



Rock Imbibition Phenomenon

Background: What is *imbibition* and how can we observe this phenomenon? Using a core plug sample of sedimentary rock, we can directly observe the imbibition of water by the rock.

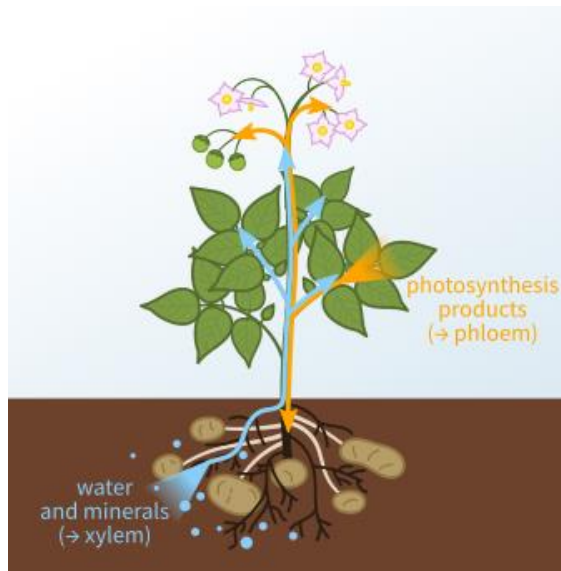
Before we define *imbibition*, let's review physical properties of rocks:

1. We know rocks are composed of grains: minerals, fragments of other rocks (such as sedimentary rocks), and organic components.
2. Empty space exists between these grains in the rock. This empty space is described as *porosity*.
3. Fluids can move through these pore spaces between the grains because there are *throats* that connect the pore spaces to each other. The ease of fluid movement is described as *permeability*.
4. Compared to most igneous and metamorphic rocks, fluids move/migrate through sedimentary rock much more easily, and thus have a higher permeability.

What is Imbibition?

Imbibition is the process by which a substance absorbs or *uptakes* fluids. This occurs due to *capillary action*, driven by the attraction of a fluid to a specific substance. Imbibition of water is commonly seen with plants. The roots of plants are absorbing and pulling water from the soil.

With water imbibition, substances must have an affinity for water (be hydrophilic) in order for this process to occur. The cells in plant roots absorb water because their membrane is hydrophilic. The grains in some sedimentary rocks are hydrophilic.



Source: https://commons.wikimedia.org/wiki/File:Xylem_and_phloem_diagram.svg

For this activity, we are observing imbibition in a rock sample.

- Add a small amount of water to the plastic tray provided.
- Place the sedimentary rock core plug provided in the tray of water.
- Observe what happens to the water in the tray once the core comes in contact with the water.

You have observed the phenomenon of imbibition in rock!



Photo Credit: Sabrina Ewald