

WHAT ROLE DO FUNGI HAVE IN FIGHTING CLIMATE CHANGE?

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Why did the mushroom get invited to all the parties?

Because he was a **FUN GUY!**

DID YOU KNOW?

- Fungi are more closely related to humans than they are to plants.
- Fungi don't create their own food. Instead, they get nutrients by breaking down organic material.
- The largest organism in the world is a fungus!
 - It's a mushroom called the **honey fungus**, it's THOUSANDS of years old and as big as 1,665 football fields!

SAPROPHYTIC AND MYCORRHIZAL FUNGI

- This resource will focus on 2 types of fungi because of the important roles they play in promoting soil health: **saprophytic** and **mycorrhizal fungi**.
- Saprophytic fungi are **decomposers**. They use **enzymes** to break down organic matter into simpler substances that are more accessible for plants to use for growth.
- Mycorrhizal fungi form relationships with plant roots that helps them both. While they help plants absorb water and nutrients from soil, plants use photosynthesis to provide the fungi with sugars.
 - Both are **critical** to maintaining **ecosystem balance!**

What's an **enzyme**?

A enzyme is a special kind of protein that speeds up chemical reactions. They are used to break down food into energy, repair tissue and more.

WHAT IS CARBON SEQUESTRATION?

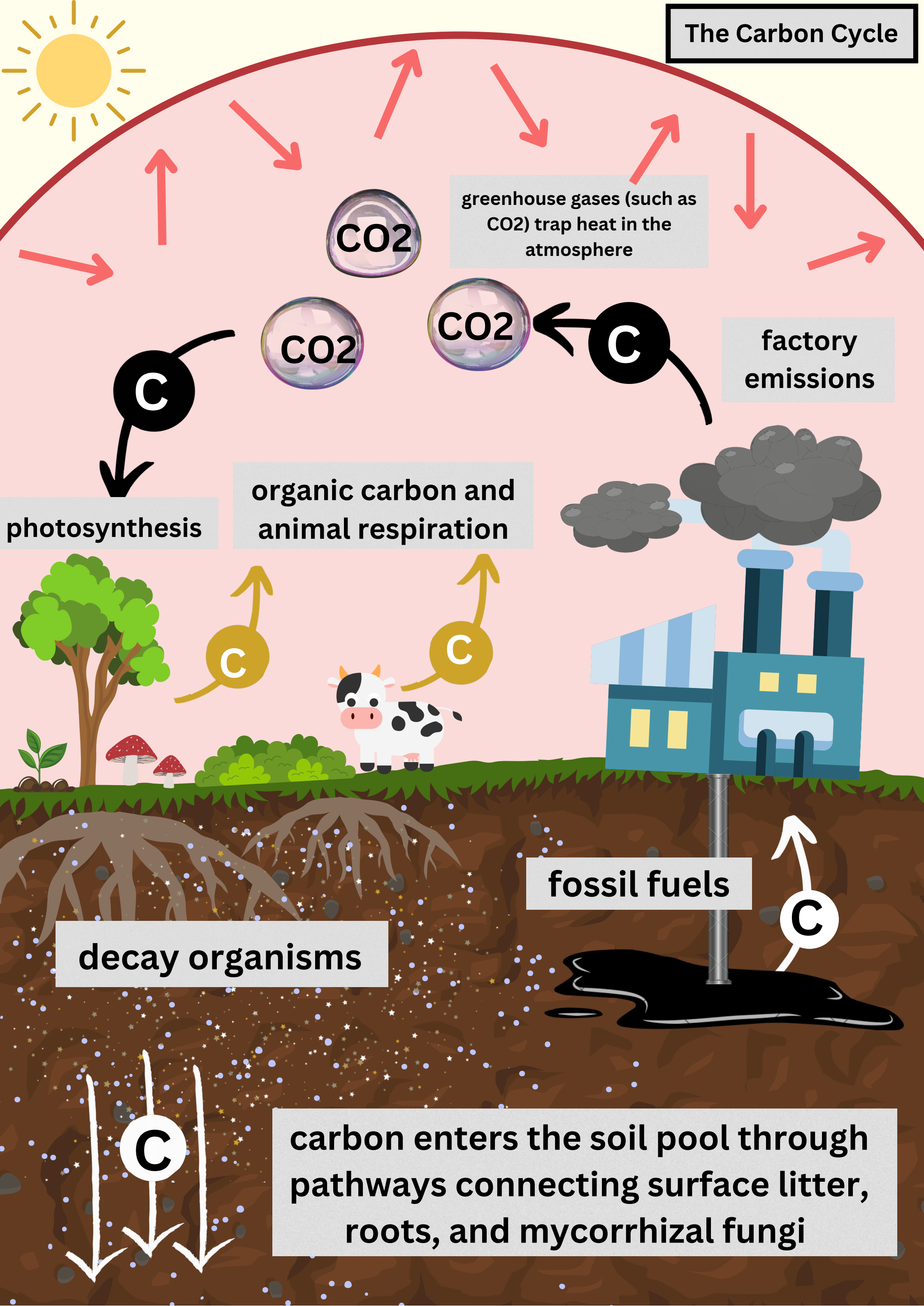
- The process of **capturing** and **storing** carbon dioxide to prevent it from entering the atmosphere.
- See the diagram of the carbon cycle on the next page!

HOW DOES CARBON SEQUESTRATION REDUCE THE EFFECTS OF CLIMATE CHANGE?

- When carbon is released into the atmosphere it reacts with oxygen to form CO₂, a **greenhouse gas**.
- If there is too much CO₂ in the air it acts like a blanket preventing heat from escaping into space and warming the planet. This is part of the greenhouse gas effect and is a key factor contributing to climate change.
- Fungi help store carbon for extended periods of time by breaking down organic matter, such as dead plants, and converting it into **stable compounds** in the soil.
 - In this case, a stable compound refers to a form of carbon that is less likely to release CO₂ back into the atmosphere.

In 2023, a study found that the underground roots (mycelium) of mycorrhizal fungi, help store about 36% of the carbon dioxide released world-wide by people burning fossil fuels each year!

The Carbon Cycle



SOIL STRUCTURE

- Networks of **mycelium** (thread like structure of fungi) form clusters and clumps of soil. This clumping prevents soil from washing away (**erosion**) and make it better at holding water (**drought resistant**).



FORESTS AND AGRICULTURE

- Demand for agricultural land is the biggest driver of **global deforestation**.
- Use of fungi in farming practices can increase crop yields:
 - **increase biodiversity** and **ecosystem resilience**
 - **biopesticides**: reducing impact of harmful insects on crops
 - **biofertilisers**: enriching soil health
- Promoting sustainable agriculture and reforestation is a highly effective way to promote fungal activity and carbon sequestration.

POLLUTION

- **bioremediation**: the process of using living materials to clean up polluted sites.
- Fungi can help process/clean up hazardous materials such as **heavy metals** and **radioactive** material.
- A study in 2015, took a pile of soil and poured diesel on it. The researchers then introduced **mycelia** from oyster mushrooms. After 4 weeks, they found **95%** of the **toxic compounds** had been **converted** into **non-toxic compounds** (sugars). The mushroom spores attracted insects, which laid larvae, which attracted birds, who brought seeds. The mycelia converted a toxic pile of dirt into an **oasis of life** within 8 weeks of treatment!

HAVE YOU SEEN FUNGI IN YOUR NEIGHBORHOOD?

Use this guide to help you identify 3 common fungi found in Scotland.

Please use **caution** as some can be **toxic** or **inedible**!



Turkey Tale (*Trametes versicolor*)

- **Edible:** sometimes used in tea.
- They decompose dead wood so other living things can use the nutrients to grow.
- **Shape:** small, flat, colourful fan on a piece of wood.
- **Colour:** brown, tan, blue or green.
- **Gills:** underside has a white surface with tiny pores.



Chanterelle (*Cantharellus cibarius*)

- **Edible:** delicious taste! try them in a pasta.
- **Shape:** smooth, convex cap.
- **Colour:** golden to yellow orange.
- **Gills:** blunt, forked ridges on underside (instead of true gills).
- **Stem:** smooth and same colour as the cap.



Fly Agaric (*Amanita muscaria*)

- Caution: **Toxic!** it's bright appearance serves as a warning to potential predators that it is not safe to eat.
- **Shape:** round caps, can 5-20cm in diameter.
- **Colour:** distinctive red cap with white spots.
- **Gills:** white, crowded, and free from attachment to the stem.
- **Stem:** white stem with distinctive ring or skirt.



Find out more:

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