OXYGEN IN PHOTOSYNTHESIS – YOUR LITTLE OXIDATION EVENT

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Key Learning Objectives:

1. Understand that the atmosphere's composition has been significantly modified by the actions of photosynthesising organisms (ACSES021)
2. Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes (ACSES001)
3. Represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error, and uncertainty and limitations in data; and select, synthesise and use evidence to make and justify conclusions (ACSES004)

*SEQ Figure * ARABIC 1: The effect of photosynthesis on Earth's atmosphere*

bit.ly/meriSTEMatmosphereox

Materials:

The Earth's atmosphere has not always had a lot of oxygen. After the development of life about 4 billion years ago, photosynthesis started taking place.

Photosynthesis: Light energy Chlorophyll

The oxygen gas produced by this reaction initially reacted with iron in the ocean crust to create ocean oxide. It was only as the production of ocean crust, and therefore iron, began to slow down that oxygen began to accumulate in the environment. This was the Great Oxidation Event.

In this experiment, you will be testing the production of oxygen gas, and the absorption of CO_2 by plants during photosynthesis.

Elodea	Test tube
500mL beaker	CO_2 indicator
Short stem funnel	Sodium bicarbonate
Splint	Sunny place or other light source (e.g. 150 W Halogen lamp)

Method:

1. Fill your beaker with 200mL of water and stir in 2tsp of sodium bicarbonate.
2. Add a couple drops of CO_2 indicator to your water. Note the colour
3. Place freshly cut stems of elodea into the stem of the funnel. Carefully place this funnel, inverted into your beaker so that the stem faces upwards.
4. Fill your test tube with water. Place your thumb over the top of the test tube and carefully invert it so that it sits over the stem of your funnel, filled with water.
5. Place your setup in front of your light source and set a timer for 1 hour.
6. Monitor your experiment; every 10 minutes record the colour of the water and any changes to the test tube that you notice. Make notes of any other changes within your beaker.
7. After 1 hour, carefully remove your test tube from the beaker, stoppering it with your thumb to prevent any gas escaping. Place a glowing splint into the test tube and note what happens. Be careful not to touch the splint to any wet surfaces.

Aim:

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Hypothesis:

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Risks and Precautions:

Results:

Appropriately represent your findings below.

What happened to the colour of the water over the 1 hour?

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What did you observe inside the test tube? What happened when the glowing splint was placed in your test tube?

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What do your results indicate about photosynthesis?

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Did your results match your hypothesis? If not, why not? What might have been sources of error in your experiment?

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