15 September 2015

CanU Grow - Soil Science Module

Meeting with Soil Science Graduate Students, Rob Ellis, Mitch Timmerman, Jim House, Amber Lee Anderson

The purpose was to follow up on each activity station idea previously proposed and determine if each had been fleshed out sufficiently to be offered.

1. Soil Physical Properties (Theresa, Geethani, Mayowa)

Location – Room 318

Hands-on activities

* hand texture different soils
* soil columns, add water and watch the different rates of infiltration
* add dilute HCl and see evidence of carbonates
* use soil monoliths to show layers and for determining soil color

Display

* have a display of different soil structures

2. Nutrients in Soil (Inoka, Ike)

Location – Room 318

Display

* nutrients in pizza (nutrients in specific pizza components)
* nutrients required by the crops and animals for specific components (wheat, canola, corn, meat, dairy)
* inorganic fertilizer nutrients
* organic nutrients
* clay loam soil and how much nutrient it contains

Hands-on activities

* build a nutrient molecule model?
* Measure nutrient in soil using a simple greenhouse nutrient test kit
* Velcro display board (??)

3. Soil pH/Conductivity (Rumi, Ahmed)

Location – Room 318

Hands-on activities

* “edible” pH scale, measure pH of different food products (e.g. tomato juice, orange juice, pop)
* measure pH of soil:water suspensions of contrasting soils
* “edible” E.C. scale, measure conductivity using different food products (e.g. potato chips in water, RO water)
* measure E.C. of soil:water suspensions of contrasting soils

Display

* chart showing pH versus soil nutrient availability
* impact of E.C. on plants

4. Soil Ecology (Megan, Abolfazl, Fernanda)

Location – Room 333

i) Display

- range of soils from long-term organic rotation plots from low to high SOM, plus a sand and an organic soil

- long-term organic plot monoliths (Martin Entz)

- changes in SOM with depth

Hands-on Activity

* measure changes in color with depth

Link to the next section “Soil organic matter is food for soil micro-organisms”

ii) Hands-on Activity

* observe different soil micro-organisms on a series of different microscopes

Display

* the functions of the different soil micro-organisms

iii) Display

* use compound microscope and projector to show different nematodes
* distinguish the “good” and the “bad” nematodes

iv) Display

* nodulation in roots with root samples and dissecting microscope

5. Technology in Soils (Timi, Ashley, Mike, Justice, Amanda)

Location – Room 318 next to the Growth Bench

Hands-on Activities

* measuring soil moisture using a POGO (download an app or use an existing smartphone)
* measure surface temperature with an IR Thermometer
* measure incoming shortwave and longwave radiation using the pyranometer and pyrgeometer already available (put them in the growth cabinet to achieve different lighting

Display

* comparison of making pizza dough by hand versus using a mechanical device
* importance of soil water and soil temperature for growing crops
* time lapse camera, photos acquired during a session

6. Runoff and Infiltration on Frozen and Unfrozen Soil (Mitch and assistant(s))

Location – Soil Science Equipment Shed

Display

* frozen soils versus unfrozen soils, different textures
* sediment in the runoff
* infiltration water

Hands-on Activities

* adding water or snowmelt
* assessment of runoff and infiltration

Other Logistics Considerations

* one more meeting to confirm that preparations are in place for each activity station
* run all activities on Oct 8 (practice run), make adjustments to number of activities per station and even the overall number of stations as needed
* divide the students into 3 groups of about 6 or 7 (i.e. not all activity stations will be active for each 20 minute time slot)
* there will need to be a “guide” assigned to each group to get them navigated from one activity station to the next