Key Stage 3 – Hardy Crops and Photosynthetic Experiments

Notes for teachers

At a glance

Food security is an issue of the future. With rapid global population increase and climate change potentially resulting in many farming areas of the world becoming more arid, scientists are looking at ways to increase the size and reliability of future harvests.

Scientists at the University of Oxford are investigating the action of a single protein associated with the photosynthetic process. Results so far indicate that modification of this protein can result in crops that are more resistant and better able to grow in arid soils.

This activity offers students the opportunity to plan an investigation and engage in follow up data handling within the context of current research and with the background of significant real-world issues.

Learning Outcomes

- Planning an investigation
- Data handling and presentation

Each student will need

- A copy of the student worksheet
- Graph paper

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**Possible Lesson Activities**

1. **Starter activity**
   - Ask students to make a list of 5 things that are important when conducting an experiment. Pool class ideas on the board.

2. **Main activity: Experimental design**
   - Students read the introduction and complete an experimental plan by working through the experimental plan prompts/questions on the student worksheet. This is task 1 on the student worksheet.

3. **Main activity: Data handling**
   - Students complete data handling for data provided on the student worksheet (task 2). This includes completing a partially completed table, producing a graph and analysing the results.

4. **Main activity: GM data handling**
   - Show the Oxford Sparks animation about hardy crops and encourage the students to read the information at the start of task 3 on the student worksheet.
   - Students complete data handling for data provided on the student worksheet. This includes completing a partially completed table, producing a graph and analysing the results.

**Graph that students should plot using table 1.**

**Graph that students should plot using table 2.**

- Students complete follow up questions which require students to analyse the data from both the data handling exercises.

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5. Plenary
   • Experimental key word bingo.

Web links
   • Oxford sparks animation on Hardy Crops: https://www.oxfordsparks.ox.ac.uk/content/hardy-crops-tackle-food-insecurity