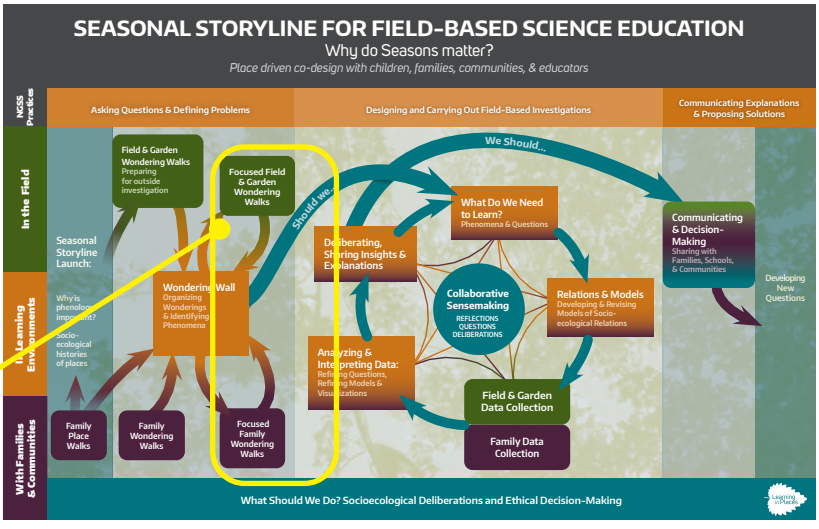
LE 5 Overview

Take Focused Wondering Walks to Make New Observations and Generate New Wonderings Related to Your "Should We" Question

Now that you and students have selected a "Should We" question and decided on related, focal phenomena (LE 4), you are ready to learn more about them by observing and continuing to wonder. In this learning engagement, you, students, and their families will explore your "Should We" question by observing these phenomena more deeply using the **5 socio-ecological dimensions** that you first learned about in LE 2.3. You, students, and families will **take focused Wondering Walks** to observe these phenomena across a multitude of places and/or times, both at school and in neighborhoods. You will also observe focal phenomena to think specifically about the relationships that might be important components of your "Should We" question, relationships referred to as **base relationships**. Lastly, you will generate new wonderings based on these focused observations. Students will then synthesize these new observations and wonderings about focal phenomena by looking for similarities and differences and reflecting on why they might be seeing those related to place, seasons, and differences in scale (time, space, size, and perspective).

Big Ideas About Nature-Culture Relations To Have In Mind As You Plan For Learning Engagement

This learning engagement continues the work of focusing students' and families' observations and wonderings along five socio-ecological dimensions, now in service of learning more about their "Should We" question and related focal phenomena selected in LE 4.2. By using the five socio-ecological dimensions to observe and wonder, and then synthesize observations and wonderings, students can continue to see the **relationships between, for example, plants and other plants, and/or plants and animals, and/or animals and kinds (soil and water, for example)**. Students' observing, wondering, and analysis in this LE lead to important sense-making that they will use in their ethical deliberations and decision-making about their "Should We" question later in the Seasonal Storyline. As students start to see humans as a part of the natural world along multiple **scales** (and not separate from the natural world and/or dominant to and over the natural world), they will start to consider the multiple dimensions of their decisions and actions within socio-ecological systems.



GRANT #1720578 LEARNING IN PLACES COLLABORATIVE, BOTHELL, SEATTLE, WA AND EVANSTON, IL

LE 5 LEARNING GOALS

LE5 incorporates observations and wonderings about students' "Should We" question and related focal phenomena from both school and family focused Wondering Walks using the 5 socio-ecological dimensions. By the end of this learning engagement, students will be able to:

1. Make observations of focal phenomena (and other related elements of their "Should We" question) in different places and/or at different times around the school.
   a. Use various scales (time, space, size, perspective) to make these observations
   b. Attend to species, kinds, and behaviors, places, lands, and waters, and human decision-making
   c. Attend to relationships among species (including humans!), kinds, places, lands, and waters
2. Generate wonderings related to their observations
3. Make more observations and generate more wonderings about focal phenomena (and other related elements of their "Should We" question) with their families in their neighborhoods
4. Synthesize observations and wonderings about focal phenomena (and other related elements of their "Should We" question) and explore similarities and differences across places and/or times

CONNECTIONS TO NGSS

» **Crosscutting Concepts:** Patterns; Cause and Effect; Scale; Systems and System Models, Energy & Matter Structure and Function; Stability and Change
[NOTE: several of these might apply depending on the focal phenomena and the class "Should We" question]

» **Science Practices:** Asking questions; Planning and carrying out investigations; Analyzing and Interpreting Data; Obtaining, evaluating, and communicating information

» **Disciplinary Core Ideas:** LS1: From molecules to organisms; LS3: Heredity; LS2: Ecosystems; LS4: Biological Evolution ESS2: Earth's systems; ESS3: Earth and Human Activity
[NOTE: Applicable DCIs will depend on the focal phenomena you and the class "Should We" question that you and students have chosen.]

Learning Engagement in LE5

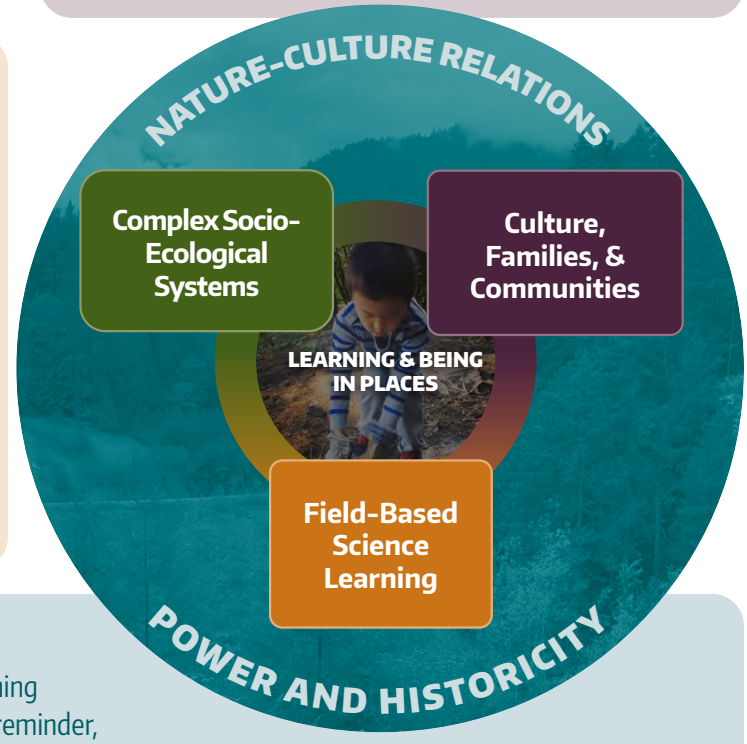
LE 5.1 Wondering Walk to Observe Focal Phenomena and Other Elements of the "Should We" Question: In this lesson, you and students will take focused Wondering Walks to observe your focal phenomena, and other elements related to your "Should We" question in three different places and/or across time using the 5 socio-ecological dimensions. Students and families will take this same focused Wondering Walk in their neighborhoods. Then, students will synthesize family and classroom observations and wonderings from these walks in preparation for revising their initial models in LE 6. You will take several walks in LE5.1 before moving on to LE6–that is ok and necessary! Students should have multiple opportunities to observe focal phenomena related to their "Should We" questions.

Engaging the Rhizome

Complex Socio-Ecological Systems: LE 5 continues to engage students with the 5 socio-ecological dimensions that they were introduced to in LE 2.3. They continue to use these dimensions to observe and wonder about their focal phenomena and other elements of their "Should We" question both at home with their families and at school. Students also use the dimensions to help them think about finding similarities and differences related to their observations and wonderings. Students use these lenses as tools to help them explore, think about, and wonder about the various scales (time, space, size, and perspectives), positionalities, decision making, relationships, and actors at play as part of their "Should We" question. They also consider how power and historicity shape these elements.

Culture, families, and communities: Students and families will engage in focused Wondering Walks to observe and wonder about focal phenomena and other elements of their "Should We" question. Then, as you did at various times in LEs 1-3, you and students will incorporate family observations and wonderings into classroom observations and wonderings, as well as in your discussions and reflections about them. As you have seen in previous learning engagements, incorporating family understandings, knowledges, ideas, wonderings, and practices ensures that you and students are able to engage in deeper sense-making because you have a richer dataset to consider. In addition, you position family knowledge as a critical component of classroom science learning, thus helping students see that their families' ways of knowing and doing can make important contributions to science.

Field-based science Learning: This learning engagement provides opportunities for students to continue to hone their observation skills outside in a variety of places and/or over time. Not only do they have these opportunities in school but they also have them at home, learning alongside their families. Also, they continue to ask questions and engage in wondering, which are important elements of scientific practice. In addition, students engage in data analysis and finding patterns by looking for similarities and differences across school and family observations and wonderings as part of synthesizing those observations and wonderings.



Power and Historicity:
As you have learned in LEs 1-4, classroom and outdoor teaching and learning are always done from powered positions. As a reminder, when students see themselves, their families, and the places that are important to them play a central role in what they learn in school, they understand that school science is related to their lives and their communities. This also signals to students that science does not stop when they leave school, and that their "Should We" question and related focal phenomena might be important to investigate in their neighborhoods too. Also keep in mind that it is important to talk with students about how power and historicity connect with their "Should We" question and related focal phenomena that they are observing and wondering about in this learning engagement. That will help them deliberate about and ultimately make decisions about their "Should We" question later in the storyline.

Learning in Places

Lesson Plan

LE5.1: Wondering Walks to Observe Focal Phenomena Related to Our "Should We" Question

Purpose

When you launch LE 5 in your classroom, you and students will have identified a "Should We" question and at least two related focal phenomena to learn more about. In order to learn more about them, **you, students, and their families will take focused Wondering Walks** to observe elements of your "Should We" question that you included in your initial models (LE 4.3). Depending on your "Should We" question and related focal phenomena, you, students and families will conduct observations in at least three different places, or over at least three time periods, around the school and in families' neighborhoods. As part of these observations, students and families will identify any **base relationships** that are important to the focal phenomena and the class "Should We" question. This is in preparation for revising initial models in LE 6.

Why this is important

Now that you have chosen a "Should We" question and identified related phenomena, students and families will explore them more deeply by observing them in a variety of places and/or over time (like morning, noon, and early evening, or over the course of a week). As part of these observations, students and families will look for **base relationships** that are important (for example, a plant in relation with another plant, an animal in relation with a plant, an animal in relation with a natural kind, like water). This will help students and families generate new wonderings about their "Should We" question and these phenomena, which will be important precursors to investigating them throughout the rest of the Seasonal Storyline for Field-Based Science Education. The Next Generation Science Standards highlight the importance of engaging in authentic science practices. Scientists who use field-based methods in their research observe phenomena in places (whether that is different places in the same location or across multiple locations), and over time, to better understand those phenomena and to identify elements of them for further investigation.

Engaging family and community knowledge and practices

As you did at various times in LEs 1-3, you and students will incorporate family observations and wonderings into classroom observations and wonderings, as well as into your discussions and reflections about them. As you have seen in previous learning engagements, incorporating family knowledges, ideas, wonderings, and practices ensures that you and students are able to engage in deeper sense-making because you have a richer dataset to consider. In addition, you position family knowledge as a critical component of classroom science learning, thus helping students see that their families' ways of knowing and doing make important contributions to science.

LEARNING GOALS

By the end of this lesson, students will be able to:

1. Make observations of focal phenomena in different places, and/or at different times, around the school
    a. Use various scales (time, space, size, perspective) to make these observations
    b. Attend to species, kinds, and behaviors, relationships, places, lands, and waters, and human decision-making
    c. Document base relationships
2. Generate wonderings related to their observations
3. Make more observations and generate more wonderings about their focal phenomena with their families in their neighborhoods
4. Synthesize observations and wonderings about their focal phenomena and explore similarities and differences across places and times

CONNECTIONS TO NGSS

» **Crosscutting Concepts:** Patterns; Cause and Effect; Scale; Systems and System Models, Energy & Matter Structure and Function; Stability and Change [NOTE: several of these might apply depending on the focal phenomena]

» **Science Practices:** Asking questions; Planning and carrying out investigations; Analyzing and Interpreting Data; Obtaining, evaluating, and communicating information

» **Disciplinary Core Ideas:** LS1: From molecules to organisms
LS3: Heredity
LS2: Ecosystems
LS4: Biological Evolution
ESS2: Earth's systems
ESS3: Earth and Human Activity
[NOTE: Applicable DCIs will depend on the focal phenomena you and students choose.]

ASSESSMENT OPPORTUNITIES

» LE4.1b Wondering Walks to Observe Focal Phenomena Related to Our "Should We" Question (student tool), and related student discussions and questions

» Student talk (observations they make, questions they ask, wonderings they voice) during the Wondering Walks, and other parts of classroom activity

» LE4.1c Wondering Walk synthesis tool and related student discussions

Teacher background information

As you learned in LE 2, wondering is a practice that is central to sophisticated scientific field-based observation and questioning. Remember that who gets to wonder, and whether or not these wonderings are taken up in a learning environment, are deeply powered and historicized. Making space for all student and family wonderings and using them to support student sense-making positions student and family ideas as important, meaningful, and critical to students' learning. Students and family wonderings are also important precursors to ethical deliberation and decision-making that are personally meaningful and important to students, their families, and their communities. The goal of this learning engagement is to support students and families in focusing their wonderings on elements of the "Should We" question and related, focal phenomena that you and students have chosen. One potentially new concept in this learning engagement is **base relationships**. Base relationships are foundational building blocks of interaction within socioecological systems. For example, base relationships can include a plant related to a plant (moss on a tree), or an animal related to a plant (a caterpillar eating a leaf), or an animal related to an animal (a hawk eating a mouse), or a plant related to a natural kind like soil or water (flowers planted in soil). It is important for students to identify, model, and investigate these base relationships because they are a central component of socio-ecological systems, and understanding those relationships will help students reason not only about the specific relationships but about how they function within the larger system (and to what ends). Additionally, base relationships will undoubtedly be important to students' understandings of their "Should We" questions. For more information about the different types of relationships that are important in complex socio-ecological systems, see the **Relationships in Socio-Ecological Systems framework**. Other frameworks that will be important to consult in this Learning Engagement are: (a) **Wonderings, "Should We's,"** and **Investigation Questions Framework** and (b) **Making Observations and Collecting Data Framework**. Additionally, the **Discussion, Reflection, and Deliberation Framework** will be an important resource for you as you support rich student discussions about students' "Should We" question and related, focal phenomena, their observations of them across place and/or time, including any base relationships they observe, and their synthesis of their and their families' observations and wonderings.

Centering equitable practices:

- **Provide equitable access to outdoor learning experiences:** Avoid centering student behavior outdoors as your main concern. While it is natural to be nervous about students' behavior outdoors, which might come from concerns about safety while outside, centering their behavior often eclipses their sense-making and robs them of opportunities to learn. Additionally, centering behavior often results in policing children of color more often and more harshly than white children. As you have already seen previous learning engagements, students **will** be excited to be outside. They **will** speak in louder voices than they normally would in the classroom. They **will** spread out but will come back together as they share their ideas, observations, and wonderings. Allow them both emotional and physical space to do this. Consult the **Supporting Learning Outdoors Framework** for strategies you can use to support students in their learning and sense-making outside.
- **Encourage student idea generation, wonderings, questions, comments, and suggestions.** Avoid a rush to judgment that any student's ideas, wonderings, questions, comments, and/or suggestions are silly, misinformed, nonsensical, or off target. Instead, ask clarifying questions. Ask how other students would incorporate whatever was said into ongoing discussions (other students might have perspective on peers' commentary that you don't). Assume a sense-making stance, and a 'desire to participate' stance, and let those guide your actions as a teacher and facilitator.
- **Use the 5 socio-ecological dimensions to frame observations and wonderings:** Avoid too-simplistic framings of the activities in this learning engagement, such as using Wondering Walks to simply classify, point out, or name species related to the class' "Should We" question and related, focal phenomena, and/or framing observations and wonderings solely in terms of how focal phenomena are useful for humans. As you and students take these next Wondering Walks, use your questions to model the use the 5 socio-ecological dimensions as part of observing and wondering about your focal phenomena across places and/or over time. This includes modeling how to take the perspective of more-than-humans, how to focus on relationships among species, kinds, lands, and waters, how to use different scales when observing and wondering (time, space, size), and how to look for evidence of human decision-making (because remember, humans are part of ecosystems, not dominant over them and not absent from them).
    - Create a set of back-pocket questions related to the 5 dimensions and take them with you out on the Wondering Walks to prompt students as they are walking, observing and wondering (they will think about these dimensions too in Part A of the LE 5.1b student tool as they plan for these Wondering Walks, but these back pocket questions will be useful to remind them to use these 5 dimensions as part of their thinking). For example, you could consider the following questions and tailor them to the class' "Should We" Question and related, focal phenomena:
        - **Species, Kinds, & Behaviors:** What species and kinds are involved in our focal phenomena? What are some behaviors that those species and kinds are engaged in and why? What species and kinds have power over others and why might that be? How does that power play out?
        - **Relationships:** What relationships between species, kinds, places, lands, and/or waters are involved in your focal phenomena? Who benefits from these relationships? Who might not benefit? Why? How might the relationships we are observing change across different scales of time (geologic time, plant, animal, & soil time, Indigenous peoples' time, nation-state time, global time, the future related to any of these time scales)? [You might choose to make a set of base relationship cards to help focus students' thinking about relationships even more.]
        - **Places, Lands, & Waters:** What places, lands, and/or waters are involved in your focal phenomena? Who is involved in making decisions about these places, lands, and/or waters? Who is not involved in decision-making, and is that problematic? How so? How have these places, lands, and waters changed over time?
        - **Thinking across Scale:** What time scales are important to think about related to your focal phenomena? (Look back at the Socio-Ecological Histories of Places work you did in LE 1.A.) What different scales related to space might be important to consider given your focal phenomena (looking at something from above or below, for example)? Try and take the perspective of species and kinds that you listed. Would doing that help you think about your focal phenomena differently?
        - **Human-Decision Making:** What evidence of human decision making is important to take into account given focal phenomena? Who gets to make the decisions and why? Would different decisions be made if others were making the decisions?

To prepare for this lesson

1. Make sure you engage in **place mapping** to plan where you and students could take these wondering walks. This will also help you support students when they do some planning in Part A on the 5.1b student tool. The class "Should We" question and related phenomena will determine whether students should observe them in three different places and/or over time, so as you place map, think about the affordances and constraints of different places (and/or times) with respect to making observations of the focal phenomena. **The Place & Place Designing: Mapping Opportunities to Learn Framework** will be helpful to you as you plan your outdoor instruction.

2. Decide ahead of time how you want students to engage in this lesson so that you can plan how you will orchestrate and facilitate this learning engagement. Students will need to take three different Wondering Walks as part of this learning engagement (to observe in three different places and/or over time). Will each student conduct observations and pose new wonderings? Will students do this in small groups? When making these decisions, center student learning about their "Should We" and related, focal phenomena by conducting observations and posing wonderings.

3. Plan discussion prompts and strategies that you will use to ask students to identify and debrief their observations and wonderings with each other as they walk. Remember that students can and should be engaged in sense-making as they are walking (versus waiting to start their sense-making until they are back indoors). Position walking as important work time. For example, you can have a "walking question of the day" that asks students to make a connection between the focal phenomena and their neighborhoods/families/everyday lives.

4. Use each of the tools yourself, including the family tool, before you ask families and students to use them. This will give you a good sense of student and family activity in this learning engagement. Based on the information asked for in each tool, plan questions and discussion prompts and strategies that you want to use to facilitate rich discussions and support student learning related to their observations and wonderings, as well as their synthesis of their and families' observations and wonderings. Anticipate student and family questions and concerns and plan how you will address them.

5. If you need a refresher on the 5 socio-ecological dimensions, re-read the LE 2.3 lesson plan and revisit the accompanying slide deck.

6. Send home LE5.1a Focused Family Wondering Walk before you and students go out on your walks. That way, families will have time to go on their walks and document their observations and wonderings. Make sure to let families know that if they don't have time for three different walks, one and/or two (whatever they have time for) is fine. You and students will incorporate these observations and wonderings into your synthesis work in this lesson (after you and students take your wondering walks at school).

7. Remember that phenology is central to the Storyline for Field-Based Science Learning: Don't forget about the seasons and the impacts that they have on the focal phenomena that students and families are observing and wondering about. For example, asking students questions such as, "How would this be different in another season? Why do you think it matters that both X & Y (2 phenomena) are happening in the same season? Why do you think this is happening in this season?" will get students thinking about the relationship between seasonal changes in life cycle, population growth, migration, intersections with temperature, rainfall, etc. This is the foundation of gaining an understanding of **phenology**. Visit the **Phenology framework** for more background.

MATERIALS

- LE5.1a Family Focused Wondering Walk
- LE5.1b Wondering Walks to Observe Focal Phenomena Related to Our "Should We" Question (student tool)
- LE5.1c Wondering Walk synthesis tool (Let's compare our family and classroom observations!); multiple copies of this chart (one for each focal phenomenon students are observing and wondering about)
- The classroom's 5 socio-ecological dimensions graphic organizer you and students constructed in LE 2 (this should be visible in the room)
- Back pocket questions related to the 5 socio-ecological dimensions (strongly suggested)
- The classroom's Wondering Wall you and students constructed in LE 3 (this should be visible in the room)

TIME

30 minutes for students to prepare for their Wondering Walks in the classroom, and 40-45 minutes for each Wondering Walk outdoors; 30-45 minutes to synthesize

Instructional Sequence

Preparing for the Wondering Walks

1. Ask students: "Who can remind us of our "Should We" question? Who can remind us of our related, focal phenomena?"

2. Explain to students: "Now that we have chosen these focal phenomena as important elements of our "Should We" question, we are going to take more Wondering Walks to learn more about them. Our goal is to observe these phenomena in (three different places and/or over time) and ask more wonderings about what we are observing. Before we go outside, we need to do some thinking and planning so that we can make the most of our time outside."

3. Make sure students have a copy of **LE5.1b Wondering Walks to Observe Focal Phenomena Related to Our "Should We" Question** (student tool). Before they go out on their Wondering Walks, they should do some planning using Part A in this tool. (An alternative to providing a copy for every student is asking students to work in groups and providing one copy per group. You might choose to debrief students' responses in Part A after each question or give them time to respond to all of the prompts in Part A and then debrief their responses and questions.)

4. Explain to students: "We are going to take about 20 minutes to think and plan before we go outside. You have some questions in front of you we need to think about and answer."

5. Explain to students : Thinking about our "Should We" question and our focal phenomena, do you think we should observe those in three different places? In the same place at three different times? Why?"

Assessment Opportunity: Students' responses should give you information into their understanding of their "Should We" question, and the related, focal phenomena.

Assessment Opportunity: Students' responses and questions should provide you with additional information related to their understanding of the "Should We" question, their focal phenomena, and the 5 socio-ecological dimensions.

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6. Ask students: "If you think we should observe in three different places, what places do you think we should go? Why? If you think we should observe in the same place but at three different times, what place should we observe and during what times? Why?"
    - » Note: students may suggest places other than the places you have identified in your place mapping. That is ok!
7. Ask students: "What dimensions should we use when we observe our phenomena?" (Students should use the 5 socio-ecological dimensions classroom graphic organizer to think about this question. The class' "Should We" question and the specific phenomena you have chosen should guide their thinking about this question in terms of which dimensions are central to your discussions and activity.)
8. Explain to students: "Let's think about relationships specifically. As part of our walks to observe our focal phenomena, we will be looking for what we'll call "base relationships" that are part of those phenomena. Base relationships are relationships like a plant related to a plant, or an animal related to a plant, or an animal related to an animal, or a plant related to a natural kind like soil or water. We want to observe these types of specific relationships when we are on our Wondering Walks."
9. Ask students: "Who has an example of a plant-plant relationship? Who has an example of an animal-plant relationship? Who has an example of a plant-natural kind relationship? Who has an example of a human-animal relationship?" Ask students for examples of different types of base relationships to gauge their understanding of this concept.
10. Ask students: "What questions do you have before we go outside to conduct our observations?" You can choose to respond to these in the moment if they are important to answer before going outside and/or you can choose to table questions that you think might be better to discuss after the Wondering Walks.

Remember that base relationships are are foundational building blocks of interaction within socioecological systems. As part of understanding their "Should We" question and ultimately deliberating and making a decision about it, it is important for students to identify the base relationships involved in their "Should We" question, and investigate them through their modeling and their investigations later in the Seasonal Storyline

Assessment Opportunity: Asking students to provide examples of a concept is a useful way to gauge their understanding and explore any confusions.

Invite families to take a Wondering Walk in their neighborhood to observe focal phenomena related to students' "Should We" question, and to generate additional wonderings

1. Send home the family tool (LE5.1a) and invite families to participate before you and students take your walks at school. This will give families time to take this walk and make their observations and generate wonderings while you and students engage in these same activities at school.
2. Before sending home this family tool, ask students to fill out the first page of the tool given the planning they just engaged in (Part A of LE 5.1b). Families will need this information for their Wondering Walk.
3. Remember to make it clear to families that if they only have time for one Wondering Walk, that's fine!

Remember that family knowledges and practices are critical to classroom learning, student sense-making, and student identity development. By starting this learning engagement with family activity, you are signaling the importance of families to students' learning and sense-making at school.

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Going on Wondering Walks to observe focal phenomena

1. Based on your place mapping as part of planning for this lesson, and based on students' preparation in Part A of LE 5.1b, go on these Wondering Walks. Students should document their observations and wonderings using Part B in LE5.1b.
2. Remember that students' goal is to explore their focal phenomena in three different places and/or at three different times. They should be using the 5 socio-ecological dimensions to guide their observations and wonderings. Notice that as part of each walk, they will be identifying any important base relationships and making sure they add those to their observations.
3. Whenever you can, ask questions to deepen students' observations, wonderings, and sense-making about the focal phenomena. Use the back-pocket questions you created when preparing for this lesson.
4. Remember to consult the Avoiding Potential Challenges section of this lesson plan for important things for you to keep in mind during this Wondering Walk.

Wondering Walks provide opportunities for students to observe, as well as wonder and reflect about, nature-culture relations that are important in understanding complex socio-ecological systems. During these walks, students are practicing their observation skills, which are an important part of field-based science.

Complex socio-ecological systems, including the focal phenomena you, families, and students have identified, are powered and have histories that are important to surface, wonder about, and reflect on as part of sense-making. Additionally, you want to make sure that all students have opportunities to participate in these activities in equitable ways.

Synthesizing family and classroom observations and wonderings about focal phenomena

1. At this point, families will have taken their Wondering Walk to make observations of one (or both) of the focal phenomena in their neighborhood and to pose related wonderings. Remember that some families might have recorded observations and wonderings on the LE5.1a Focused Family Wondering Walk activity sheet and some families might have recorded observations and wonderings on blank sheets of paper. The format doesn't matter; the observations, ideas, and wonderings are what is important! Additionally, some families might not have written anything down, but they might have gone on walks and had discussions so make sure that you ask students to share observations from their walks, and ideas and wonderings from these discussions! You do not have to have all family tools returned to start this synthesizing activity in class. Use the ones you have and ask students to share family discussions.
2. Once you and students have completed your Wondering Walks at school, you can synthesize observations and wonderings across locations and/or times at school and in family's neighborhoods.
3. You will use **LE5.1c Wondering Walk synthesis tool (Let's compare our family and classroom observations and wonderings!)** Have students synthesize using this tool for each focal phenomenon they observe. The goal of this synthesis work and related discussions is to collect all observations and wonderings related to your focal phenomena so that students can use them, as well as their analysis of them, to revise their initial model in LE 6. You can ask students to synthesize in several ways. You can ask small groups of students to synthesize their classroom and family observations and wonderings, or you can do this as a whole class.

Organizing, comparing, and contrasting are forms of data analysis that can help surface patterns. Plus, this type of analysis will help generate questions that will be useful in generating "Should We" and Investigation questions later in the storyline.

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a. It will be useful for you to create cards. You can use index cards or sticky notes, one color for observations, one color for wonderings, and one color for base relationships. Make sure to keep observations (including base relationships) and wonderings attached to the focal phenomenon to which they relate. Write one observation, wondering, or base relationship on each card. Use both student and family tools! This way, students can move cards around as they compare and contrast observations, and then group observations, including base relationships, and wonderings under each focal phenomena.

4. Explain to students: "Now that you and your families have gone on a Wondering Walk in their neighborhoods to observe our focal phenomena (in three different places and/or over time) and we have done this at school, it is time to look at all of our new observations, including our thinking about base relationships, and wonderings from our neighborhood and from around our school."

5. Explain to students: "Our goal is to capture all new observations and wonderings about our focal phenomena so that we can keep learning more about them and our "Should We" question. Plus, we want to identify which base relationships seem really important to our "Should We" question. We also want to compare and contrast our observations and wonderings because that way, we can see what is similar about what we observed (and where and/or when we observed it!) and what might be different."

6. Using the cards you created, model for students how they can group their observations and wonderings for each focal phenomena.

7. Give students some time to look at their groupings. Ask them questions such as, "What do you notice that is the same? What do you notice that is different? For what you notice that is different, how might the place where you made these observations and/or the time when you made these observations impact what is different? Do you think the season has anything to do with what you observed either at home or at school? Why? Which of the 5 dimensions was really helpful to you as you and your families made observations? Why? What base relationships seemed most important to our focal phenomena? Why might that be? What about your wonderings? Are there new wonderings that we don't have on our Wondering Wall yet related to our "Should We" question and our related, focal phenomena? If there are, let's add them to our Wondering Wall."

Assessment Opportunity: Student responses to these types of questions can give you a window about how they are thinking about and understanding the 5 socio-ecological dimensions and their importance in better understanding their "Should We" question and their related, focal phenomena.

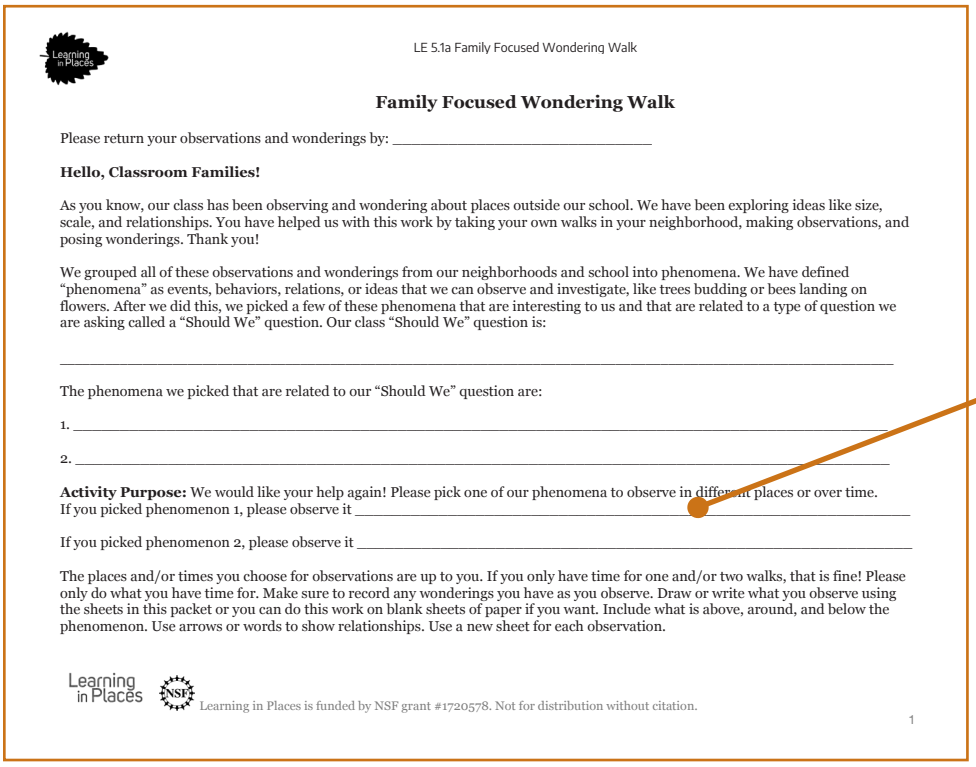
   a. To keep track of similarities and differences in observations (including base relationships), and wonderings, students can use LE 5.1c Wondering Walk synthesis tool (Let's compare our family and classroom observations!), or you can make that into a classroom chart and record ideas from this discussion onto this chart.

   b. If students identify wonderings related to their "Should We" question and/or their focal phenomena, make sure they add those to their Wondering Wall. Adding those will be helpful to them when they revise their initial model in LE 6.

Analyzing observations is an important part of field-based science. Analysis of observations leads to new questions and helps scientists make claims about those questions.

8. Ask students: What new questions do you have that we should write down so that we don't forget about them?" Document these questions. You might choose to have a discussion about some of them now, or you might choose to table them and discuss them later in the Seasonal Storyline.

Continued next page...



LE 5.1a Family Focused Wondering Walk

Family Focused Wondering Walk

Please return your observations and wonderings by: _____

Hello, Classroom Families!

As you know, our class has been observing and wondering about places outside our school. We have been exploring ideas like size, scale, and relationships. You have helped us with this work by taking your own walks in your neighborhood, making observations, and posing wonderings. Thank you!

We grouped all of these observations and wonderings from our neighborhoods and school into phenomena. We have defined "phenomena" as events, behaviors, relations, or ideas that we can observe and investigate, like trees budding or bees landing on flowers. After we did this, we picked a few of these phenomena that are interesting to us and that are related to a type of question we are asking called a "Should We" question. Our class "Should We" question is:

_____

The phenomena we picked that are related to our "Should We" question are:

1. _____

2. _____

Activity Purpose: We would like your help again! Please pick one of our phenomena to observe in different places or over time.
If you picked phenomenon 1, please observe it _____

If you picked phenomenon 2, please observe it _____

The places and/or times you choose for observations are up to you. If you only have time for one and/or two walks, that is fine! Please only do what you have time for. Make sure to record any wonderings you have as you observe. Draw or write what you observe using the sheets in this packet or you can do this work on blank sheets of paper if you want. Include what is above, around, and below the phenomenon. Use arrows or words to show relationships. Use a new sheet for each observation.

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1

After students complete Part A of LE5.1b and you and the students have created a plan for your Wondering Walks, make sure students fill out the first page of the family tool (LE5.1a) so that their families know what to do for the Wondering Walk.

Wondering Walks to Observe Focal Phenomena Related to Our "Should We" Question

Name: _____ Today's Date: _____

The season is: _____

The weather during our walk is:

The temperature during our walk is: _____

Our "Should We" Question is:

_____

We are observing these phenomena when we go outside:

_____

_____

Part A: Preparing for Our Walk
Before we go outside, we need to do some thinking about where we are going to walk, when, and why. Let's answer these questions so that we have a plan when we go outside.

1. Where do you think we will find these phenomena outside? Where should we look? If we need to observe these phenomena during three different times, what times should we go observe? Why? Write down your ideas.

_____

_____

_____

_____

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Make sure students have time to plan their Wondering Walks before they start walking, observing, and wondering. Students' thinking about and responses to these planning questions should be driven by their "Should We" question and their related, focal phenomena.

LE 5.1b Wondering Walks -- Student Tool

2. What are some things we should think about when we are observing these phenomena? Circle the dimensions you think will be important for us to use. For each dimension you circle, write your reason for circling it underneath the picture.

Species, Kinds, and Behaviors

Relationships

Places, Lands, & Water

Thinking across Scales

Human Decision-Making

What questions do you have before we go outdoors?

_____

_____

_____

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Walk #1

Location 1: _____ Time: _____

Weather:

Temperature: _____

Draw what you observe here.

↑above

around ← →

↓ below

We Wonder...

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3

Students and families will observe focal phenomena using different spatial scales (around, above, below).

LE 5.1a Family Focused Wondering Walk

Walk #1 continued...

Now that you have observed this phenomenon from above, below, and around, what relationships are part of this phenomenon that you think are important to highlight? Put a star or a check mark in the box to the left of any relationship you observe that you think is an important part of this phenomenon. (Don't worry if you do not observe all of these types of relationships. Just check the ones you do observe.)

If you haven't already drawn or written about the relationships you checked, go back to your drawing and add them in. Also, if you have new wonderings after observing any of these relationships, write those down too.

	Animal-Animal		**Animal-Plant**
	Animal-Human		**Plant-Plant**
	Plant-Human		**Animal-Natural Kind (for example: water, rock, sun, air)**
	Plant-Natural Kind (for example: water, rock, sun, air)		**Human-Natural Kind (for example: water, rock, sun, air)**
	Human-Human		**Other?**

For each walk students (and families) take, they should try and identify any important base relationships that they see. They can also ask wonderings about these. Attending to base relationships will be very helpful later in the Seasonal Storyline.

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4

Our "Should We" Question is _____
The phenomenon we observed _____

The season is _____

	Location: Weather: _____ Temperature: _____	**Location:** Weather: _____ Temperature: _____	**Location:** Weather: _____ Temperature: _____	**What new wonderings do we have?**
Differences What is something you noticed that is different about your observations across locations?	Something **different** we noticed was: _____ We think it was different **because:** _____ _____ _____			
Similarities What is something similar that you noticed about your observations across locations?	Something **similar** we noticed was: _____ We think it was similar **because:** _____ _____ _____			**What base relationships seem important to our "Should We" question?**

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Give students enough time to analyze their observations and wonderings. They should be exploring similarities and differences about their observations across places and/or over time. They should also be thinking about the relationship among place and/or time and the similarities or differences that they notice.

Remeber to make sure students add any new wonderings to their Wondering Wall.

Family Focused Wondering Walk

Please return your observations and wonderings by: _____

Hello, Classroom Families!

As you know, our class has been observing and wondering about places outside our school. We have been exploring ideas like size, scale, and relationships. You have helped us with this work by taking your own walks in your neighborhood, making observations, and posing wonderings. Thank you!

We grouped all of these observations and wonderings from our neighborhoods and school into phenomena. We have defined "phenomena" as events, behaviors, relations, or ideas that we can observe and investigate, like trees budding or bees landing on flowers. After we did this, we picked a few of these phenomena that are interesting to us and that are related to a type of question we are asking called a "Should We" question. Our class "Should We" question is:

_____

The phenomena we picked that are related to our "Should We" question are:

1. _____

2. _____

Activity Purpose: We would like your help again! Please pick one of our phenomena to observe in different places or over time.
If you picked phenomenon 1, please observe it _____

If you picked phenomenon 2, please observe it _____

The places and/or times you choose for observations are up to you. If you only have time for one and/or two walks, that is fine! Please only do what you have time for. Make sure to record any wonderings you have as you observe. Draw or write what you observe using the sheets in this packet or you can do this work on blank sheets of paper if you want. Include what is above, around, and below the phenomenon. Use arrows or words to show relationships. Use a new sheet for each observation.

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If it's raining or you forget something to write on, you can take pictures of what you notice or simply remember them. You can then draw and write about your observations and wonderings when you get back inside.

What you can do to support learning:

- What kinds of roles and relationships do you notice related to the phenomenon you chose?
- What similarities and/or differences do you notice across places and over time? Similarities and differences help us see *patterns* in our world.
- Remember that there are no *right* answers. We want to collect as many observations of our focal phenomena and wonderings about those observations as we can!

The phenomenon we observed is (pick #1 or #2 from the list below):

_____

_____

We observed this phenomenon in these three different places:

1. _____
2. _____
3. _____

OR

We observed this phenomenon at three different times (what times did you observe?):

_____

The season is: _____ The weather during our walk is (circle one): 

The temperature during our walk is: _____

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Walk #1

Location 1: _____ Time: _____

Weather:

Temperature: _____

Draw what you observe here.

↑above

around ← →

↓ below

We Wonder...

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Walk #1 continued...

Now that you have observed this phenomenon from above, below, and around, what relationships are part of this phenomenon that you think are important to highlight? Put a star or a check mark in the box to the left of any relationship you observe that you think is an important part of this phenomenon. (Don't worry if you do not observe all of these types of relationships. Just check the ones you do observe.)

If you haven't already drawn or written about the relationships you checked, go back to your drawing and add them in. Also, if you have new wonderings after observing any of these relationships, write those down too.

	Animal-Animal		**Animal-Plant**
	Animal-Human		**Plant-Plant**
	Plant-Human		**Animal-Natural Kind (for example: water, rock, sun, air)**
	Plant-Natural Kind (for example: water, rock, sun, air)		**Human-Natural Kind (for example: water, rock, sun, air)**
	Human-Human		**Other?**

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Walk #2

Location 2: _____ Time: _____

Weather:

Temperature: _____

Draw what you observe here, including relationships.

↑above

around ← →

↓ below

We Wonder...

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Walk #2 continued...

Now that you have observed this phenomenon from above, below, and around, what relationships are part of this phenomenon that you think are important to highlight? Put a star or a check mark in the box to the left of any relationship you observe that you think is an important part of this phenomenon. (Don't worry if you do not observe all of these types of relationships. Just check the ones you do observe.)

If you haven't already drawn or written about the relationships you checked, go back to your drawing and add them in. Also, if you have new wonderings after observing any of these relationships, write those down too.

Something to think about: Are there relationships that you observed on this walk that you didn't observe on Walk #1? Why do you think that is? Or, did you observe relationships on Walk #1 that you didn't observe on this walk? Again, why might that be?

	Animal-Animal		**Animal-Plant**
	Animal-Human		**Plant-Plant**
	Plant-Human		**Animal-Natural Kind (for example: water, rock, sun, air)**
	Plant-Natural Kind (for example: water, rock, sun, air)		**Human-Natural Kind (for example: water, rock, sun, air)**
	Human-Human		**Other?**

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Walk #3

Location 3: _____ Time: _____

Weather:

Temperature: _____

Draw what you observe here, including relationships.

↑above

around ← →

↓ below

We Wonder...

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Walk #3 continued...

Now that you have observed this phenomenon from above, below, and around, what relationships are part of this phenomenon that you think are important to highlight? Put a star or a check mark in the box to the left of any relationship you observe that you think is an important part of this phenomenon. (Don't worry if you do not observe all of these types of relationships. Just check the ones you do observe.)

If you haven't already drawn or written about the relationships you checked, go back to your drawing and add them in. Also, if you have new wonderings after observing any of these relationships, write those down too.

Something to think about: Are there relationships that you observed on this walk that you didn't observe on Walks #1 and/or #2? Why do you think that is? Or, did you observe relationships on Walks #1 and/or #2 that you didn't observe on this walk? Again, why might that be?

	Animal-Animal		**Animal-Plant**
	Animal-Human		**Plant-Plant**
	Plant-Human		**Animal-Natural Kind (for example: water, rock, sun, air)**
	Plant-Natural Kind (for example: water, rock, sun, air)		**Human-Natural Kind (for example: water, rock, sun, air)**
	Human-Human		**Other?**

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Wondering Walks to Observe Focal Phenomena Related to Our "Should We" Question

Name: _____ Today's Date: _____

The season is: _____

The weather during our walk is: 

The temperature during our walk is: _____

Our "Should We" Question is:

_____

We are observing these phenomena when we go outside:

_____

_____

Part A: Preparing for Our Walk
Before we go outside, we need to do some thinking about where we are going to walk, when, and why. Let's answer these questions so that we have a plan when we go outside.

1. Where do you think we will find these phenomena outside? Where should we look? If we need to observe these phenomena during three different times, what times should we go observe? Why? Write down your ideas.

_____

_____

_____

_____

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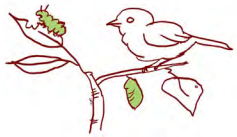
2. **What are some things we should think about when we are observing these phenomena?** Circle the dimensions you think will be important for us to use. For each dimension you circle, write your reason for circling it underneath the picture.

Species, Kinds, and Behaviors



Relationships

Places, Lands, & Water

Thinking across Scales

Human Decision-Making

What questions do you have before we go outdoors?

_____

_____

_____

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Part B: Talking Our Walk (Use the plan we made. Write and draw observations and wonderings.)
Walk #1

Location 1: _____ Time: _____

Weather:

Temperature: _____

Draw what you observe here, including relationships.

↑above

around ← →

↓ below

I Wonder...

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Walk #1 continued...

Now that we have observed our focal phenomena from above, below, and around, what relationships are part of these phenomena that you think are important for us to highlight? Put a star or a check mark in the box to the left of any relationship you observe that you think is an important part of these phenomena.

If you haven't already drawn or written about the relationships you checked, go back to your drawing and add them in. Also, if you have new wonderings after observing any of these relationships, write those down too.

	Animal-Animal		**Animal-Plant**
	Animal-Human		**Plant-Plant**
	Plant-Human		**Animal-Natural Kind (for example: water, rock, sun, air)**
	Plant-Natural Kind (for example: water, rock, sun, air)		**Human-Natural Kind (for example: water, rock, sun, air)**
	Human-Human		**Other?**

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Walk #2

Location 2: _____ Time: _____

Weather:

Temperature: _____

Draw what you observe here, including relationships.

↑above

around

←

→

↓ below

I Wonder...

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Walk #2 continued...

Now that we have observed these phenomena from above, below, and around, what relationships are part of these phenomena that we think are important to highlight? Put a star or a check mark in the box to the left of any relationship you observe that you think is an important part of this phenomenon.

If you haven't already drawn or written about the relationships you checked, go back to your drawing and add them in. Also, if you have new wonderings after observing any of these relationships, write those down too.

Something to think about: Are there relationships that you observed on this walk that you didn't observe on Walk #1? Why do you think that is? Or, did you observe relationships on Walk #1 that you didn't observe on this walk? Again, why might that be?

	Animal-Animal		**Animal-Plant**
	Animal-Human		**Plant-Plant**
	Plant-Human		**Animal-Natural Kind (for example: water, rock, sun, air)**
	Plant-Natural Kind (for example: water, rock, sun, air)		**Human-Natural Kind (for example: water, rock, sun, air)**
	Human-Human		**Other?**

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Walk #3

Location 3: _____ Time: _____

Weather:

Temperature: _____

Draw what you observe here, including relationships.

↑above

around

←

→

↓ below

I Wonder...

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Walk #3 continued...

Now that you have observed these phenomena from above, below, and around, what relationships are part of these phenomena that you think are important to highlight? Put a star or a check mark in the box to the left of any relationship you observe that you think is an important part of these phenomena.

If you haven't already drawn or written about the relationships you checked, go back to your drawing and add them in. Also, if you have new wonderings after observing any of these relationships, write those down too.

Something to think about: Are there relationships that you observed on this walk that you didn't observe on Walks #1 and/or #2? Why do you think that is? Or, did you observe relationships on Walks #1 and/or #2 that you didn't observe on this walk? Again, why might that be?

	Animal-Animal		**Animal-Plant**
	Animal-Human		**Plant-Plant**
	Plant-Human		**Animal-Natural Kind (for example: water, rock, sun, air)**
	Plant-Natural Kind (for example: water, rock, sun, air)		**Human-Natural Kind (for example: water, rock, sun, air)**
	Human-Human		**Other?**

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Let's Compare our Family and Classroom Observations and Wonderings!

LE # 5.1c

Our "Should We" Question is _____
The phenomenon we observed _____

The season is _____

	Location: Weather: _____ Temperature: _____	**Location:** Weather: _____ Temperature: _____	**Location:** Weather: _____ Temperature: _____	**What new wonderings do we have?**
Differences What is something you noticed that is different about your observations across locations?	Something **different** we noticed was: _____ We think it was different **because:** _____ _____ _____			
Similarities What is something similar that you noticed about your observations across locations?	Something **similar** we noticed was: _____ We think it was similar **because:** _____ _____ _____			**What base relationships seem important to our "Should We" question?**

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