

Research-Based Summer Activity for Students Transitioning from Year 11 to 12 in AQA Biology

Objective: To deepen students' understanding of advanced biological concepts through independent research on topics that build upon the KS4 Triple Biology curriculum. This will develop research skills and prepare students for AQA A-level Biology.

Topics Covered:

- Cellular Biology (Cell Structure, Organelles)
- Genetics (DNA, Gene Expression)
- Ecology (Ecosystems, Conservation Biology)

Materials Needed:

- Notebook or digital document for notes
- Access to a computer with internet for research
- Presentation software (PowerPoint, Google Slides, etc.)

Step-by-Step Instructions:

Part 1: Researching Cellular Biology

- 1. Select a Topic:**
 - Choose a specific aspect of cellular biology, such as the structure and function of a particular organelle (e.g., mitochondria, chloroplasts).
- 2. Conduct Research:**
 - Use reputable sources such as scientific journals, educational websites (e.g., BBC Bitesize, Khan Academy), and biology textbooks.
 - Focus on detailed functions, significance in the cell, and recent discoveries or advancements related to your chosen organelle.
- 3. Summarise Findings:**
 - Write a summary covering the key points: structure, function, and importance in cellular processes.
 - Include any interesting facts or recent research findings.

Part 2: Investigating Genetics

- 1. Select a Topic:**
 - Choose a topic such as the process of gene expression, genetic mutations, or advances in genetic engineering (e.g., CRISPR technology).
- 2. Conduct Research:**
 - Explore detailed mechanisms of gene expression and regulation.
 - Look into real-world applications of genetic engineering and recent advancements.
- 3. Summarise Findings:**
 - Write a detailed report explaining the chosen genetic process or technology.
 - Discuss its implications in medicine, agriculture, or biotechnology.

Part 3: Exploring Ecology

- 1. Select a Topic:**
 - Choose a specific ecosystem (e.g., tropical rainforest, coral reef) or an ecological issue (e.g., habitat destruction, climate change impacts).
- 2. Conduct Research:**
 - Investigate the biodiversity, key species, and ecological interactions within the ecosystem.
 - Research conservation efforts and the impact of human activities on this ecosystem.
- 3. Summarise Findings:**
 - Create an overview of the ecosystem or issue, highlighting important species, interactions, and conservation strategies.
 - Discuss the significance of maintaining biodiversity and ecosystem health.

Combining Research and Presentation:

- 1. Compile Your Research:**
 - Organise your notes and summaries from each topic.
 - Ensure that each section is clear, informative, and well-structured.
- 2. Create a Presentation:**
 - Develop a presentation that summarises your research on cellular biology, genetics, and ecology.
 - Use slides to organise information logically, with headings, bullet points, and visuals (images, diagrams, graphs).
 - Include a slide for each topic with a detailed explanation and key points.
- 3. Add Visual Aids:**
 - Incorporate diagrams, charts, and images to make your presentation visually appealing and to help explain complex concepts.
- 4. Prepare a Summary Report:**
 - Write a brief report (2-3 pages) summarising your research findings from each topic.
 - Reflect on what you learned and how these topics relate to the AQA A-level Biology curriculum.
- 5. Presentation and Reflection:**
 - Practise presenting your research to a family member or friend.
 - Reflect on your learning process: What did you find most interesting? What challenges did you face, and how did you overcome them?
 - Consider how this research has prepared you for A-level Biology.

This activity allows students to delve deeper into fascinating biological topics, fostering a deeper understanding and appreciation for the subject while honing essential academic skills.