

Winogradsky Column: Living Mud

Heads Up!! This activity is long term and will require at least 4-12 weeks to see results

What is a Winogradsky column?

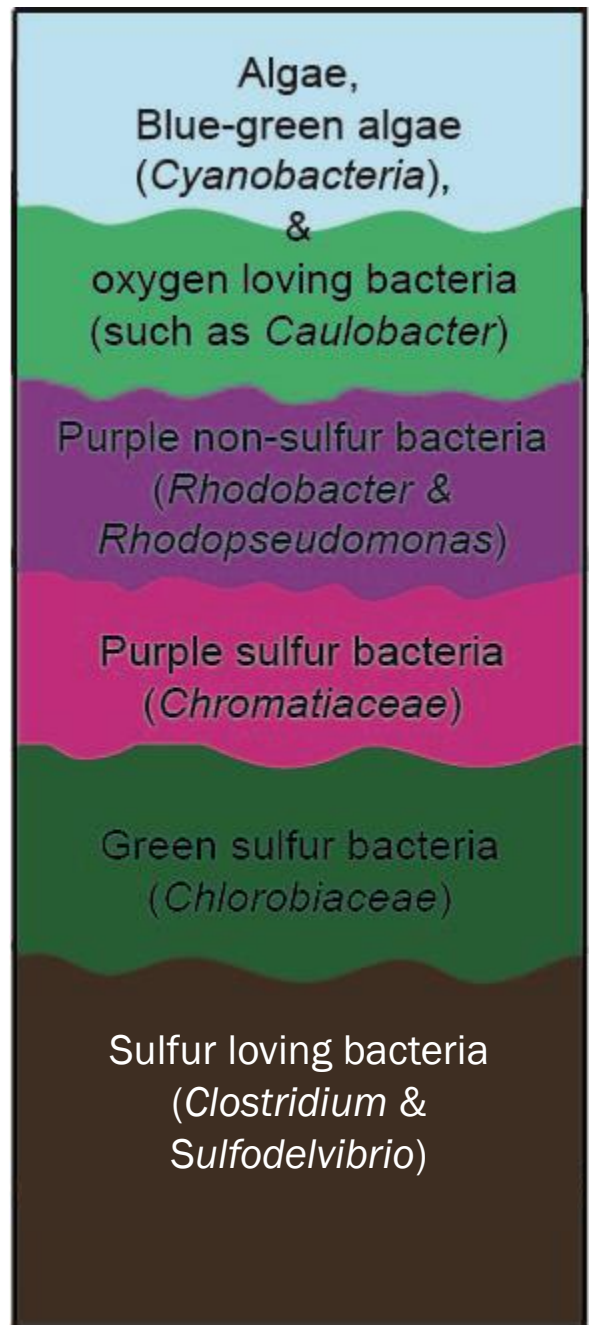
Bacteria are microscopic (teeny tiny) organisms that we normally don't see with our eyes. To live, bacteria need food or nutrients, just like humans. A great source of nutrients for bacteria are the minerals in the soil. Microbiologist, Sergei Winogradsky, invented a way to study the different types of bacteria that live in the soil. His method is called the Winogradsky column, and it turns out it is easy and fun to make at home! With some soil, water, and some other additions, you can grow your own microbial communities. In these communities there will be some algae, fungi, and viruses. But the best part of the community is the bacteria, so remember to **VOTE FOR BACTERIA** in the MEGAMicrobe poll!

How does a Winogradsky column work?

Just like humans, bacteria need to nutrients to grow. However, bacteria can be picky eaters. Some bacteria will only grow when lots of oxygen is present; while, other bacteria think oxygen is like broccoli and will refuse to grow if it gets anywhere near them. Instead, those bacteria prefer to eat sulfur (a chemical found in eggs). If you have ever smelled a rotting egg, the smell comes from the sulfur. In a Winogradsky column, nutrients are spread out in a way that will make the different bacteria in the soil separate (this spreading out of nutrients is called a nutrient gradient). The bacteria that like oxygen will move to the top, where oxygen is most readily available. Meanwhile, bacteria that hate oxygen but love sulfur will move to the bottom.

What do you need to make your own Winogradsky column?

1. A clear cylindrical container (an empty 2-liter soda bottle, empty water bottle, or tennis ball canister would work great!)
2. Some dirt from outside
3. Water (from a lake/pond/river/stream works best. If only tap water is available, let the water sit out for a day so the chlorine can disperse)
4. Leaves, oats, or old newspaper
5. An egg (can be raw or you can get an adult to help you make a hard-boiled egg)
6. Scissors or a knife to cut the top of the bottle off
7. Plastic wrap
8. Rubber band



How do you make a Winogradsky column?

1. At your nearest stream, pond, or lake, collect some water in a container.
2. In a separate container, collect some soil/mud
3. Bring your water and soil home
4. Mix your soil and egg together
5. If using a water or 2 liter bottle, cut the top off so you have a bigger opening to put your materials inside
6. Fill the bottle about $\frac{1}{4}$ of the way with the soil and egg mixture. This mixture will provide lots of sulfur to bacteria because eggs are rich in sulfur.
7. Add more soil/mud to the bottle until it is $\frac{2}{3}$ of the way full
8. Add the stream/pond/lake water almost to the top of the bottle so it fills up about half of the remaining space
9. Cover the column with plastic wrap and secure it in place with a rubber band
10. Set the column in the sunlight or under a lamp
11. Let your column go and watch for changes over the next 4-12 weeks