

Hydrogeology Trial Event

1. **DESCRIPTION:** Students will manipulate a groundwater computer model, answer questions about groundwater concepts, and evaluate solutions, based on hydrogeological evidence, to reduce anthropogenic effects on groundwater.

A TEAM OF UP TO: 2

APPROXIMATE TIME: 50 Minutes

2. **EVENT PARAMETERS:**

- a. The supervisor will supply answer sheets and modeling resources.
- b. Students may bring a calculator, writing utensils, protractor, and an 8.5" x 11" note sheet.
- c. Supervisors and students should refer to www.groundwater.org/so.html for event guides, sample tests, event set-up recommendations, stated online resources, and more.

3. **THE COMPETITION:**

- a. The competition will take place in three parts (Parts 1 - 3).
 - b. Students will be given a total of 50 minutes to complete Parts 1 - 3.
 - c. Students will be given Parts 1 – 3 at the beginning of the event and may complete Parts 1 - 3 in any order.
 - d. Students will complete Parts 2 & 3 using a scenario selected by the supervisor from the Groundwater Foundation's Hydrogeology Challenge (practice scenarios available at <http://groundwater.beehere.net>).
 - e. Part 1: Students take a written test. The competition must consist of at least one question from each of the following areas: the fundamentals of groundwater and hydrogeology, surface-groundwater interactions, the relation of groundwater flow to geologic structure, and the management of contaminated groundwater. Questions can be multiple choice, true/false, fill in the blank, or short answer.
 - f. Part 2: Students will use and manipulate a scenario selected by the supervisor from the Hydrogeology Challenge under static pumping conditions to answer questions.
 - i. Supervisors will provide the Hydrogeology Challenge scenario URL to students.
 - ii. Students must fully complete the scenario for three wells in static conditions. The three wells will be provided by the supervisor (For example: Wells A, B, and C).
 - iii. Students will submit model results online.
 - g. Part 3: The supervisor will provide a set of circumstances for which the students will: 1) evaluate the risk of contamination to wells in the Hydrogeology Challenge scenario, 2) be able to explain any and all assumptions that were made in their analysis, and 3) complete a Remediation Techniques Table.
 - i. The set of circumstances must include the following: non-static conditions (at least one well must be pumping water), a pollutant (from the Contaminant Table found online), and a pollution source to be located at one well. The set of circumstances may include well types, well uses, and/or any other information the supervisor deems relevant.
 - ii. Students will manipulate the Hydrogeology Challenge scenario to determine which wells are at risk of contamination by the pollutant and approximately how long until the contamination may occur.
 - iii. Students will fill out a Remediation Techniques Table for the given set of circumstances (see example table online). The supervisor will provide the remediation techniques in the Remediation Techniques Table. The student will have to fill out the remediation technique definition, whether the technique is in-situ or ex-situ, the type of technique (chemical, biological, etc.), the average cost of the technique (low, medium, or high), and whether the technique is applicable to the pollutant given in the set of circumstances. Students and supervisors may use the Remediation Table for Hydrogeology (located online) as a guide, but are not limited to the techniques listed in this resource.
 - iv. Students will use their results from the Hydrogeology Challenge and Remediation Techniques Table to answer questions about the scenario. Questions can be multiple choice, true/false, fill in the blank, or short answer.
4. **SCORING:** Highest total score wins. (Part 1 = 25%, Part 2 =25%, Part 3 = 50%.) First tiebreaker: highest score on Part 3. Second tiebreaker: highest score on pre-selected questions from Part 1. Answers must include units where appropriate.
5. **Recommended Resources:** All reference and training resources including the Hydrogeology Challenge and Event Guide are available at www.groundwater.org/so.html.

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Questions? Contact hydro@groundwater.org