



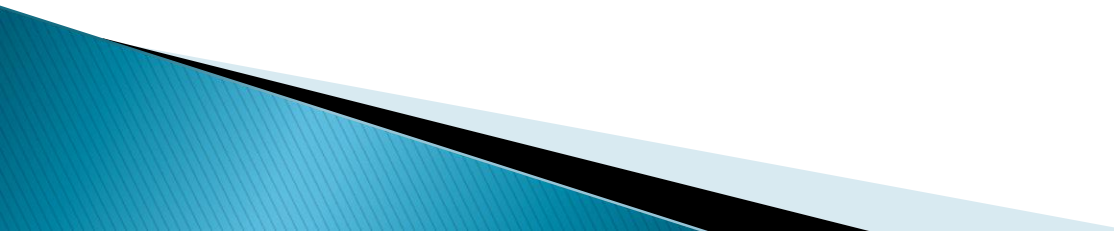
Water Quality C

Macomb Science Olympiad Extravaganza
09 January 2014
John Takle, CHMM

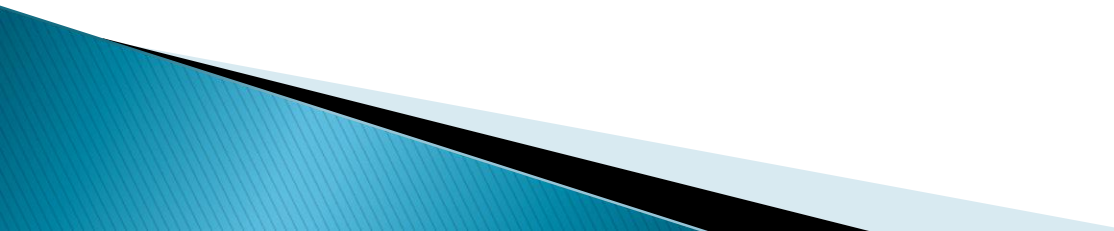
The Basics

- ▶ Supervisor introduction
- ▶ Event will focus on content knowledge / process skills in the evaluation of aquatic environments
 - utilize estuary and **marine** scenarios and have students analyze and evaluate comparative ~~macroinvertebrates~~ **indicator organisms** and water quality data.
- ▶ Three segments
 - Estuary and Marine Water Quality Information
 - Coral Reef Ecology
 - Water Monitoring and Analysis

Question Format

- ▶ Inquiry-based competition to emphasize process skills and mental challenges using suggested content.
 - Multiple-choice, matching, and fill-in answers.
 - Answer sheets.
 - Essay questions will be used as tie-breakers
 - ▶ Data assessments and interpretations
 - Graphs, food webs, ecological pyramids, life patterns, sampling & population densities, etc.
 - ▶ Process skills:
 - Defining variables, forming hypotheses, making calculations and predictions, etc.
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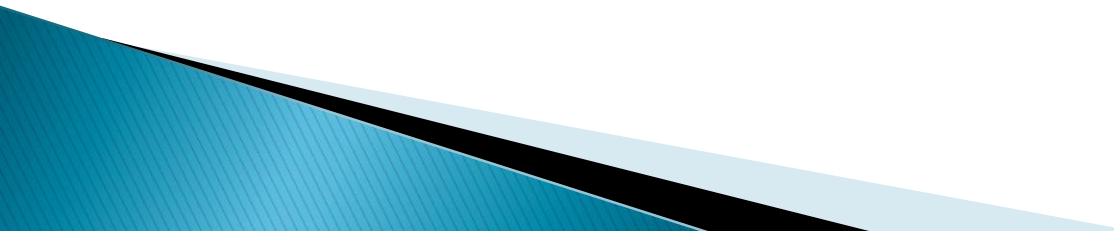
What to bring...

- ▶ Each team is to bring one (1) STUDENT-BUILT salinometer / hydrometer for testing.
 - ▶ Up to two (2) non-programmable, non-graphing calculators.
 - ▶ Z87 chemical splash goggles for EACH participant.
 - ▶ Pencils and erasers.
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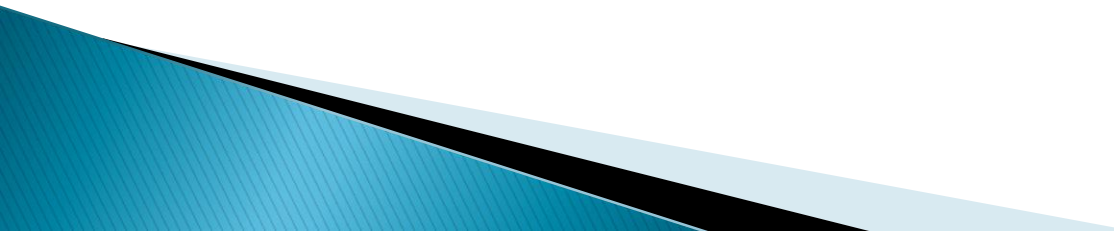
Water Quality Information (Ecological Principles to Estuaries & Marine)

- ▶ Aquatic ecology
 - ▶ Water cycle
 - ▶ Nutrient cycling
 - ▶ Aquatic chemistry and its implications
 - ▶ Potable water treatment
 - ▶ Aquatic food chains and webs
 - ▶ Community interactions
 - ▶ Population dynamics
 - ▶ Watershed resource management issues
 - ▶ Sedimentation pollution
 - ▶ Nuisance / invasive species
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Coral Reef Ecology

- ▶ Coral reef biology
 - ▶ Growth and reproduction
 - ▶ Zooanthellae
 - ▶ Reef fish communities
 - ▶ Reef ecosystems
 - ▶ Health indicators
 - ▶ The importance of coral reefs
 - ▶ Problems associated with pollution
 - ▶ Reef system management
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Process Skills

- ▶ Equipment use
 - ▶ Collecting and interpreting data
 - ▶ Measurements
 - ▶ Calculations
 - ▶ Classifying
 - ▶ Interferences
 - ▶ Variable analysis.
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Chemical Analysis

- ▶ Understand what the chemical is, how it is tested, and explain why it is important to water quality.
 - Salinity (only actual testing with salinometer)
 - pH
 - Dissolved oxygen (DO)
 - Temperature
 - Nitrates and Phosphates
 - Fecal coliforms
 - Total solids (total residue) and Turbidity
 - Biochemical Oxygen Demand (BOD)
 - Aragonite Saturation (NEW – for marine, esp. coral reefs)
- ▶ Use of case studies to showcase knowledge of potential human-caused problems and the types of chemical testing that would be performed to confirm suspected sources and types.

Resources!

- ▶ Science Olympiad webpage for Water Quality:
 - http://soinc.org/water_quality_c
 - Rules, training handouts for students, etc.
 - Links to websites for EPA, NOAA, etc.
 - Instructions for constructing a simple Salinometer.

- ▶ Scioly wiki for Water Quality Science Olympiad Student Center:
 - <http://scioly.org/wiki/index.php>
 - Forums and examples of past Water Quality tests.

QUESTIONS??

- ▶ John Takle
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