

Activity:

Photosynthesis investigation

Use this experiment to help pupils understand how plants and algae in the ocean can help fight climate change by absorbing carbon dioxide through photosynthesis.

You will need:

- 4 sealable clear jars
- Pondweed*
- Hydrogen carbonate indicator
- [Photosynthesis investigation sheet](#)

*Pondweed can be collected from ponds or slow-flowing streams, or bought from aquatic supplies shops. The experiment also works with leaves if you can't get pondweed.

What to do

1. Set up the experiment. First, place equal amounts of hydrogen carbonate indicator into 3 clear containers and add pieces of pondweed. Seal the containers.
2. Place one container in direct sunlight, one in a shady area, and one in a completely dark space. As a control, place one sealed container with hydrogen carbonate indicator but no plant in sunlight.
3. Once there is a noticeable change in colour of the solutions, gather the 4 containers together and observe the colour of the indicator. Record the results on the [Photosynthesis investigation sheet](#).
4. Explain that hydrogen carbonate indicator shows the level of carbon dioxide. Record on the investigation sheet whether the carbon dioxide level has increased or decreased.
5. Discuss why the levels changed. Carbon dioxide reduces in the container in bright light due to photosynthesis, whereas it increases in the dark container due to respiration but no photosynthesis.
6. Relate the results of this activity to the ocean by explaining how plants and algae in the sea absorb huge amounts of carbon dioxide from the atmosphere through photosynthesis, which helps in our fight against climate change.



The UK has
lost about
92% of its
seagrass in
the last
century

Photosynthesis investigation

Name: _____

High carbon dioxide

Atmospheric levels

Low carbon dioxide



Respiration > Photosynthesis

Respiration = Photosynthesis

Respiration < Photosynthesis

Location	Colour of indicator	Has carbon dioxide...	What does this result tell you?
Light		Increased	_____ _____ _____
		or	
		Decreased	
Shade		Increased	_____ _____ _____
		or	
		Decreased	
Dark		Increased	_____ _____ _____
		or	
		Decreased	
Light (control)		Increased	_____ _____ _____
		or	
		Decreased	

OUR OCEAN SUPERHEROES



MCS / Georgie Bull

Seagrass



MCS / Sine Scot

Maerl



MCS / Keith Hiscock

Kelp

Why are they superheroes?

Oxygen

Like other green plants and algae, our superheroes produce their food through a process called photosynthesis. This process also gives us the oxygen we need to breathe. We couldn't live without green plants and algae.

Climate Change

Our superheroes are much better at removing Carbon Dioxide (CO₂) than plants on the land. Carbon Dioxide is the gas that is produced by humans, for example when we burn fuel to make electricity or use cars. This gas is heating up our world, causing climate change.

Biodiversity

These vital underwater habitats provide a sheltered environment for far more wildlife than sandy seabeds. This helps ocean biodiversity - the range of different wildlife found in the area. Good biodiversity is a sign of a healthy habitat.

Erosion

Kelp and seagrass help to prevent erosion (wearing away) of the seabed and coast. They create a natural barrier which slows down the waves and reduces their impact. This is particularly important as climate change causes more severe storms.

Protecting our superheroes

Building ports and other development in coastal areas, climate change and mooring of boats can all damage our superheroes.

We need people to know about why these habitats are so important so they know to take care of them, for example, by mooring boats outside of these areas, or by taking action to reduce the amount of CO₂ we produce.