepared to begin your A level in Biology in September, the Biology team would like you to complete several **transition work tasks** and bring back to your first lesson. These are outlined on the school website.

Thank you and looking forward to seeing you in September!

