# 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.