

1. **DESCRIPTION:** The event will focus on the evaluation and understanding of aquatic environments.

**A TEAM OF UP TO:** 2

**EYE PROTECTION:** #4

**APPROXIMATE TIME:** 50 Minutes

2. **EVENT PARAMETERS:** Each team may bring one 8.5" x 11" two-sided page of notes that may contain information in any form from any source, **one student built salinometer/hydrometer for testing** and up to 2 non-programmable, non-graphing calculators. Each participant must bring Z87 chemical splash goggles.
3. **THE COMPETITION:** This event will be composed of three sections of approximately equal point value. This may include analysis, interpretation or use of charts, graphs and sample data. Supervisors are expected to utilize estuary and **marine** scenarios and have students analyze and evaluate comparative macroinvertebrates and water quality data. Process skills may include equipment use, collecting and interpreting data, measuring, analyzing data, and making inferences.
  - a. This section will use multiple choice, matching, fill-in-the-blank and/or short answers in areas such as: aquatic ecology, water cycle, nutrient cycling, aquatic chemistry and its implications for life, potable water treatment, waste water treatment, aquatic food chains/webs, community interactions, population dynamics, watershed resource management issues, sedimentation pollution and harmful species.
  - b. This section will examine **coral reefs** and **the ecological factors that have harmful effects on reef ecosystems. It will also include the identification (common name only) of Coral Reef organisms and their importance as indicators of reef health. In addition teams are expected to know the general ecology, life cycles, and feeding habits of all listed organisms:**

Global	Global	Indo-Pacific region only
Banded coral shrimp ( <i>Stenopus hispidus</i> )	Long-spined black sea urchins ( <i>Diadema</i> spp.)	Barramundi cod ( <i>Cromileptes altivelis</i> )
Butterfly fish ( <i>Chaetodon</i> spp.)	Parrotfish (>20 cm) (Scaridae or Scarinae)	Bumphead parrotfish ( <i>Bolbometopon muricatum</i> )
Crown of thorns starfish ( <i>Acanthaster planci</i> )	Pencil urchin	Humphead wrasse ( <i>Cheilinus undulatus</i> )
Fleshy algae	Recently killed coral	Giant clams ( <i>Tridacna</i> spp.)
Grouper >30 cm (Serranidae, Epinephelinae)	Snapper (Lutjanidae)	Sea Cucumber
Hard coral	Sponge	<b>Atlantic region only</b>
Lobster	Sweetlips - (Haemulidae <i>Plectorhinchus</i> spp.)	Flamingo Tongue Snail ( <i>Cyphoma gibbosum</i> )
Morey eel (Muraenidae)	Triton ( <i>Charonia</i> spp.)	Nassau grouper ( <i>Epinephelus striatus</i> )
<b>Note: spp.is abbr for multiple species</b>		Gorgonia

- c. Water Monitoring and Analysis Section - Students are expected to understand and interpret data related to testing procedures and purposes for collecting data related to salinity, pH, phosphates, turbidity dissolved oxygen, temperature, nitrates, fecal coliform, total solids, biochemical oxygen demand **and aragonite saturation** and their relationship to one another. **The water quality index used for freshwater ecosystems does not apply to estuaries and marine ecosystems.** Actual testing will be limited to salinity. Teams must build, calibrate, bring and demonstrate a salinometer/hydrometer capable of measuring saltwater (most likely NaCl) concentrations between 1-10% (mass/volume). There are no restrictions except that the team must build the device. Teams should be able to estimate percent to the nearest tenth. Full credit will most likely be given  $\pm 1$  at Regionals and  $\pm 0.5$  at State/Nationals. Points for salinity testing should be approximately 5% of the total score. The presence of calibration solutions is up to the event supervisor.
4. **SCORING:** Questions will be assigned point values. Students will be ranked from highest to lowest score. Ties will be broken by pre-determined tiebreaker questions.

**Recommended Resources:** All reference and training resources including the **Water Quality/Marine and Estuary CD (WQCD)** and the **Bio/Earth CD (BECD)** are available on the Official Science Olympiad Store or Website at [www.soinc.org](http://www.soinc.org)