4-H SLO Scientists Vignette

The 4-H SLO Scientists program asks the question “How do we create usable knowledge that can be used to better our home, community, and world?” A vignette is provided as an example of how a 4-H SLO Scientists session is conducted (Enfield, 2000).

In this vignette, Gary and Elena lead a 4-H YAPES session from Deep Down Underground. Gary and Elena are conducting the third meeting (of the 10-meeting unit) with this group, an outdoor activity on soil.

After the group of youth-adult pairs are settled in the meeting room Elena reviews the previous meeting’s activities by asking questions of the participants, seeking to hear their reflections. Then Gary introduces the next activity, and he and Elena walk the group to a previously selected activity or research site. The participants are arranged into two subgroups of four persons each. Elena begins: Today we’re going to explore the underground world! What you see on the surface – the trees, grass, and animals - is only a small part of the living world. All that goes on above the ground really depends on the world underground! What do you think is happening under your feet right now--what do you think might be living down there? Elena writes down the ideas offered by the participants onto a flipchart. Then she continues: Let’s take a look at what Gary is standing on!

Elena digs under Gary, by pushing the shovel deeply into the ground on all four sides of a square (about twelve inches on each side), asks Gary to step aside, and levers the block of earth out of the ground, trying to keep the block of soil as intact as possible. Elena places the block of earth on a sheet of plastic or cloth laid out on the ground, and says: Let’s carefully observe the soil block without touching it yet. We may look, smell, and even listen to it.

After giving the group some time to observe, she asks the participants to say what they observed with their three senses. She writes the observations offered on the flipchart . . . then she says: I need a volunteer to slowly pour this one-half cup of water over the soil block. Observe carefully and see what happens to the water.

Elena asks some "sciencing" questions (Ponzio, 1993), such as the following and allows time for the dyads to discuss and respond: Describe any layers in the soil block. Describe the organic matter that you see. Describe any animals that you can see. In what part of the soil block are they (near roots, in decaying matter on the surface, deep underground)? Describe what happened to the water poured over the soil block. Why do you think it did that?

After a fast-paced discussion period, Gary introduces the next action by directing the two-dyad groups to go to a certain site in the general area and dig up a soil block. He says: We are going to be digging up soil blocks from a few different areas today and looking at the underground world of plants and animals. In your groups, separate the soil blocks by (1) gently separating the organic matter from the mineral soil, (2) gently separating the roots of each plant from the soil so we can see what the plants look like underground, and (3) gently capturing the animals that are living in the soil and put them in the plastic containers so we can look at them. This is not a race! The more carefully we observe, the more we are going to see. Let’s find as many things as we can.
As the dyads start to carefully take the soil blocks apart, Elena reminds them of what to do with the various components and to observe and take their time. After an appropriate period of time, Elena says:

OK. Now we need to put everything back - the plants, animals, soil - exactly how we found them. (This is, of course, impossible, but can lead to a discussion of how easy it is to take something apart and how hard it is to restore it again, especially in nature.)

After the groups put the soil "back," Elena asks more "sciencing" questions, such as the following: How many different types of animals did you find and where in the soil block were they? What do you think they might be eating? If you didn’t find any, why do you think this is so?

Describe the roots of the different plants you found. How do you think they might help water enter the soil? How do you think they might help keep the soil in place during a heavy rain?

How hard was it to separate out the different parts? Why was it so difficult to put it all back together?

If there is time, Gary asks the four-person groups to dig up a soil block from another area (knowing in advance that the soils are different). When the groups have finished looking at the different soil blocks, he does some "sciencing" that compares all the blocks. He asks questions such as these: Compare the soils you looked at. How were they similar and how were they different? Which soil had the most humus (organic matter)? What is this decaying matter? What is breaking it down? Which soil had the most animals? How do you explain this?

Compare the roots of the different plants. Which roots do you think might be best at:

1. Helping water soak deep in the soil? What is your evidence? How could you test your ideas?
2. Holding the soil in a place in a heavy rain? What is your evidence? How could you test your ideas?
3. Surviving when there is little rain? What is your evidence? How could you test your ideas?

If time permits, Elena has the dyads calculate the number of worms or other animals found in an acre, using the number found in one square foot and then multiplying by 43,560 square feet per acre. She may also ask them why they think it might be important to know about the structure of soil.

As they will in each of the 4-H YAPES sessions, the participants helped Gary and Elena clean up and put things away. When the last youth-adult team had said goodbye and left, Elena and Gary sat down to review thoughts and ideas about the session.