PREPARE TO TEACH

SET UP STATION MATERIALS

- ☐ Bring bins (limnology and WQ) up on deck. Keep everything in bins. Alert lead instructor if materials are missing or broken.
- ☐ Bring Van Dorn bottle and storage rack on deck, and locate line for the Van Dorn bottle. Check to make sure everything is in good working order. Secure bottle to line & ship with BOWLINE.
- ☐ Make sure limnology kit is on deck and fully stocked.
- ☐ Setup datasheet with your name, date, time, and location. Review datasheet directions.
- ☐ Gather index card, pencils, and logbooks for students. Smile!

PURPOSE

At this station we will assess lake health by looking for a supportive habitat.
ASK: What is the temperature, where? Is there enough DO to support **a wide variety of organisms**?

CONNECTION TO LAKE HEALTH

When water quality is high a wide diversity of living organisms can thrive, including humans. Dissolved Oxygen (DO) is necessary for all consumers and can be used as an indirect indicator of pollutants. Temperature will dictate where certain organisms live and cue life-cycle phases. Temperature, dissolved oxygen, (and pH) are the most fundamental measures of water quality.

SAMPLE COLLECTION

Pre-sampling discussion (2 min)

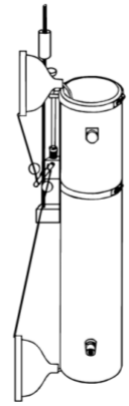
1. **Is the water supportive?**
   → Can it support a wide variety of life?
2. **What would make the water uncomfortable for life?**
   Pollutants *Not enough oxygen*
   The wrong temp *Harmful bacteria*
   The wrong amounts of nutrients
3. **Who needs healthy, supportive water?**
   → All organisms:
   → Humans, turtles, fish, eagles, etc…

COLLECTING THE SSAMPLE

The Van Dorn bottle (7 min)

How will we collect water from any depth?

✓ Valves closed
✓ Path clear for messenger
✓ Attach messenger over deck



→ **Blue** @ boat
Red @25 & 75 ft
Green @50 feet

→ **50-60 ft** *(IS)*
60-70 ft (*Man)*

→ At least 5 feet from the bottom

Prepare the sample (5 min)

Wear goggles!

1. **Take Temp**

Predict: Colder or warmer than the surface?

2. **DO**

A. **Overflow** bottle with water
→ No bubbles
B. Add #1 then #2 to **TRAP** the oxygen
C. Stopper
D. Invert to mix

Prep for peer teaching! (3 min)
Student should talk about:

- ☐ **Sampling info in logbook**
- ☐ **How to use Van Dorn bottle**
- ☐ **What we will do with the water**
- ☐ **Importance of water quality**

TEACHING THE STATION

INTRO (2 min)

Will the water support a wide diversity of life?

How **comfortable** is the water for living things?

Is there evidence of pollutants?
- Low DO, Oxygen being used up

PERFORM CHEMICAL TESTS (12 min)

Temperature – *compare surface to deep water*

Surface temp.

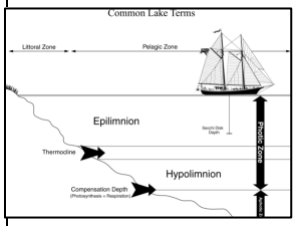
Same, Different? WHY?

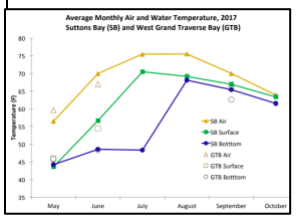
Deep temp.

PONDER:

→ Will it stay this temp?

→ What could heat up the water?





ANALYZE:

→ Is this temp. "normal"?
**Seasonal*
**Solubility*

→ What evidence do you have?

Ecosystem connection: Warmer water = higher metabolism = consumer needs **more food & <u>oxygen</u>**
<u>Cooler water HOLDS more Dissolved Oxygen</u>

Dissolved Oxygen → ADD Chemical #3 before Learning Rotations start

1. Target:

To support the widest **diversity** of life

2. Measure 10 mL

→ Add to reactor vessel

3. Add sodium thiosulfate

→ Count drops!

→ Swirl after every drop

→ Stop when PALE YELLOW

4. Add 2 drops starch

5. Continue…

→ Count drops!

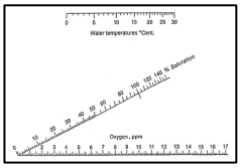
→ Swirl after every drop

→ Stop when CLEAR

 # drops = ppm DO

Humans require 195,000 ppm O_2

6. Is there enough DO?
- Compare to how much it could hold (temperature, nomagram)
- Low DO usually means something is **<u>consuming the oxygen</u>**.
- ***Excessive nutrients*** entering the lake encourage **algal blooms**, which leads to **more decomposition**, a process that consumes Oxygen.



LAST 3 min

What does our sample tell us?	**Temperature**	**Dissolved Oxygen**	**Habitat**
	"Normal" for this time of year?	↑ temp. = ↓ DO >5ppm DO?	DO & temp impact growth & reproduction

<u>BETWEEN GROUPS</u>:
→ Dump all chemicals in the waste container.
→ Rinse all equipment with fresh water

CLEAN UP

- ☐ Empty waste in the sink.
- ☐ Rinse all containers.
- ☐ Place everything neatly back into the Water Quality bin.
- ☐ Give your completed datasheet to the Lead instructor.
- ☐ DRY off, or leave open.
- ☐ Disinfect and wipe goggles.
- ☐ Refill squeeze bottles with water.

WATER QUALITY STATION - QUICK GUIDE

Next-Gen Schoolship
Inland Seas Education Association

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