631 495-4675 Josen Levi jslevi068@hotmail.com

CAN'T JUDGE A POWDER

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

1. **DESCRIPTION:** The intent of this event is for students to make and record observations. Students will test and characterize one pure substance and then, based only on data they collect, answer a series of questions about that substance. Students WILL NOT be asked to identify the solid. Emphasis of this event is on the quality of data collected, answering questions about the substance and providing data to support their answers.

   A TEAM OF UP TO: 2 **EYE PROTECTION**: #4 **APPROXIMATE TIME**: 50 minutes

2. **EVENT PARAMETERS:** Students may bring only specified items. No other items including calculators are allowed. The event supervisors will check the kits, confiscate non-allowed items, and have the right to penalize a team up to 10% if additional items are in the kit.

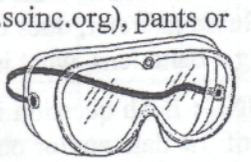
   a. **Students may bring** only these items:
      i. test tubes, brushes & racks, spot plates, well plates, reaction plates, beakers or similar small containers for mixing
      ii. something for scooping & stirring
      iii. pH or Hydrion paper
      iv. hand lens(es)
      v. Beral pipettes
      vi. 9-Volt Conductivity tester
      vii. paper towels

      Note: Students not bringing these items will be at a disadvantage. The event supervisor will not provide them. DO NOT BRING PENS OR PENCILS

   b. **Supervisor will provide:**
      i. 1 M NaOH
      ii. 1M HCl
      iii. 2 different writing instruments
      iv. waste container(s)
      v. wash bottle with distilled water (no more than 250 mL)

      The supervisor may provide:
      vi. Other equipment (such as a thermometer, balance, hot plate, probes, calculator, etc.)
      vii. If the supervisor feels instructions are needed in order to use something provided, instructions will be available.

   c. **Safety Requirements:** Students must wear the following or they will not be allowed to participate: closed-toed shoes, ANSI Z87 indirect vent chemical splash goggles (see www.soinc.org), pants or skirts that cover the legs to the ankles, and additionally a long sleeved lab coat that reaches the wrists and the knees or a long sleeved shirt that reaches the wrists with a chemical apron that reaches the knees. Chemical gloves are optional, **but recommended**. Students who unsafely remove their safety clothing/goggles or are observed handling any of the material or equipment in a hazardous/unsafe manner (e.g., tasting or touching chemicals or flushing solids down a drain and not rinsing them into a designated waste container provided by the supervisor) will be **penalized** or disqualified from the event.



3. **THE COMPETITION:** Contestants will be given a sample of one pure substance. Equipment and test chemicals listed will be provided. The supervisor will make the selection of equipment and chemicals. Students and teachers ARE NOT to know what substance has been selected before the event. Students will be expected to perform relevant tests using the materials provided. Emphasis in scoring is placed on careful and organized observations.

a. Teams will use various tests to characterize the substance. These tests are to be determined by the students, not the supervisor. It is recommended that students be given 25-35 minutes to do these tests. Data is to be recorded on a data sheet with a pen provided by the event supervisor. It should be neat and organized.

b. During testing and observation of their substance, students must record their data. Any mistakes or changes should be crossed out. The data should be numbered sequentially as it is collected. The pens will be collected before the questions are given to the team.

c. Students will be given a different writing implement and a list of questions about the characteristics of their substance. The ability to answer these questions will depend on the quality and thoroughness of their investigations. Questions will have answers that derive from student observations. Questions will not be asked about melting point.

d. When the questions and writing implement are distributed, the Event Supervisor will collect all samples. If the team has sufficient data and/or observations to support the answer to a question, they are to simply place the data number(s) beside the question. Place a number for all data that supports your answer to the question. Students are never expected to actually answer the question, just put the numbers of the observation(s) that would be used to answer the question. So if the question was "Is dissolving the substance an endothermic or exothermic process?", the students would put the numbers of the observation of the temperature of the pure water and the temperature of the solution on dissolving as answers or if the students had taken it a step further and already subtracted the two temperatures, the student would put that number as the answer for more points. The student would not ever say endothermic or exothermic.

4. **Examples of Possible Substances**: baking soda ($NaHCO_3$), borax, Epsom salts, sugar, alum, chalk, non-iodized table salt (NaCl), sodium acetate ($NaC_2H_3O_2$), starch, talc, calcium carbonate, ammonium chloride, boric acid, copper (II) chloride, copper (II) sulfate, etc. Note: Colored and white salts are permissible.

5. **Sample Questions about the Substance:**

   a. Is the substance soluble in water?
   b. If soluble in water, is the solution capable of conducting a current?
   c. Does the substance react with an acid to produce a gas?
   d. If soluble in water, what is the approximate pH of the solution?
   e. If soluble in water, does the substance dissolve endothermically or exothermically?
   f. Using a hand lens, what is the shape of the individual particles or are they too small to see?

6. **SCORING:** Each question is worth up to 5 points. The number of points awarded will depend on the quality of the data and/or observations. If the team remembers an answer to a question but does NOT have the supporting data and/or observations, they may write the answer to the question with their pencil and receive a maximum of 2 points. Ties will be broken by using the most answers that received 5, then 4, then 3, etc. Time is not a tiebreaker!

Recommended Resources: Reference and training resources including the **Chem/Phy Sci CD** are available on the Official Science Olympiad Store or Website at http://www.soinc.org