

Read the General Rules in the manuals and on www.soinc.org as they apply to every event.

1. **DESCRIPTION:** Students will use process skills to complete tasks related to **Earth's fresh waters**.

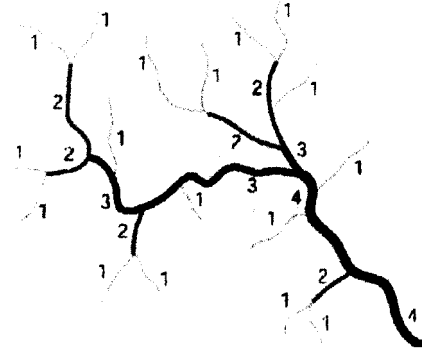
A TEAM OF UP TO: 2

APPROXIMATE TIME: 50 minutes

2. **EVENT PARAMETERS:** Each team may bring four 8.5" x 11" double-sided pages of notes containing information in any form from any source and bring up to two non-graphing calculators.

3. **THE COMPETITION:** Participants will be presented with one or more tasks, many requiring the use of process skills (i.e., observing, classifying, measuring, inferring, predicting, communicating, and using number relationships) from the following topics:

- a. Interpretation of fresh water features shown on USGS topographic maps
- b. Stream drainage systems: **stream order**, drainage patterns, main channel, tributaries and watersheds
- c. Channel types: braided, meandering, straight **and calculations of sinuosity**
- d. Sediment: weathering, erosion, forms and sizes, transportation, deposition
- e. River valley forms and processes: geology, gradient, base level, floodplain features, dynamic equilibrium, nick points, waterfalls, stream capture, deltas and fans
- f. Perennial and intermittent stream flow, stream gauging and monitoring, stream flow calculations, discharge, load, floods, recurrence intervals, (Division C only: Chezy and Manning equations)
- g. Groundwater: zone of aeration, zone of saturation, water table, porosity, permeability, aquifers, confining beds, hydraulic gradient, water table contour lines, flow lines, capillarity, recharge and discharge **and interactions between surface and groundwater**
- h. Karst features: sinkholes, solution valleys, springs, disappearing streams, caves
- i. Lake formation and types: faulting, rifting, volcanic action, glaciation, damming of rivers, changes over time
- j. Lake features: inflow and outflow, physical and chemical properties, stratification, shorelines, waves
- k. Wetlands: interactions between surface and groundwater **in the evolution of bogs and marshes**
- l. Destruction/Effects of land use changes, dams and levees: sedimentation, down-cutting, diversion of water, flooding, ecological changes
- m. Hydrologic cycle and water budgets: precipitation, runoff, evaporation
- n. Pollution: types, sources, transport



4. **REPRESENTATIVE TASKS:**

- a. Analyze and interpret features and actions of a stream or river appearing on a topographic map including watershed boundaries, elevation, gradient, direction of flow, drainage pattern, valley shapes, erosional landscapes, and depositional features
- b. Construct a water table contour map and indicate the direction of groundwater movement
- c. Analyze data on the thermal structure of a lake and determine how the stratification changes seasonally

5. **SCORING:** Points will be awarded for the quality and accuracy of responses. Ties will be broken by the accuracy and/or quality of answers to pre-selected questions.

Recommended Resources: All reference and training resources including the **Bio/Earth CD** are available on the Official Science Olympiad Store or Website at <http://www.soinc.org>.

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Dynamic Planet- The Earth's Fresh Water 2012

Each team may bring in 4 double sided 8.5" x 11" pages of notes. This is an indication that the topic is vast and that students need to be prepared.

I plan to have a station-to-station test. Currently the plan is to have 5 stations with 8 or 9 minutes at each station. At the end of the time interval, students will hand in each station answer sheet. There will be enough work at each station for 2 students to complete.

I am hoping to have a map activity, an essay question, and a variety of other types of questions/activities to be completed. The selections that are in bold print on the event description will be a priority for the event.

The general guidelines for this event give the backbone for the exam. For example, it lists lake types and formation so students need to know the different types of lakes as well as how different types of lakes are formed.

Here is a sample question: In a stratified eutrophic lake, what happens to the oxygen content of the hypolimnion as the summer progresses?

Absolutely no cell phones or parents/coaches are allowed in the room before, during, or after the competition. Students do need to bring pencils and be prepared.

Science Olympiad is a premier science competition that provides students with knowledge, problem-solving skills, and opportunity.

cannot go back to stations
no parents allowed in room