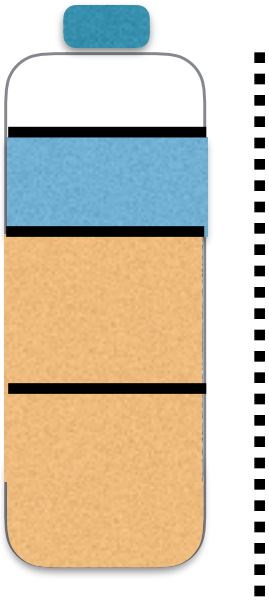
Winogradsky Column Protocol

1. Measure the column to the bottom of the cap (see dashed line). Use centimeters!



How tall is the column: _____ cm

Draw a line on your column 1/3 and 2/3 of the way up.

2. Fill column to 1/3 line with the **sediment with the special ingredient**. **Use a funnel to help you fill!**

3. Fill column the rest of the way with sediment to the 2/3 line. Tap the bottle on the lab bench to settle the sediment.

4. Now you need water — but you still need to leave enough air in the column for the aerobic microbes.

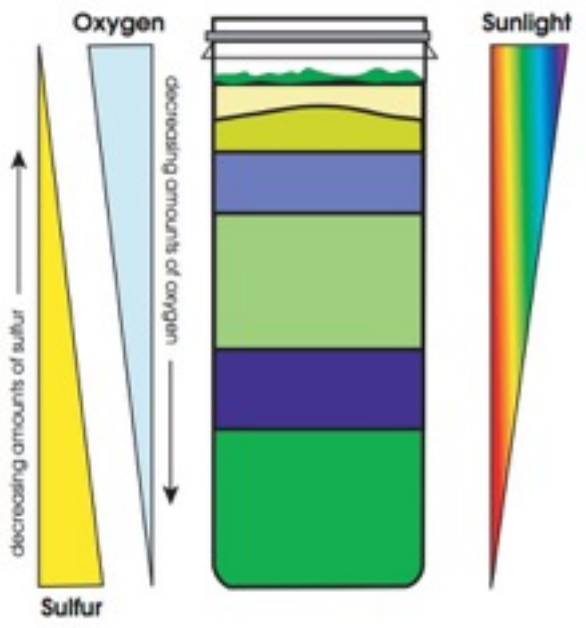
Measure the remaining space and divide in half — mark this line.

5. Add water to your column up to that line.

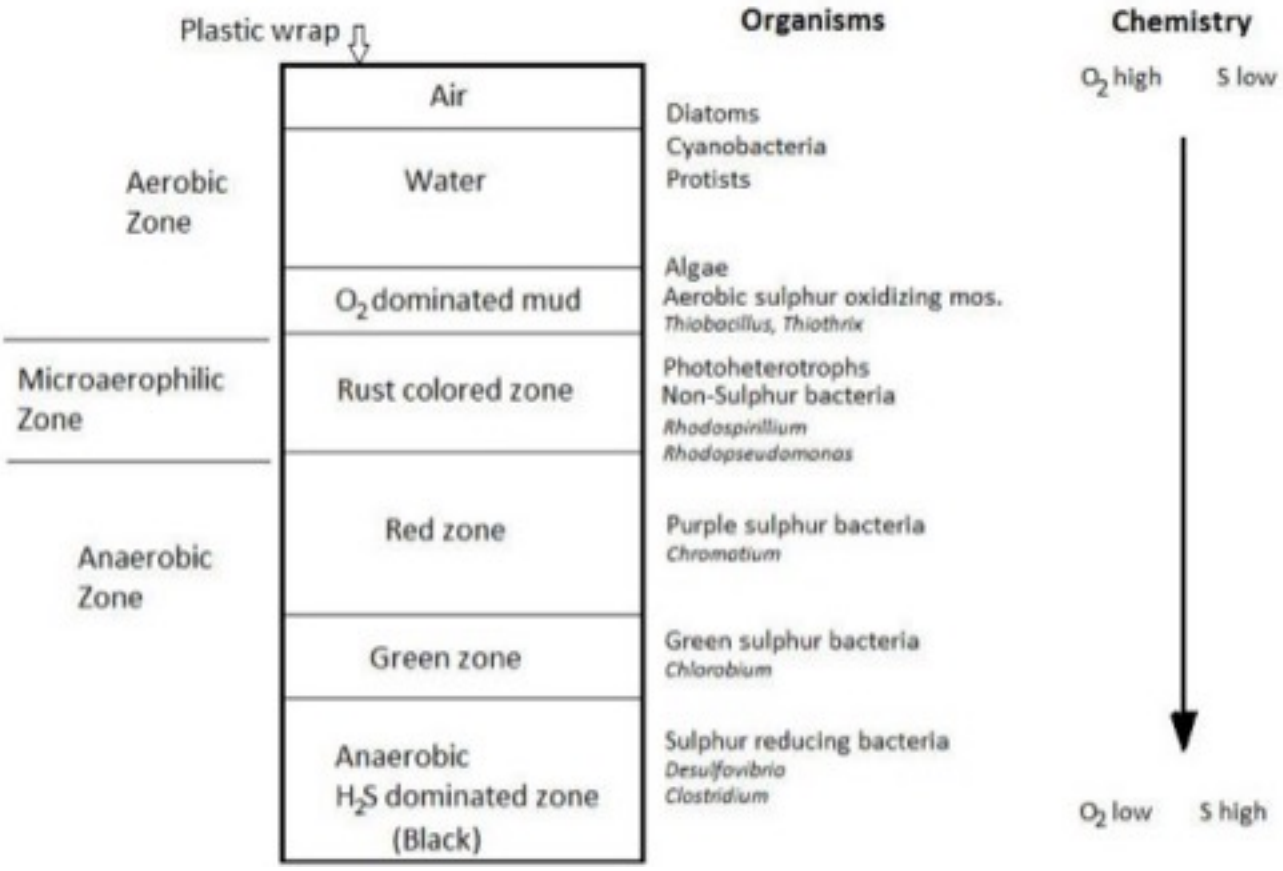
6. Cap the bottle, leaving the cap slightly loose. If your bottle does not have a cap, cover it with plastic wrap and tape it to seal.

7. Take a photo of the bottle to record its appearance.

8. Measure & describe the sediment, water and air. Count air bubbles & measure the 10 largest. Look for the presence of animals (worms, snails, larvae)



The Winogradsky Column



Name:

Ingredient:

Follow the Winogradsky Column protocol to set up your column.

1. **Background (your sediment / water): Write down three facts about the microbial communities in soil / water**
   - **1.1**
   - **1.2**
   - **1.3**

2. **Background (your ingredient) (Y/N):**
   - **2.1 Can microbes use your ingredient as food?**
   - **2.2 If yes, is this food easy or hard to decompose?**
   - **2.3 Can your ingredient inhibit microbes?**

Winogradsky Column Protocol

3. **Predictions: Our hypothesis is that sediment chemistry affects the microbial community, including what can grow and how much respiration there will be.**

3.1 If the hypothesis is correct, **what do you predict** will happen to each of the following microbial communities compared to the control? Will the zone be bigger or smaller?

(green zone 1)	Aerobic photosynthetic microbes:
(purple zone)	Purple sulfur bacteria:
(green zone 2)	Green sulfur bacteria:
(black zone)	Sulfur-reducing bacteria

3.2 WHY did you make these predictions?

3.3 If the hypothesis is correct, **what do you predict** will happen to the respiration of the overall microbial community (indicated by the number of bubbles formed)?

4. **Results (complete after recording September data):**

Were your predictions supported? Why or why not? Was anything surprising about the results?

Winogradsky Column Protocol

Week 0 (date =)	Week 1 (date =)	Week ___ (date =)

Table of observations. Measure any layers in the sediment and water (**use cm**!). **Describe** colors of layers. Loosen the bottle caps, smell the column, and **describe** any odors. **Count** the air bubbles present in the soil (on your line). **Count** the number of air bubbles that come to the surface of the water in **1 minute**. **Measure** the largest 10 bubbles (if there are any).

Winogradsky Column Protocol

Draw your column:

Week 0 Week 1 Week ___ (date):