

## GLOBE Soil Moisture Campaign Pre-Survey Activities and Implementation Hints

### Basic Equipment Required:

- Soil cans, foil pouches or plastic bags
- Trowel
- Ruler
- Permanent marker
- Map and/or GPS
- Scale (0.1 g)
- Some way to dry the soil (oven, dehydrator, microwave)

### Initial planning

- Who: call for student and parent volunteers; have at least one planning meeting
- Why: explain motivation – scientists need regionally widespread soil moisture data to compare with their models and satellite data
- How: form teams of 2-4; supply with first 5 items above; provide with protocol sheet
- How 2: contact local soil expert/agency and ask to use their soil drying oven for a few days
- Where: decide what near-by areas each team will visit; sites should be open, flat and have typical soil moisture for that type of landcover and time of year.

### Pre-campaign activities

- Just Passing Through (GLOBE inquiry activity/demonstration about how soils and water interact)
- Soils in my backyard (GLOBE activity that introduces qualitative soil characterization concepts)

### Web sites that provide latitude and longitude based on an address:

- [www.geocode.com/modules.php?name=TestDrive\\_Eagle](http://www.geocode.com/modules.php?name=TestDrive_Eagle)
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### Drying Options

Note: the logistics of this protocol assume you will have many (30 or more) soil samples to dry so the option below are biased towards devices that will allow you to dry large batches of samples easily.

- 1) Soil Drying Oven – the best option (see local contact list below). Recommended drying time: 24 hrs.
- 2) You or a parent might have food dehydrator, which might only operate at 75-85° C. This is acceptable if you dry the sample for another 10-24 hours.
- 3) Your school may own a kiln, which could be used for the purpose of drying soil samples. If your school does have a kiln, ask your school's art teacher if you can use it for a day or so (depending on how many samples your class collects, and how many samples can fit into the kiln). You would need to set the temperature for a steady 105° C (which is 221° F), allow the samples to dry in the oven for 24 hours, and weigh them immediately upon removal from the oven. It is important that the samples not be dried at a temperature higher than 105° C (221° F), and for no longer than 24-48 hours, because the water integral to the clay structure begins to break down at higher temperatures and/or prolonged exposure to high temperatures, thus causing an error in your soil samples' dry weight.
- 4) Microwave – this is a poor option here because microwaves can only dry 1-2 samples at a time and you have to iteratively heat and cool the soil to avoid the breakdown of clays and other problems. The standard recommendation is to heat your soil on a microwave safe dish on high for 2 minutes at a time. As the soil dries, reduce the heating time to one minute. After cooling at each stage, weigh the sample and continue the process until successive weights do not differ by more than 1%.