



# Garden Learning Engagement

## LE 6 Investigation Questions

### Background

There are many ways to collect data and gather information to explore a garden “Should We” question. Doing field-based investigations is one way. In this learning engagement, learners will carry out an investigation and collect data in the garden. This process of planning and carrying out investigations enables us to move from opinions, beliefs, or initial ideas about phenomena to making claims from evidence.

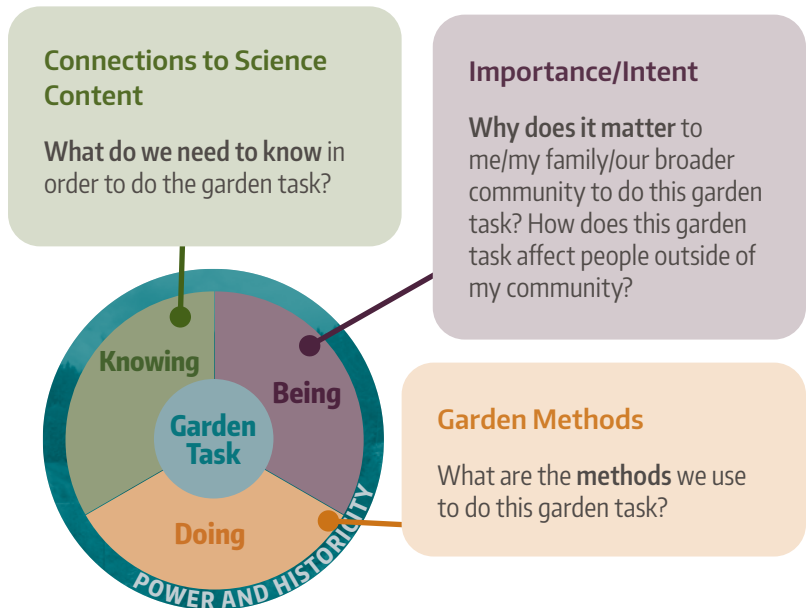
**Data** is the information we collect when we conduct our research, including garden-based observations, community interviews, and garden methods research.

**Evidence** is data that is used to prove or disprove a particular idea. Evidence is the set of data we use to answer our research and “Should We” questions.

### Purpose

Learners have collected other forms of data from community interviews and different garden methods research. In this learning engagement learners will gather observational data to continue to make sense of their “Should We” question.

Throughout the instructional sequence we call out moments that tie into the **knowing, being and doing** of garden practices.



### MATERIALS

- » Investigation Protocol
- » Any data collection materials that are needed (refer to protocol)

### LE OVERVIEW

- » Plan for the Investigation
- » Ask Investigative Questions as a group
- » Collect the data

### LEARNING GOALS

#### Learners will...

- » Pose questions and design investigations to inform their decision-making practices.
- » Engage in field-based science practices as part of a socio-ecological investigation.

## Instructional Sequence

### Educator Preparations: Planning for Investigations

TIME

45 minutes



#### 1. Review the Educator Planning Tool

- » Review the “Should We” question and any learner-generated questions. Write, modify, synthesize or copy questions that relate to the “Should We” question and related phenomena. What specific data would we need to collect to investigate these questions?
  - Your “Should We” question may evolve over the course of your investigation. You may notice that learners are asking more refined versions of the “Should We” question. Share with learners that as we collect data and learn more, we are likely to have more specific questions. For example, your investigation might start with the question “Should we weed the garden?” and become more a specific question such as “Should we weed the morning glory from the sunflower patch?”
- » Review the revised models and identify events, processes, or relationships from your model that you need or want to learn more about. You have already collected data through garden methods and community interviews. What questions remain unanswered? What data can you collect to investigate these questions?

#### Being

As we spend more time doing our garden task, our observations and questions will often become more specific. We will become more aware of how this garden task affects specific beings in the garden.

#### Knowing

Identify what you know already know and what you want to learn more about.

#### 2. Reflect on data that is gathered through the daily observation protocols. Could any of that data be important to the investigation?

#### 3. Review the list of available investigation protocols in the table at the end of this LE. Choose one or two of investigation protocols that can be used to support your learners exploration of the “Should We” question. Gather the necessary data collection materials. Decide if all students will do the same protocol or if groups will each do different protocols and share their data. Decide how you will prepare students to use the protocols you select.

- » There are many possible investigation questions and potential protocols to collect data. If you are searching for other options, refer to LE 7 Classroom Tools for more field-based science protocols and background information to support you creating your own protocol.

#### 4. Before finalizing your investigation plan, engage in place mapping around the garden. Look for places where learners can collect data using the data collection protocol. Test the protocol by collecting data and using the same tools as the learners. Adapt the protocol if you need to meet the affordance of your investigation site.

## Part 1: Asking Investigation Questions (15 min)

- » Throughout model revision and whole group discussion, learners may have generated possible research questions to answer the “Should We” question. Tell learners: “You all came up with excellent questions to help us make decisions around our “Should We” question. I recorded questions that I heard during our model revision and group discussion and compared them to some of the tools we have available for our research, and came up with one investigation question for us to explore together! Our questions is: \_\_\_\_\_ ”
- » Ask learners to brainstorm what this question means to them: can you tell me, in your own words, what you think we’ll be investigating? Where do you think we should investigate this question in the garden/ Where do you think you and your family could investigate this question in your neighborhood? What do we already know about this question?
- » Tell learners: “Now that we have our investigation question, we are going to think about types of data that we need to collect, and how we will use that data to answer our “Should We” questions.

### Knowing

Connect to learners' knowledge about the investigation question.

## Part 2: Collecting Data (30 min)

- » Collect Investigation Data
  - Prepare to collect field-based science data from your selected site.
  - Make sure that learners have the data collection tools they need, and understand if and how tools will be shared as part of data collection.
  - Whenever you can, ask questions to deepen learners' observations, wonderings, and sense-making about the focal phenomena
- » Invite families to collect data in their own neighborhoods
  - Send home the family tool (along with the protocol for your investigation) and invite families to gather data on their garden spaces.
  - Before sending home this family tool, ask learners to fill out the first page of the tool with the necessary information for families.
  - Let families know that it is okay if they can only complete part of the family tool investigation protocol. Engaging their child in data collection around a shared research question is the most important part of family learning.

### Being

Here is another opportunity for learners to engage in science learning with their families and members of their community.

See table next page...

NAME OF DATA COLLECTION TOOL	EXAMPLE INVESTIGATION QUESTION (BUT THERE ARE MANY MORE!)	TYPE OF DATA COLLECTED
<b>Invertebrates (Critters) Biodiversity Tally Sheet</b>	Where do we find the most bugs/ invertebrates (by the compost, under leaves, in the sun, by water, etc.)?  Do bugs like sunny or shady spots, moist or dry soil?	<b>Quantitative:</b> number of critters  <b>Qualitative:</b> species of critters
<b>Biodiversity Species Type and Abundance</b>	How many different bugs are on the bok choy plants? How many of each?  How many worms are in this garden bed (with leaves) compared to that garden bed (without leaves)?	<b>Quantitative:</b> number of types of species and how many of each  <b>Qualitative:</b> types of species, maybe also details about them (juvenile, adult, male, female, etc)
<b>Soil Observations</b>	What organisms are found above, below the soil?  What is the soil like in our garden?  What kinds of relationships can we observe in soil?	<b>Quantitative:</b> relative soil moisture, soil temperature, species counts.  <b>Qualitative:</b> species-kind, species-species relationships, behaviors, etc.
<b>Soil Moisture</b>	What types of soil are in the garden?  How does soil type relate to moisture, species diversity, abundance, rain runoff, etc.?	<b>Quantitative:</b> Soil moisture levels approximated through paper towel "test"; soil temperature readings (and then identification of soil type)  <b>Qualitative:</b> Soil type, feel, relationship to runoff, etc.



# LE6 Educator Backpack Field Guide

TIME	ACTIVITY
15 min	Identify Investigation Questions
30 min	Collect Data

Our "Should We" Question:

---

---

**Weather Notes:** note the date, time and weather

Our Interview Questions:

## Investigation Question prompts:

Once you have identified an investigation question ask learners:

- Brainstorm what this question means to them: can you tell me, in your own words, what you think we'll be investigating?
- Where do you think we should investigate this question in the garden?
- Where do you think you and your family could investigate this question in your neighborhood?
- What do we already know about this question?

**Focus on Data Collection:** data collection is a record of observations, and allows learners to see measurable change of phenomena over time and across places. Scaffold sense-making by asking learners to think about:

- Their family knowledges and practices
- The goals of the activity or investigation
- What they have observed in another place and/or another time

## Connections to Families and Communities:

- Invite families to collect data in their own neighborhoods and share back with the group.