Water Quality B

Science Olympiad 2020

CRWC

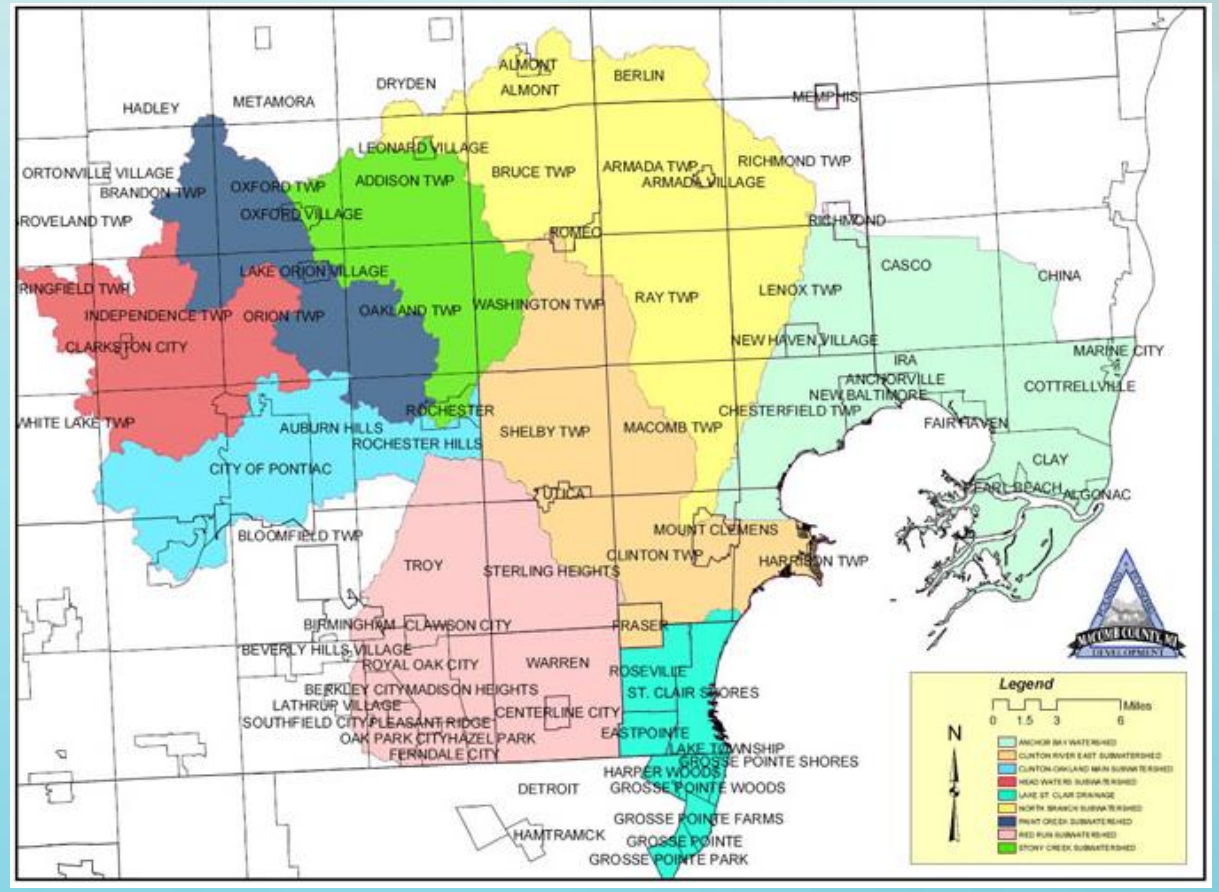
CRWC

- Non-profit organization
- Funded through local government membership dues, private contributions and grants
- Members include individuals, businesses, local governments and community organizations
- 8 staff working in 3 program areas:
  - **Education**
  - **Stewardship**
  - **Watershed Management**

the CLINTON RIVER WATERSHED

"The Clinton River is one of the 7 environmental wonders of southeast Michigan"
-- Model D Media

- Four counties – Lapeer, St. Clair, Oakland, Macomb
- 63 communities within the watershed
- 7 subwatersheds
- 12 additional Lake St. Clair direct drainage communities
- 760 Square Miles
- 1.5 million people



WATER QUALITY

in the Clinton River Watershed

- Current Water Quality Problems:
  - Bacterial contamination from sewer overflows and failing septic systems
  - Persistent contaminated sediments from before the clean water act
  - But what is the single greatest source of impairments in the Clinton River?

STORMWATER POLLUTION!

What is STORMWATER POLLUTION?

When it rains on impervious surfaces, it picks up pollutants

These pollutants are carried by this stormwater runoff to our drainage systems and eventually end up in our waterways.

Common Stormwater Pollutants

- Lawn fertilizers
- Pesticides
- Runoff from driveways, rooftops, sidewalks
- Lawn clippings and leaves
- Soil
- Septic effluent
- Geese and other types of wildlife droppings
- Boat by-products (oil, gas, cleaning products)

WHAT CAN WE DO

To prevent stormwater pollution?

- What to bring
- Test Format
- Topic breakdown
- Tips/Tricks for building a salinometer
- Recommended Study tips
- Questions

TEST OVERVIEW

What to expect, and how to prepare for the Water Quality portion of the Science Olympiad.

What each team should bring

- HOMEMADE Salinometer or Hydrometer
  - This should be calibrated for measuring the salinity of a solution between 1-10%
- Eye protection for each individual (Category C) soinc.org/eye-protection
- 2 non-graphing, non-programmable calculators
- Writing utensils
- One 8.5” x 11” cheat sheet
  - If in a sheet protector, it must be sealed with tape
  - Both sides may be used

Test Format

Four Sections

- Marine and Estuary Ecology
- Coral Reef Macroflora and Fauna Identification
- Water Monitoring and Analysis
- Salinometer Testing

Question format includes

- Multiple Choice
- Matching
- Fill in the blank

Students will get 40 minutes to complete the exam. The first 10 minutes of the period will be used for instruction and time for teams to calibrate their salinometer If needed. *(note: only calibration solutions of 0% and 10% will be provided)*

Found here:

https://www.soinc.org/water-quality-b

HINT

Study the provided internet resources!

Part I. Marine and Estuary Ecology- 30% of total score

- This portion will consist of multiple choice questions only
- Aquatic ecology, (coral reef/estuarine), community interactions, recently killed coral
- Interpretation of charts, food webs, and/or graphs

Part II. Coral Reef Macroflora and Fauna Identification- 30% of total score

- This portion will consist of flora and fauna identification
- Students are expected to know common name and region found
  - Global, Atlantic, Indo-Pacific
- See handout and Water Quality Description for list of organisms.
- In addition to the identification, there will be 5 questions on general coral reef ecology.

The *types* of images teams can expect to see:

Part III. Water Monitoring and Analysis – 30% of total score

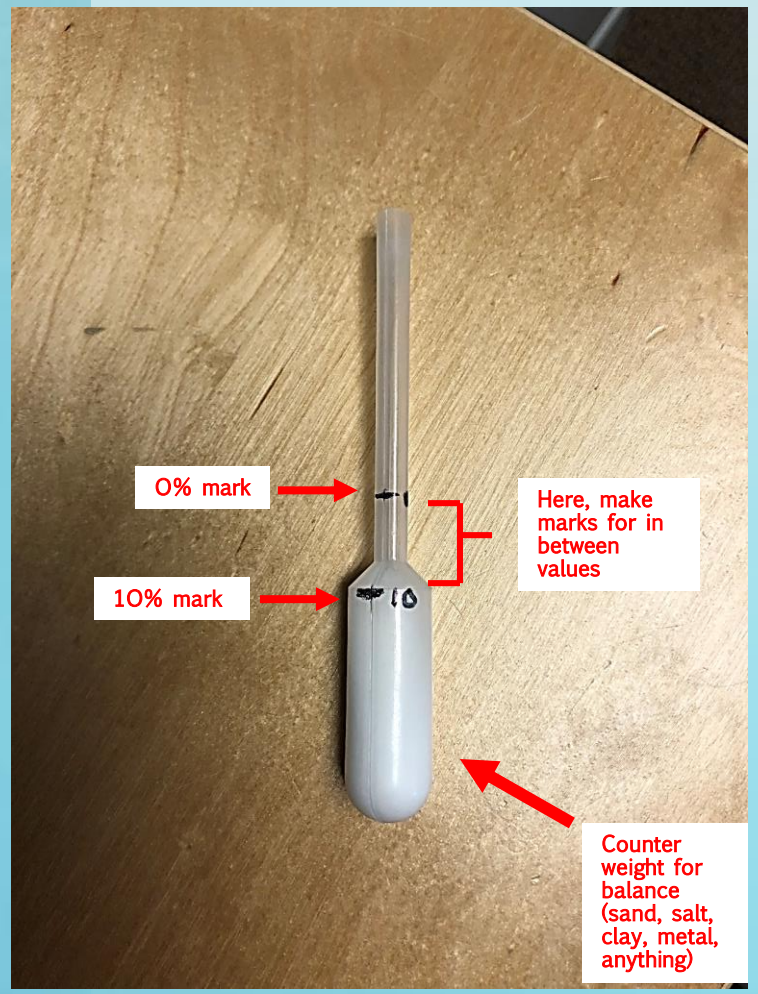
- This portion will consist of matching and fill in the blank
- No physical laboratory tests in this portion
- Know definitions, implications, and testing procedures
  - Salinity, turbidity, depth, phosphates, oxygen, temperature, nitrates, fecal coliform, total solids, BOD, dissolved oxygen, aragonite saturation, etc.

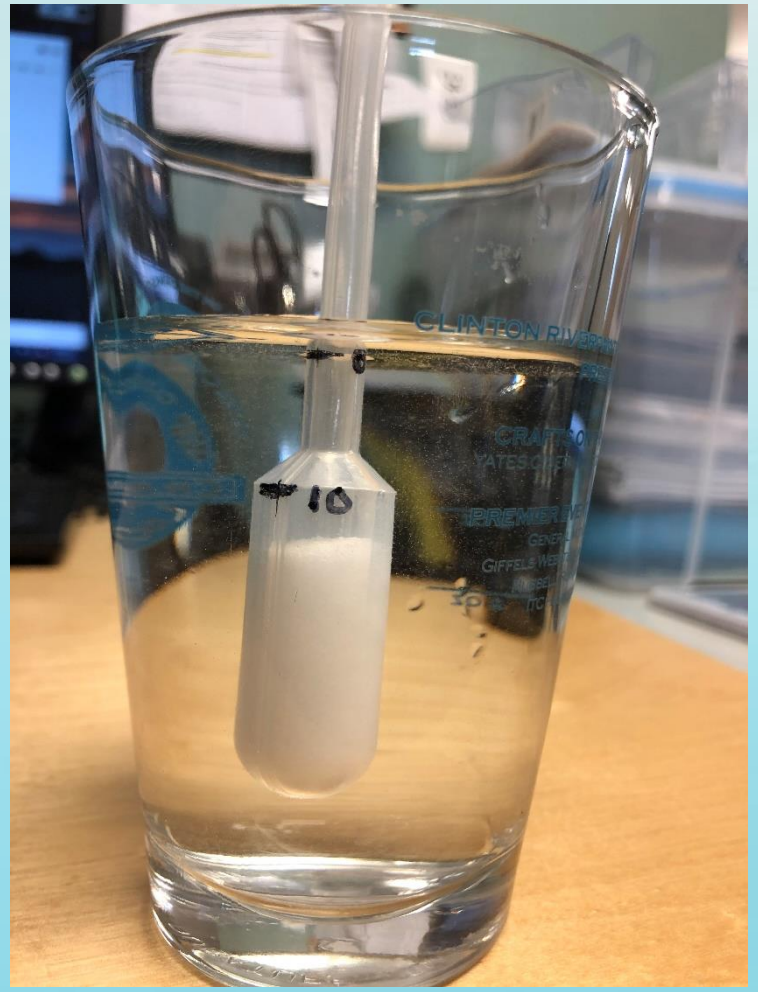
Part IV. Salinometer Testing- 10% of total score

- Calibration solutions of 0% and 10% will be provided on site.
- Must be built to operate within a 400mL – 600mL beaker, at least 400mL of water
- Must measure within ±1% of actual solution for full credit.
- Points for bringing a homemade salinometer will account for 5% of the total score.
- Points for an accurate measurement will account for 5%of the total test score.
- All solutions will be made using distilled water at room temperature.

Hint: Try using a pipet or eyedropper with added weight instead of a straw and clay.

Tips/Tricks for Building a Salinometer



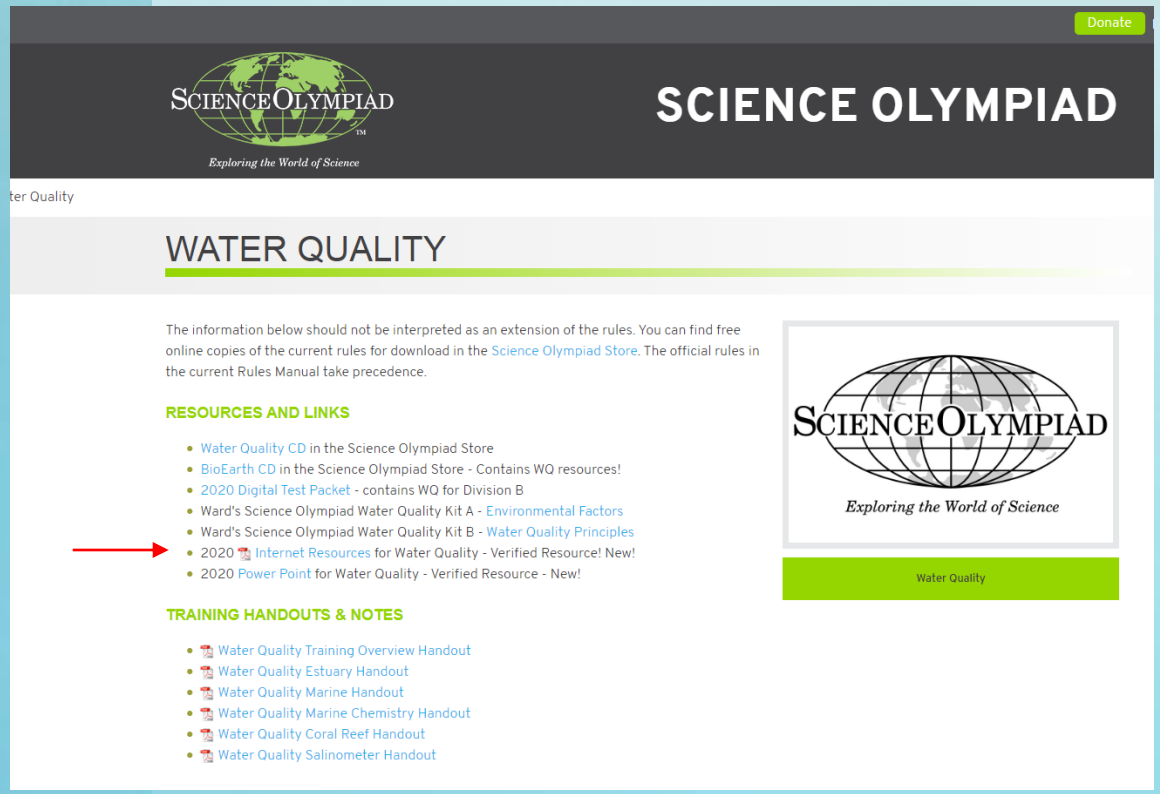


1. Add weight/trim pipet until it floats upright
2. Mark 0%
3. Create saline solutions to calibrate your salinometer – 0% and 10% will be provided at the event for students to check that their salinometer is accurate
4. Mark your salinometer accordingly.

Tie Breaker…

- 3 questions from the test will be examined in the event of a tie. The decimal method will then be used. An additional 0.1 pts will be awarded for each correct tiebreaker.
- These questions will be pre selected and documented on the exam as a tiebreaker.
- For example, Teams A and B both score 92 points.
  - The first tiebreaker is examined, Team A answered correctly and Team B did not. Team A is awarded an additional 0.1 points. Team A then has 92.1 points and Team B has 92 points. Team A wins the tie.
  - The second and third tiebreaker questions will only be examined if necessary.

Recommended Study Tips



- Review the **internet resources** provided on the Science Olympiad Website. https://www.soinc.org/water-quality-b
  - Study Lectures by Mr. Van Arsedale Online Textbook. Some questions were sourced from these.
  - Some questions were adapted from the practice exam.
- Make flash cards of macroflora and fauna with their image/name and region
- Create a personalized study guide based on the hand outs.
- Have team members design tests, and give them to each other-timed.
- Practice using the salinometer/hydrometer.

Questions?

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