

Soil-lift?

What soils give to us, unseen:
helping Creation + Climate.

As part of our Creationtide celebration this year, we show two tall Textile panels which hint at how Soil is full of often-unseen life. Its residents relay energy, gases, minerals and fluids which make other life possible. Find these Energy-Adventures on pillars facing the chancel and organs here. Look at Bacteria and Fungi in the soil in new ways! As far as possible, each panel is made from Organic or Recycled/Repurposed/Deadstock materials: included are fibres dyed with Waterbeach weeds, mushroom-challenged polyester and dried teabags, embroidered! **Please don't touch!**

Be inspired to look and give thanks for what Soil does. Soil offers us spiritual encouragement for our souls; its daily transformations, via Chemistry, Physics and Biology are like a miracle. Jesus said, 'Unless a grain of wheat falls into the earth and dies, it remains just a single grain, but if it dies, it bears much fruit' [John 12 24-26]

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Any further assistance with the Science elements in this project would be greatly appreciated! Please let me know your thoughts.

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'Our hands imbibe like roots, so I place them on what is beautiful in this world'

St Francis of Assisi

10 facts about Bacteria in Soils

1. When natural things die, bacteria move in and **digest** organic material, releasing useful gases and minerals for re-use by plants, air, and other life [**saprobiotic** processes]
2. When they **release energy** from Carbon and Oxygen molecules, one process enables Carbon Dioxide [CO₂] useful for plant and tree growth.
3. Bacteria interact with fungi and hyphae for **symbiotic purposes**: they bring some nutrients and collect others from their host.
4. They interact with root environs to emit **hormones and enzymes** which might prompt the plant to do things beneficial to the plant itself [e.g. take in more ammonia to then convert to nitrogen] - or even prompt the plant to act to repel or resist predators?
5. They prompt roots to produce **nitrogen-fixing** nodules which fuel growth.
6. They respond to inundated or damaged soils to **readjust** oxygen and other gas levels in them
7. produce fluids which **bond soil particles** together into more useable clumps.
8. **On decease**, they leave particles which benefit soil anyway.
9. Some bacteria can **facilitate erosion** of parent-rock granules/crystals.
10. One teaspoon of productive soil may contain may hold between 100 million and 1 billion bacteria.

Fungi – hide their wires?

1. What we think of as toadstools, mushrooms, etc are just the small 'fruit' of complex, underground 'root' systems called **mycorrhizae**.
2. Often, these fungal mycorrhizae take sugars or lipids from plants but, in turn, supply the plant with water and mineral nutrients. **Symbiosis** is the name for this process.
3. Their wire-like systems are especially good at enabling plants to take up the chemical phosphorus, helping transform it into phosphates which the plant can use for roots, shoots and DNA transfer. *[The reds here hint at phosphorous's fiery nature. Fungi and Micro-organisms in soil make it useable by converting it to phosphates]*
4. **Hyphae** are tiny, hair-like forms of mycorrhizae which attach especially around the roots of plants. They can reach into almost-invisible air-pockets and water-drops to help plants and trees to grow better. *[Here, look for tiny 'hairs' on root near base].*
5. Fungus-power can split open lignite, the substance which makes wood so strong. *[A rectangular panel at the base hints at how the mycorrhizae colonise and turn lignite back to soil.]*
6. Research shows how trees may form communities through fungal underground networks. They may communicate using a flow of enzymes, amongst other substances.
7. They evolved in the Cambrian era, like Trilobites pictured here.
8. **Fungi can be friends – but also enemies! Check carefully before handling or eating them.**