

## Instructions for Making the Modified Winogradsky Columns

### Teacher will need to supply:

- one 16–17 oz. plastic drinking water bottle **per team (e.g., 6 teams = 6 bottles)**
- water from a pond, stream, or creek
- soil from the same water source
- 2 containers for collecting water and soil/mud
- small bowl for mixing
- 3–4 boiled egg yolks
- scissors
- newspaper or other paper source

### Materials provided:

- 1 trowel
- black marker
- disposable gloves
- measuring cup
- paper plates
- adjustable lamp with bulb
- plastic covers
- rubber bands
- wide stick (for packing soil)

### Setup

1. Using gloves and the trowel, collect a container of water from either a pond, stream, or creek (you will need 1½ cups per bottle) and a container of soil or mud from the same source (¼ cup per bottle); it's a good idea to have extra soil and extra water.
2. Remove the wrapper/label from the water bottle. Use scissors to cut off the top of the bottle where the bottle begins to slope.



### Procedure

1. On a paper plate, prepare the soil /mud by removing any rocks, clumps, sticks, etc.
2. On another plate, mash the egg yolks.

3. Cut or tear the newspaper into small pieces.



4. Pour  $\frac{1}{4}$  cup of the prepared soil into the bowl.
5. Mix 1 teaspoon of the mashed egg yolk (source of sulfur) and a small amount of the torn paper (cellulose, a source of carbon) to the soil. If the soil is dry, add a small amount of the source water to moisten it.



6. Place mixture into the bottle and use the wide stick to tamp down the mud and force out any trapped air.
7. Add  $1\frac{1}{2}$  cups of the source water to the bottle. Cover the top of the bottle with the plastic cup wrapper, and secure with the rubber band.



8. **Repeat steps 6–9 for each bottle.**
9. Place the bottles together in a designated area where the lamp can be positioned about 18–24 inches above the bottles.

10. The soil will settle out and you should begin to see changes in layering and color within 5–7 days.

**IMPORTANT: Remember NOT to reveal the contents of the bottle until Day 7!** Learners will make daily observations through Day 12.