

Soil Science

LEVEL:	Grades 6-7
TYPE OF CONTEST:	Individual/Team
COMPOSITION OF TEAMS:	1-2 students per team
NUMBER OF TEAMS:	3 teams per Center
SPONSOR:	R. David Cantu, Director, Cal Poly, San Luis Obispo
OVERVIEW:	Students will measure and calculate the soil pore space, determine soil pH by chemical test, and use field textural analysis techniques to identify the properties of two unknown soil samples and classify them by name using the texture triangle. Students will complete three laboratory experiments and related soils science math calculations within one hour.

MATERIALS: The following materials will be provided by the Host Center:

- Lab tables
- Running water or water in pitchers
- 2 cups of pre-measured soil samples, approximately 500 ml of each sample
- 2 clear plastic cups or graduated beakers per team
- 1 (one) 100 ml graduated cylinder per team
- pH indicator solution with dropper, cavity dishes, and pH color chart per team
- 1 squeeze bottle or water sprayer per team
- 1 copy of the Official Entry Form, Math Problems Sheet, and Textural Triangle per team
- Pencils
- Plastic Bags for used wet soil
- Broom and Dustpan

RULES:

1. Students must complete the pore space and soil texture experiments, complete pH analysis on both samples, and complete the mathematics problems within 1 hour of starting the contest.
2. Students are allowed to communicate only with their team member/partner, but discussion with other team members is strictly prohibited.

3. Students must not utilize any outside reference materials, including notes or books.
4. Each student team will turn in only one answer packet to the judges. Students must write very legibly. Judges will not score illegible answers.
5. Upon finishing, students must assist in cleaning their samples and may leave the room quietly.

JUDGING:

1. Do not mix the two sample soils together. Each sample has different properties.
2. Clearly label each of the two soils used in the contest as either "A" or "B".
3. Judges will be provided with official soil samples prior to the start of the contest. The properties of these samples will be determined by the MESA Agricultural Initiative Office prior to Junior MESA Day.
4. Keep soil samples dry before giving them to the students. Do not mix/shake/disturb the soil more than you have to in transporting soil from place to place. Do not compact the soil.
5. Judges may answer procedural questions, but are not permitted to give guidance or instruct students on matters of laboratory or math techniques.
6. Four different performance criteria are scored:
 - a. Student or team ability to correctly determine pore space percentage (0% to 100%) in two unknown soil samples by using the water absorption pore space analysis test. (50 points possible; 25 points for each sample)
 - b. Student or team ability to correctly classify (by name) the same two unknown soil samples using whatever classification method the student/team chooses. (50 points possible; 25 points for each sample)
 - c. Student or team ability to correctly determine the pH level of the same two unknown samples. (50 points possible; 25 points for each sample)
 - d. Performance on three math questions that require the students to perform calculations related to soil analysis and the textural triangle. (25 points possible)
7. In the event of a tie, duplicate prizes will be awarded to winning teams.

AWARDS:

Awards are given for 1st, 2nd and 3rd place teams.

ATTACHMENTS:

Official Entry Form
Texture Triangle Grid
Judging Guidelines

MESA DAY CONTEST RULES 2009– 2009

Master Set

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