

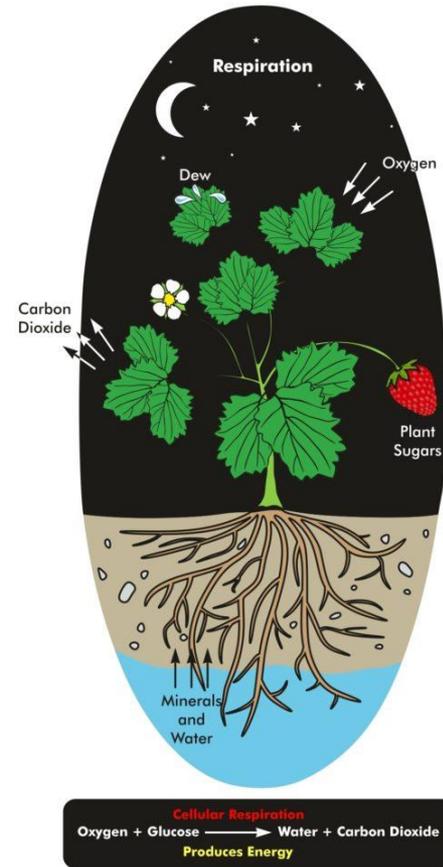


Air

Why Does Soil Need Air?

Air is necessary in the soil because, like water, many living things depend on it to survive!

- Organisms living in soil, like worms and bacteria, need to breathe air.
- Roots also need air to breathe. Without it, plants can't make as much energy for themselves and will eventually die.



Plant respiration [Infographic]. Retrieved from <https://www.science-sparks.com/what-is-respiration/>

How is Soil Aerated?

Air gets into soil similarly to water: it fills up the spaces (the pores) within soil.

- This means that, like water, soils that are very porous have a lot of room for air!
- Likewise, soils that *aren't* very porous *don't* have a lot of room for air.
- If a soil isn't porous but we want to grow a plant in it, we just need to mix in some porous soil, like loam or sand!
 - Decomposers also help air get into soil! Worms, for example, can loosen up the soil and dig tunnels into it that air can travel through.

Based on what you've learned so far about sand, silt, and clay soils...

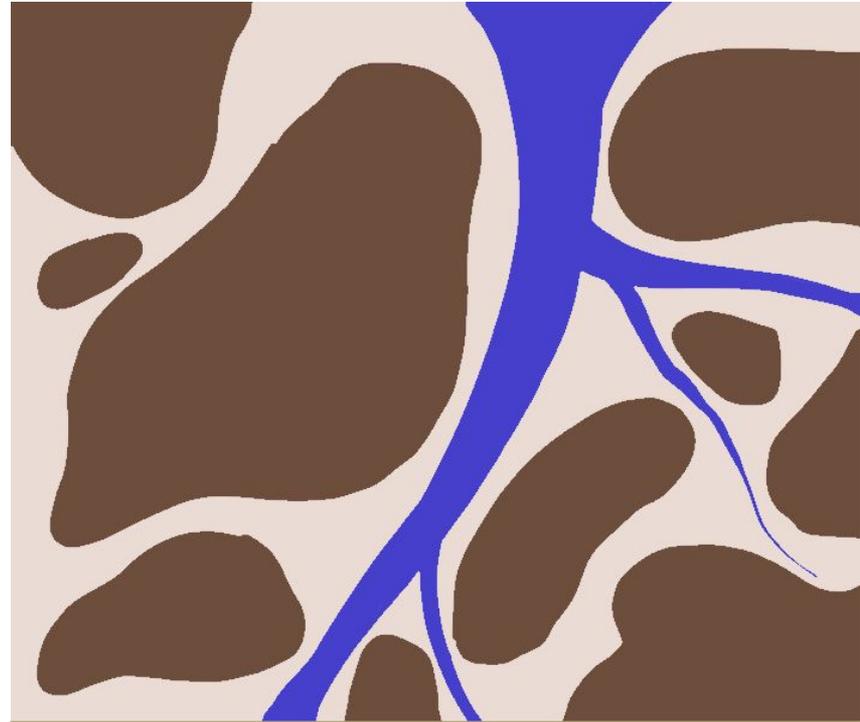
- Which soil would have the most air in it?
- Which soil has the least air in it?



Air & Water: Competing for Space in Soil

So why is it that too much water can be bad for soil health?

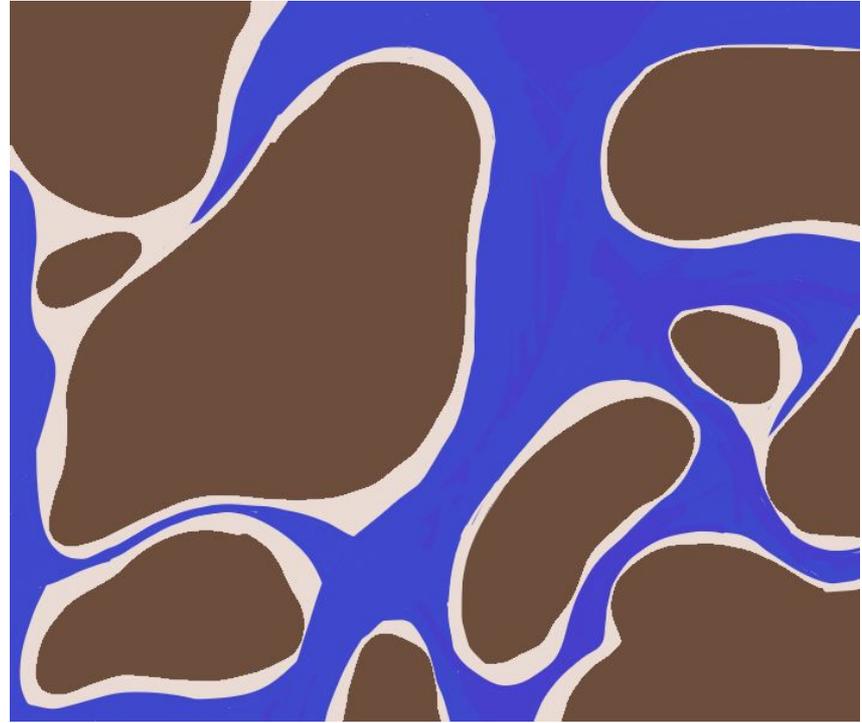
- Water and air both want to live in the same area: the pores of the soil!
- Since water is heavier than air, water can easily shove its way into all the available pores in the soil!
- Without any pores left for air to move into, the soil becomes waterlogged!
 - This doesn't easily happen to sand soil since it's very porous and water easily drains out. But it can and does happen, like at the beach near the tide: the ocean water soaks into the sand and makes it all dense and squishy!



- The **brown** spots in this image are **soil**. The **blue** streams are **water**.
- The empty space around the water and soil are the pores.
- You can see here that there's not too much water taking up the pore space. All that empty space is perfect for air to fill up!

Air & Water: Competing for Space in Soil

- For less porous soils (silt, clay, & loam) which are good at holding water, waterlogged soil can easily happen. This is bad news!
- With no room for air, plant roots and decomposers can't breathe! If the soil is waterlogged long enough, plants and organisms in the soil can drown and die.
- Too much water can also cause plants to get sick! It can cause diseases like root rot.



- Uh oh! It looks like this time too much **water** was poured!
- Now almost all of the pore space is taken up by water. This means there's almost no room for air!
- The soil has become waterlogged!