

A Winogradsky column is a method of growing microorganisms that you can do anywhere if you have some dirt, a jar or bottle, and a few other simple supplies. The microbes separate by layers of different colors based on what conditions they need to grow.

### **What You'll Need to Build Your Winogradsky Column:**

#### **Materials:**

Clear container with lid (water bottle, tennis ball container, mason jar, etc.)

Shovel/spoon

Mixing bowl

Scissors

Plastic wrap

Rubber bands

#### **Ingredients:**

Dirt or mud (collected from outside)

Water (collected from outside or tap water boiled for 10 minutes to remove chlorine)

Egg yolks/boiled egg/egg shells (Sulfur Source)

Shredded newspaper/egg cartons/other cardboard source or Calcium carbonate/chalk (Carbon Source)

#### **Instructions**

1. Draw a line on your bottle about  $\frac{1}{4}$  from the top and another  $\frac{1}{4}$  from the bottom
2. Go outside and collect your dirt, mud, and water samples. If you can't find water from a natural source (we do live in the desert!), boil tap water for 10 minutes to remove the chlorine.
3. In a small bowl, add egg yolk and shells, newspaper or other Carbon source, and dirt. Mix enough to fill  $\frac{1}{4}$  of your bottle.
4. Fill your bottle  $\frac{1}{4}$  of the way (to the line) with the mixture.
5. Add additional dirt on top to fill  $\frac{3}{4}$  of the bottle (to the top line).
6. Add dechlorinated or natural water to the top. Leave a some amount of air space at the top.
7. Cover the column with plastic wrap and a rubber band. Do not put on a tight lid, because the gases released by the microbes may cause it to break open.

8. Set in sunlight at a window and observe the changes. Feel free to experiment. What happens if you face one side towards the sunlight and the other you cover in tin foil? What grows if you store one in the dark and one in the light? What happens if you add more sulfur source, less sulfur, add old coins, or a decomposable straw to your column.

Remember it will take about 2 weeks to see any changes, and 6-8 weeks for the column to settle into a stable state. Add more water if the water starts to evaporate.

### **References:**

Anderson, Delia Castro, and Rosalina V Hairston. "The Winogradsky Column & Biofilms: Models for Teaching Nutrient Cycling & Succession in an Ecosystem." *The American biology teacher* 61.6 (1999): 453–459.

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Suter, Elizabeth. *Creating a Winogradsky Column: A Method to Enrich the Microbial Species in a Sediment Sample*. Cambridge, MA: MyJoVE Corp, 2016.