

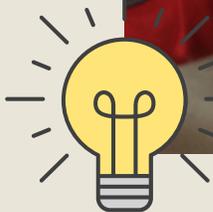


 **SOIL CAMP** 

# TRANSDISCIPLINARY EXPERIENCES

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 **The Light of Plants and Soil**   
**(Communicating with Plants and Soil)**



# TRANSDISCIPLINARY EXPERIENCES

## GROUNDING INTRODUCTION/OBJECTIVE/THOUGHT PROVOKING QUESTIONS

How do plants communicate? Can communication with plants and soil be visual, auditory, and/or kinesthetic? How do we know if a plant is sad, happy, or healthy? Can we use technology to help us communicate with plants and soil?

## EXPERIENCE AT A GLANCE

In this activity, we explored the ways in which plants communicate using the help of a "Plant Translator" (an Arduino Robot). Soil Campers formed hypotheses around how plants express their emotions (for example, unhealthy plants may show they're sad if they have discoloured leaves).

Soil Campers also observed living plants using the lights on the Arduino Robot. The Arduino senses electricity through the electrodes, which occurs more rapidly in living organisms. The stronger the electrical currents, the brighter the lights will shine.

Soil Campers were intrigued to see how the Arduino responded to different parts of plants, and developed a relationship between the plant and the amount of light shown. (How bright is the light of the leaf as compared to the stem?) To our surprise, the Arduino lit up when used on the soil. This was a wonderful discovery because it allowed the Soil Campers to visualize how the soil is a living community. Through this activity, we hoped that many Soil Campers enhanced their knowledge on how to communicate with plants and soil using technology, science, and visual observations.

## MATERIALS

- Arduino Robot
- Laptop with Arduino Code
- A plant that is alive and healthy
- A plant that is not alive or not very healthy
- Soil (can be the soil the plant is growing in)

## CONNECTION TO GROUNDING EPISTEAMS

LISTENING TOGETHER TO THE VOICES OF THE SOIL AND OTHER MORE THAN HUMANS

LISTENING TOGETHER AS A COMMUNITY TOWARDS EARTH-CENTERED HEALING

LISTENING TOGETHER TO THE HISTORIES, LANGUAGES, AND STORIES (THROUGH ANTI-COLONIAL RELATIONALITY)

For more information, please visit <https://www.soilcamp.ca/vision>



# TRANSDISCIPLINARY EXPERIENCES

## LEARNING OUTCOMES/KEY CONCEPTS

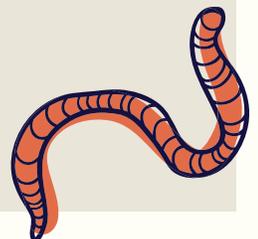
What did the Soil Campers learn from this experience?

- Hypothesizing
- Discuss ways in which plants express their emotions and health
- How to use technology to better understand plants
- How to determine whether a plant is healthy or sick by observing the plant
- Understand that plants and soil are living
- Understand that soil is a living community
- How to help plants and soil become healthy
- Arduino robots and different ways to use an Arduino robot
- How to handle a plant with care

## GUIDING QUESTIONS

Consider asking the following questions:

- How do you communicate your emotions (verbally, or through body language)?
- Are plants (and soil) living the same way humans are living?
- Do plants have emotion?
- How do you think plants (and soil) communicate their emotions?
- How do plants communicate with each other, and with us humans?
- Have any of you heard about Arduino robots? How do you think it'll help us communicate with plants (and soil)?
- How will the lights on the Arduino robot change when used on a healthy or sick plant?
- What do you think will happen to the lights on the Arduino when used on soil?
- What do you think the plants are telling us?
- Do you think soil will communicate similarly/differently as compared to a plant?



# TRANSDISCIPLINARY EXPERIENCES

## EXEMPLAR AND/OR ARTIFACTS Steps of the Activity.

### Pre-activity:

- 1) We first gathered the Soil Campers outside and stood in a circle.
- 2) We then asked the Soil Campers how they show their emotions using body language.
  - How would you express with your body that you are happy? sad? sick? angry?
  - We had the Soil Campers show us how they would express their emotions, while the facilitators also joined in!

### Extension: React to Music!

- Play a song with a mix of melodies that sound happy, sad, dramatic, etc. and have the Soil Campers express their emotions/reactions to the music through dance.
- A song like "Wall Rat" from the movie Ratatouille works!

Show that you are happy

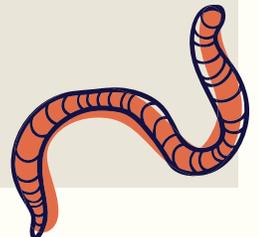


Ask the Soil Campers:



How would plants show their emotions?

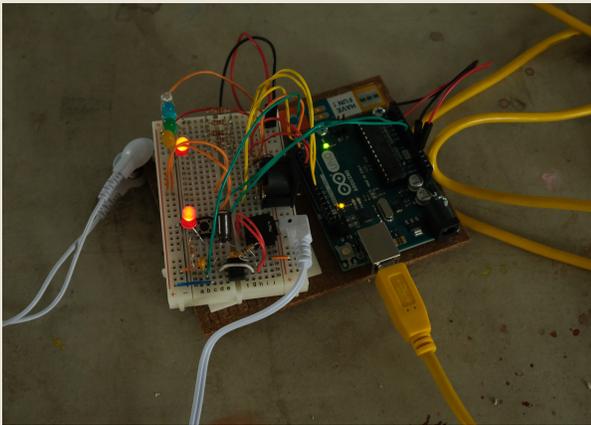
Show that you are sad



# TRANSDISCIPLINARY EXPERIENCES

## EXEMPLAR AND/OR ARTIFACTS *Steps of the Activity.*

### Main Activity:



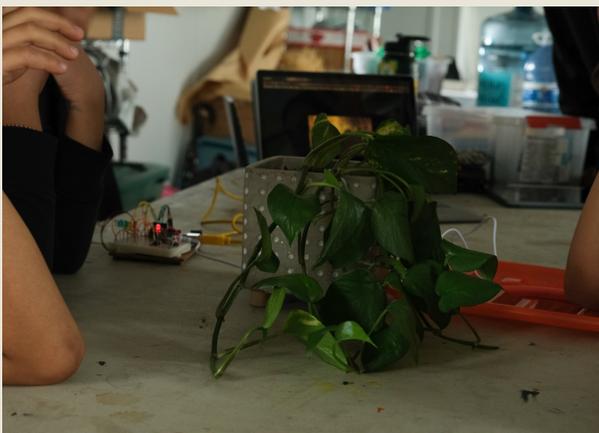
1) We first asked the Soil Campers if they have heard of an Arduino. We then introduced the "Plant Translator" Arduino Robot.

The Soil Campers named the robot "Boba".



2) Connect the Arduino to the Laptop with the Arduino Code.

During this time, facilitators may decide to show the Arduino code or showcase videos related to communicating with plants.



3) We then introduced the plant that will be used for the activity.



4) Here is a Soil Camper holding the probes that will be used to detect the electrical currents in the plant.

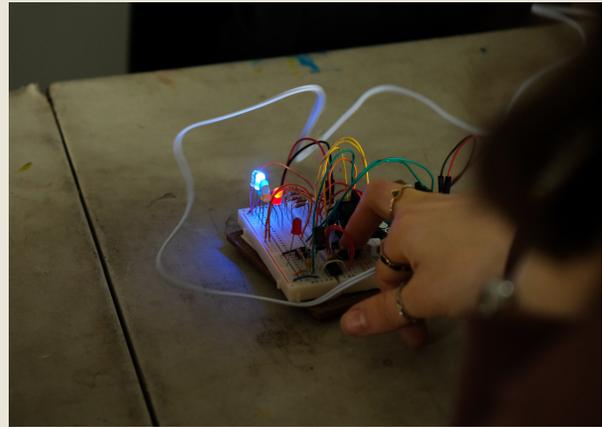


# TRANSDISCIPLINARY EXPERIENCES

## EXEMPLAR AND/OR ARTIFACTS *Steps of the Activity.*



5) The Soil Campers then placed the probes onto the green/wilting leaves and stem of the plants.

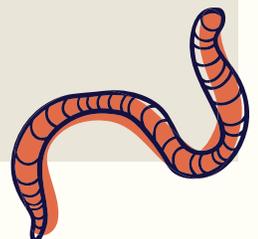


6) When the probes detect the electrical currents in the plant, the lights on the Arduino will glow. The stronger the flow of electricity, the brighter the light will glow.



The white and blue lights are glowing when the probes are placed in soil.

7) To our pleasant surprise, the lights glowed when the probes were placed in the soil! This discovery emphasized the fact that soil is a living community.



# TRANSDISCIPLINARY EXPERIENCES

## Note:

It is important to speak with the participants about how to handle a plant with care and how to respect plants. There may be occurrences where the probes may not sense the electrical currents, and continuously pressing the probes on the plant may hurt the plant. Therefore, it is important to tell the Soil Campers about how to carefully handle the plants. The Arduino Robot will not harm the plants as long as the Soil Campers are gentle.

## RESOURCES

Some resources that could be useful and fun to explore:

- Sick Plant vs. Healthy Plant [Video]
  - <https://www.youtube.com/watch?v=nhoxln83HSs>
- Arduino Project: Music with the Plants [Video]
  - <https://www.youtube.com/watch?v=yuJhKUunYPE>
- Plant Music [Video]
  - <https://www.youtube.com/watch?v=TBonJM6VmqM>



Many of these resources and the inspiration behind this activity are developed from the desire to listen to the music/voice of plants. For more information about Listening to the Music of Plants, please visit <https://www.soilcamp.ca/soil-camp-2021>

## ACKNOWLEDGEMENTS

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THANK YOU!

