



## Western STEM Connection Engaging with Reciprocity and Interdependence

### Organization:

**Title:** Western STEM Connection - Engaging with Reciprocity and Interdependence

**Summary:** Students learn about a STEM study, conducted locally, in which scientists by controlling variables such as soil moisture and nutrients, studied the impact of a changing climate on local plant growth. Students mimic this experiment in the classroom using bean seeds in order to learn about what plants need to thrive in the face unpredictable weather conditions caused by climate change.

**Inquiry Question:** Inquiry Question 2: What do Indigenous land-based food gathering practices teach us about how we can maintain reciprocal, interdependent relationships with the natural world and in so doing fulfill our responsibilities to the land?

**Duration:** 1 Class period for lesson, however, experiment can extend over several weeks

**Learning Environment:** Classroom, outdoor

**Season:** All

### Materials:

- Engaging with Reciprocity and Interdependence Study Summary ppt
- Engaging with Reciprocity and Interdependence.pdf
- Pole bean seeds
- 3 pots (at least about 8-9 inches (20-23 cm) deep) with drainage holes
- Potting Soil
- Tray
- 3 bamboo poles for bean support
- Tape (for labelling)
- Marker (for labelling)

### Curriculum Links:

Grade 9 Destreamed: A1.2, B1.1, B1.3, B2.1, B2.4, B2.5, B2.6

Grade 10 Academic: A1.4, A1.5, D1.1, D1.2, D3.7

Grade 10 Applied: A1.4, A1.5, D1.1, D1.2, D3.7

### Meta Data:

**Content Type:** Activity

**Bundle:** Food

**Theme:** Global Climate Change

**Subject Area:** Biology, Environmental Education, Outdoor Education, Science

**Curriculum Focus:** 9, 10



## Western STEM Connection:

The following study shows the manner in which reduction in precipitation caused by climate change impacts plant biodiversity locally. The study also points to things that can be done to live in reciprocity and interdependence with the natural world ie: watering and using fertilizer:

Serafini, J., Grogan, P., and Aarssen, L. 2019. Summer precipitation limits plant species richness but not overall productivity in a temperate mesic old-field meadow. *Journal of Vegetation Science*. 30(5): 832–844.

- Teacher reviews study with students using **Engaging with Reciprocity and Interdependence Study Summary ppt**.
- After reviewing the study students engage in an experiment that mimics the techniques employed by Dr. Paul Grogan and Dr. Lonnie Aarssen to manipulate the amount of rainfall the plants receive. The point is to simulate the effects that a changing climate (droughts and floods), has on plants. See the **Engaging with Reciprocity and Interdependence.pdf** explaining this activity.
- Earlier in the Bundle in Learning Activity 9: *Relational Gardening* students were introduced to a three sisters garden and the plants within it. In this experiment, students will use beans. The bean plant is a member of the 3 Sisters Garden, that enriches the soil with nitrogen which benefits both the corn and squash. Please remember that students should treat the beans with love and care while they are engaging in this experiment focused on interdependence. Although students are depleting some plants of the things they need to live, this will help them determine what actions we need to take to help our plant relatives survive in drought-like conditions resulting from climate change. This activity should inspire students to take climate action, so that all plants can continue receiving everything they need to survive. Please encourage students to give thanks to the plants before, during, and after their investigation.

Please note that the learning represented in this activity reflects Big Idea C. in the Indigenous Knowledge Learning Bundle: “Reciprocity, Interdependence, and Holism are at the Heart of Indigenous Ways of Knowing and Being”. To help your students learn more about these concepts, foundational to Indigenous knowledge, check out the Learning Activities titled: *Holism, The Honorable Harvest, and Our Responsibilities* found in the *Indigenous Ways of Knowing and Being with the Natural World* Learning Bundle (Grades 7-10).