

MODULE: *Photosynthesis and Respiration*

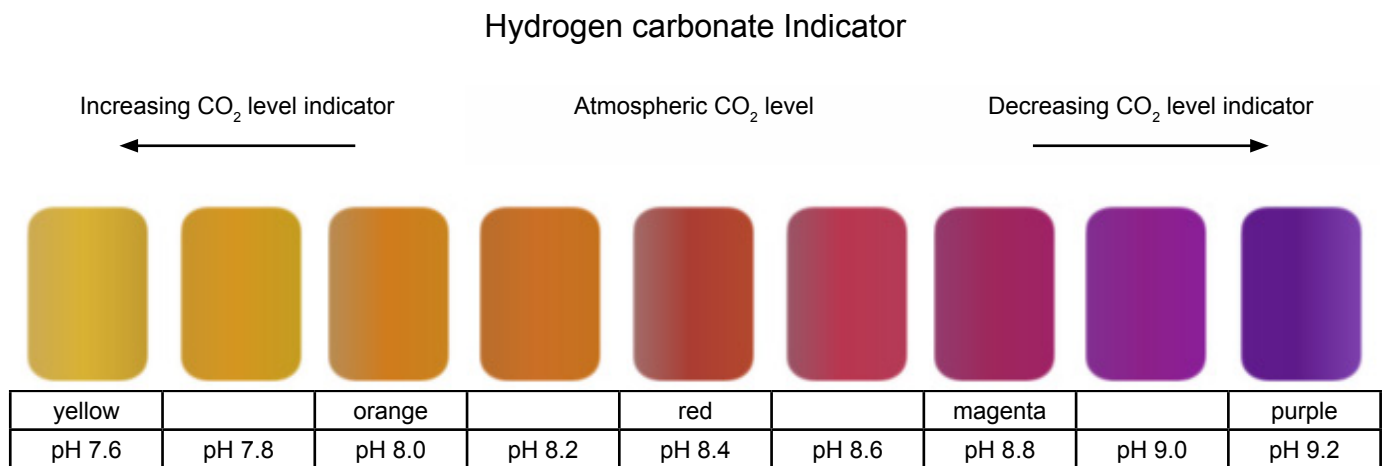
Activity Sheet 1.3: How can we show that plants produce carbon dioxide?

We know that carbon dioxide is in the air, but as it is an invisible gas we need to use technical methods to detect it.

We also know that a green plant needs carbon dioxide to photosynthesise. Changes in the concentration of carbon dioxide can be detected using a device called a hydrogen carbonate indicator.

Atmospheric air contains 0.04% carbon dioxide. When atmospheric air is bubbled through the indicator, the liquid is an orange/red colour.

However, if a plant is using carbon dioxide in photosynthesis it will remove carbon dioxide from the air, and that air turns the indicator first a deeper red and then purple:



The following investigation was carried out:

Four containers were each filled with the same amount of indicator, plus a strand of pondweed of equal length.

The containers were sealed, and:

- Container 1 was placed 20cm from a light source
- Container 2 was covered with thin fabric and placed 20cm from a light source
- Container 3 was covered with thicker fabric and placed 20cm from a light source
- Container 4 was placed in a cupboard.

When there was a noticeable colour change in the indicator, the shading was removed from containers 2 and 3, and container 4 was taken out of the cupboard.

Exercise 1

Complete the table of results by adding the explanations for the findings:

Container	Colour	Explanation
1	Purple	
2	Orangey-red	
3	Orange	
4	Yellow	

Exercise 2

How could you improve the investigation?