

Overview: Taking action on our “Should We” question with family and community

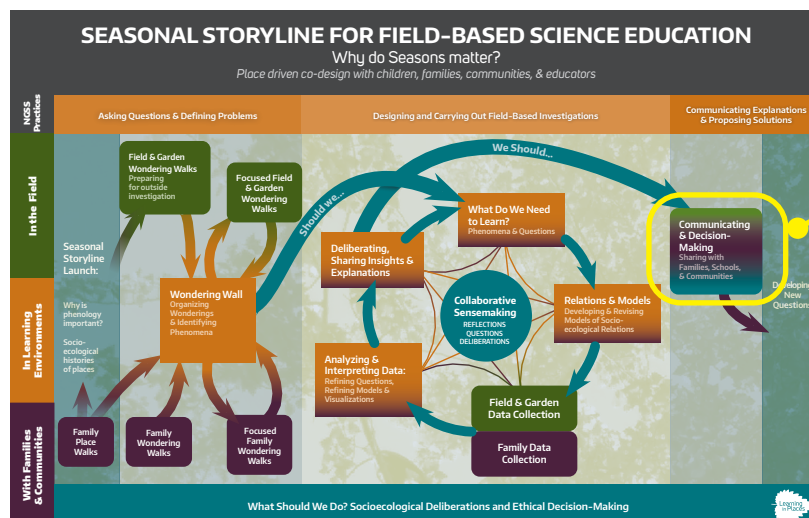
LE10 engages students in decision-making around the class “Should We” question. The class comes up with a recommendation for shared action based on their investigations and their deliberation. They then share their findings and decisions around their “Should We” questions with family and community members (including their peers!) and encourage them to also take collective action. This represents the NGSS Science and Engineering Practice of Obtaining, Evaluating, and Communicating Information. This practice

“involves important learning processes related to interpreting information, synthesizing personal understanding, and learning to make one’s own thinking visible to others...This practice is also essential to the ongoing work of the scientific and engineering communities as they collectively develop ideas and engage in design-related work.” (Bricker, et al, 2017, p.261).

Additionally, public sharing events where students share out about their decisions and recommended actions around their “Should We” questions are important events to build students’ identities as scientists and decision-makers.

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

As in LE9, LE10 engages students and their families in asking “what should we do.” Deliberations and decisions can be informed by personal experience, values and beliefs, cultural norms, social networks, and evidence from a myriad of other sources. In field-based science, deliberating and then making decisions involves utilizing knowledge, clarifying values and goals, and exploring potential impacts on humans and more-than-humans, at micro and macro scales, across multiple timescales, and from powered positions. “Should We” questions require deliberation and action even with uncertainty. “Should We” questions require that we think about power and historicity as part of our deliberations and decision making.



LE 10 LEARNING GOALS

The lessons in this Learning Engagement will help to guide you and students in synthesizing and communicating about all of the information that students have collected and analyzed in order to support students in:

1. using evidence (from multiple sources) in presenting arguments and explanations to the public
2. taking on multiple perspectives when considering decisions around the class “Should We” question
3. publicly sharing (and defending) decisions around the class “Should We” question and recommendations for action
4. using family and community practices and values in making decisions around the class “Should We” question

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 the class “Should We” question]

» **Science Practices:**

Obtaining, Evaluating, and Communicating Information, Analyzing and Interpreting Data, Constructing explanations, Engaging in argument from evidence, Developing and Using Models

» **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 and investigations you and students chose.]

Learning Engagement in LE10

Learning Engagement 10 has one lesson:

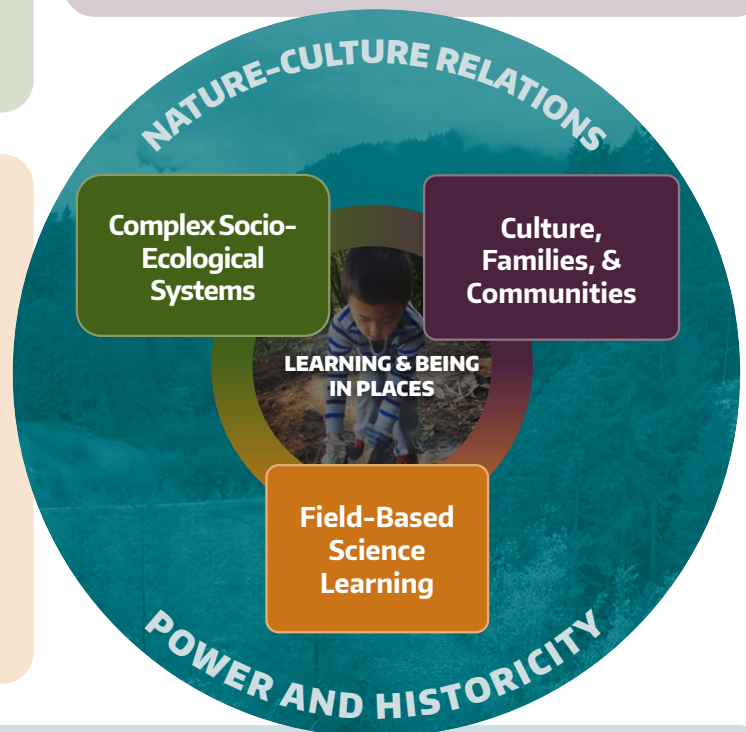
LE10.1 Preparing our decisions and recommendations: During this lesson, students assemble all of the information they have gathered through their investigations, and all of their ideas, their model revision, and their explanation based on their deliberations in LE9.1. They will come up with their final recommendations for action around the “Should We” question and present those to the public.

Engaging the Rhizome

Complex Socio-Ecological Systems: In formulating their recommended action around their “Should We” question, students think about scales of time, including seasons, and processes of change. They take on others’ perspectives and ask, “who would we help with our decision? Who might we harm?” In this process, students consider their own role within socio-ecological systems and the ethical balance between their needs, more-than-human needs, and the needs of the places in which they are making decisions.

Field-based science Learning: LE10 engages students in the NGSS practice of **Obtaining, Evaluating, and Communicating Information**. Students need to weigh all of the information they have gathered through their various investigations, their analyses of those investigations, their modeling, and their explanation construction, as well as discussions with their families, to form a final recommendation for action that is based in evidence. Their public communication is a powerful leadership and identity-building moment for students that will lead them to ask more questions and start a new Seasonal Storyline.

Culture, families, and communities: As in LE9, students are asked to consider evidence from a variety of sources, including investigations done in students’ neighborhoods with their families and in their communities in order to form a final recommendation of action around their “Should We” question. As they started in LE4.1 where they considered the decisions they made as a family, students will consider what values, evidence, and relations drive their decision-making. These include family and community knowledge and practices, as well as family and community connections to place.



Power and Historicity:

“Should We” questions ask us to think about consequences of our decisions from multiple perspectives, and to consider ethical futures not only for ourselves but for the places in which we live and for all who live there. This means acknowledging our power as humans to make those decisions while at the same time positioning ourselves within and not dominant to others in our socio-ecological systems.

Making recommendations for action publicly also means that we take both leadership and responsibility for our decisions in a public way. This positions students with agency and leadership within science learning environments in ways that are probably new to them (and to the community to whom they present). This is a powerful way to center student and family sensemaking and to demonstrate that we are always making decisions from contexts of power and historicity.



Lesson Plan

LE10.1: Preparing our decisions and recommendations

Purpose

Your students and their families have engaged in multiple investigations around the class's "Should We" question. They have analyzed a variety of data, revised models, and formed explanations. In this lesson, you will first send home LE10.1a Family tool so that students can discuss possible decisions with their families around the class "Should We" question. Working in small groups in the classroom, students will prepare a recommendation for action around the "Should We" question to be shared publicly. The public sharing of your class's seasonal storyline investigation can take many forms: a seasonal summit, a play, written and shared stories, dioramas, etc.

Why this is important

Human communities have always made socio-ecological decisions. From choices about what to eat, where to live, how to get around, to whether water is safe to drink, amongst many others. These choices are shaped by our values and cultural practices and fundamentally reflect what we call construals of nature-culture relations. Nature-culture relations are the ways human communities construct their ways of thinking and being (everyday, institutional, legal, etc.) with the natural world. Importantly, these relational construals have changed over time for different communities, and are often shaped by the technologies and uses of energy that have become central to human life in some parts of the world. Since the industrial revolution there has been global scale change to practices of extraction and large scale agriculture, amongst other things. These changes significantly impact nature-culture relations in many places in the world, but are having heightened impacts in what is known as "climate change hotspots". These changes have a pronounced correlation with the development of nation-states, capitalism and the histories and power dynamics that created them - and continue to.

Engaging family and community knowledge and practices

In this lesson, students will first discuss possible decisions around the "Should We" question with their families. Then, in class, they will collaboratively consider evidence from a variety of sources, including investigations done in students' neighborhoods with their families and in their communities. Students are also asked to deliberate around what actions they might take around their "Should We" questions--and what kinds of values, evidence, and relations drive those actions. These include family and community knowledge and practices, as well as family and community connections to place.

LEARNING GOALS

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

1. take multiple perspectives when considering decisions around our “Should We” questions,
2. deliberate about socio-ecological decisions and actions even with incomplete information,
3. connect evidence from investigations to their deliberations and decisions,
4. connect decisions around “Should We” questions to family and community practices and values.

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:

Obtaining, Evaluating, and Communicating Information, Analyzing and Interpreting Data, Constructing explanations, Engaging in argument from evidence

» 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

- » LE10.1a Family tool: What “Should We” do?
- » LE10.1b Student tool: What decision are we making and why?
- » student talk during small group discussion
- » students’ public presentations

To prepare for this lesson

- At this point in the Seasonal Storyline, you and your students should feel confident that you have enough evidence and have gathered enough information to make a final decision around your “Should We” question. You may have done a few rounds of investigations (going from LEs 6.1-9.1 a few times). These will be important as your students start to assemble their recommendations for action around your “Should We” question.
- It will be important for you to review family responses to LE10.1a Family tool-What “Should We” do? so that you can be prepared to incorporate families’ decision-making alongside the class’s decision-making.
- The Ethical Deliberation and Decision-Making in Socio-ecological Systems Framework and the Wonderings, “Should we”, and Investigation Questions in Field-Based Science Framework will both be good references for you as you prepare for this lesson.
- Take some time to carefully consider who you want the audience for the public presentations. You might consider community members who have power to make decisions around the “Should We” questions (city council members, landscapers, city parks, community-based organizations), family, or even other classes in the school. An important part of preparing for these presentations is not only supporting your students in preparing, but also supporting the public audience--with questions to ask students that are both supportive but also authentic to their decision-making processes and acknowledge students’ intellectual leadership. For example, the audience members can ask questions such as, “can you describe the evidence you have for your decision?, what other options did you consider and why was this the best choice? If we take the action you suggest, who else could be affected by our actions--other humans, places, more-than-humans? How might this affect all of our futures?”

Teacher background information

We are living in an unprecedented time in human history—what has been named the Anthropocene. The Anthropocene is a new geological era in which human activity is fundamentally reshaping earth processes—and unfortunately in ways that are having devastating and cascading effects for the social and ecological arrangements of life on earth. However, these impacts are heavily mediated by powered differences across history. For example, many climate change hotspots are not places or communities that are reflective of the technologies or societal structure and uses of energy that created the Anthropocene—in other words, the communities bearing the brunt of climate change impacts are not the ones using the most energy or producing the most greenhouse gases. While humans have entered this era perhaps unintentionally through development, inventions, and a range of other factors, there are many critically important lessons to be learned. A key skill for coming generations will be to engage in forms of sensemaking, deliberation and decision-making about social-ecological systems that can hold the complexity of the challenges and possibilities in front of us to restore and develop just and sustainable nature-culture relations that support our collective adaptive capacities in the changing earth.

Centering equitable practices

- **Make decision-making visible:** Avoid making complexity in decision-making invisible. We are always making decisions from contexts of power and historicity. For example, we could choose a human-dominant perspective when deciding what action to take around the “Should We” question, or we could choose to consider more-than-human perspectives as we decide. We could choose to ignore historicized racial inequities in places when deciding on our actions, or we could choose to include BIPOC (Black, Indigenous, People of Color) people in our community research to understand all of our collective perspectives and be better informed as we deliberate. How we conduct our investigations is crucially important to the quality of the data that we collect, and consequently the kinds of evidence-based claims we can make as we deliberate. When you make underlying assumptions visible to students, they become more nuanced and ethical decision-makers.
- **Encourage more-than-human perspective taking:** Avoid describing ecosystems only in terms of how ecosystems are useful for humans. In order to engage in ethical deliberation and decision-making about places, we need to support students in taking the perspective of more-than-humans in natural systems. How is this decision good for the trees? How is this place good for the worms? for the soil? Beginning to ask these questions will encourage students to take on broader perspectives when engaging in ethical deliberation and decision-making around ecosystems.
- **Encourage human connections to ecosystems:** Avoid positioning humans as disconnected or apart-from nature. This activity encourages thinking about connections between humans and the rest of the natural world and starting from assumptions of complex interdependence instead of human-centric or dominance.
- **Acknowledge students’ intellectual leadership and agency:** Avoid speaking for students or their ideas. Students rarely get the opportunity in school settings to hold and show authentic intellectual leadership. They have conducted so much work around wondering and noticing, exploring the multiple dimensions of their “Should We” questions, collecting data from multiple sources, and having discussions and doing investigations with their families.

MATERIALS

- » Revised models from LE6.1
- » LE9.1a student tool (you may have multiple copies of this depending on how many rounds of investigations you went through)
- » LE9.1b-c graphic organizers (you may have multiple copies of this depending on how many rounds of investigations you went through)
- » LE10.1a Family tool--What "Should We" do?
- » LE10.1b Student tool: "What "Should We" do and why?
- » LE10.1c: Student checklist for preparing their recommendations

TIME

60 min



(depending on how long it takes students to prepare their final recommendations)

Instructional Sequence

Before launching this lesson, hand out LE10.1a Family tool and allow some time for the tools to be returned. The chart is the same as it is in LE10.1b Student tool--the point is that students will have discussions with their families about what they "should" do, and then bring back and share their family discussions with each other to come up with small group recommendations.

Instructional Sequence

1. Launch the lesson by asking students: What was the "Should We" question that our class has been exploring through our investigations?
2. Remind students of the process they've gone through: that they started out doing investigations at home and at school, they analyzed their data and then decided that they didn't have enough information and did more investigations.
3. Say to students, "We have done so much scientific work to explore our "Should We" question over the past few weeks. Our next step is to actually make a decision!" Explain to students that in order to do that, we have to make sure that we are considering all sides of the question, based on all of our evidence that we now have.

Preparing decisions and recommendations

4. Show LE10.1b Student tool Making our recommendations on the doc cam. Explain to students that this is the same chart they discussed with their families in 10.1a Family tool that they discussed with their families. Now it's time to talk in small groups about what your recommendations for action will be.



Even if only a few family tools are returned, that's ok! Students can still contribute family values and perspectives in their small group discussions.

Keeping track of what steps they have taken is important for understanding what next steps scientists should take in their investigations.

5. Hand out LE10.1b Student tool Making our recommendations and allow times for small groups to work together to fill out the chart. Remind students that whatever their recommendation for action is, they need to back it up with at least three pieces of evidence. Also, they need to consider their decision from multiple points of view so that they are considering how their decision affects multiple parts of the system. Remind students that they can look at their **models from LE 6.1** if they need help remembering the different more-than-humans that are a part of the system they are considering.
6. Tell students that they will be sharing these recommendations with a public audience who will ask them questions about their decisions, so their evidence will be an important part of sharing why they are making their recommendations.
 - a. This chart may take several class sessions to complete. Students might want to draw pictures or maps to add to what they prepare on the student tool.
 - b. Encourage students to discuss their families' recommendations during their small-group work.
7. Remember that, as students prepare their decisions around the "Should We" question, their presentations can take different forms--posters, slides, stories, etc. You can choose to have a "whole class" recommendation or have different groups make their recommendations and set up deliberation between groups that have differing recommendations.
8. However you configure your class in step 7, make sure that students not only have a decision but a **recommendation for action**. As they gather their recommendations for action, discuss how, in order to convince others to take this action, they need to back up their recommendations for action with arguments that include evidence, others' (including more-than-human) perspectives, and values.

Ethical deliberation around evidence, multiple perspectives, and multiple dimensions of socio-ecological systems is an important part of ethical decision-making.

Public Presentations

9. Based on how you set up the class configurations in step 7 above, make sure to bring your class through a rehearsal of their public presentation, including rehearsing some questions that they'll likely be asked (see the "To prepare for this lesson" section of this lesson plan).

One of the important parts of making decisions around the "Should We" question is to recommend community-based action.

Why was this "Should We" question important to our family and our community?	
What options are we considering?	Option 1: Option 2:
What is our decision?	We should _____ This is supported by these 3 pieces of evidence: 1. Evidence from my outdoor investigations at home and school: 2. Evidence from my community interviews: 3. Evidence from other research: Values that are guiding our decision:

Make sure that students and families consider at least two options for their decisions.

Students and families should use at least 3 pieces of evidence from across their investigations.



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A decision should imply some collective action that we should take and that students recommend.

What action should we take now?	We should...
How are we thinking about the places we live when we make our decision?	The places we live are important in this decision because...
How does our decision change our lives--now or in the future?	This decision changes our lives now because... This decision changes our lives in the future because...



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This part of the tool asks learners to take perspectives of others to think about the ethical consequences of their actions and decisions.

Who does this decision affect?	This decision affects the more-than-humans in this place because:
	This decision does NOT benefit:
	This decision affects our family because:
What questions do we want to investigate next?	



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At the end of the storyline, you and your students should have more questions to start a new seasonal storyline.

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LE10.1a Family discussion: What “Should We” do?

Please return this by _____

Activity Purpose:

Our class is nearing the end of our Seasonal Storyline investigation and we are getting ready to make a decision around our class’s “Should We” question! In order to include our entire classroom community in this recommendation, we need your help. Please use this activity to discuss with your child what we’ve learned as we’ve explored our “Should We” question, and what your family’s recommended action is! The chart on the next page gives you a starting point for this discussion.

Activity Overview:

Use the chart on the next page to guide your family’s discussion. You can discuss with your child what the class has learned in the school investigations, as well as which aspects of this decision are important to your family.

What Can You Do To Support Learning?

- Earlier, you helped us understand important parts of decisions and decision-making by telling us about a big decision your family has made. Revisit that decision or think about some other decisions and compare/contrast different decisions you and your family have made to uncover different knowledge, goals, and values involved in making decisions.
- This is an opportunity to share your family’s histories and values. You might also explore a familial or cultural practice or decision you make in the same way as previous generations in your family.

Our class’s “Should We” question is: _____



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<p>Why was this “Should We” question important to our family and our community?</p>	
<p>What options are we considering?</p>	<p>Option 1:</p> <p>Option 2:</p>
<p>What is our decision?</p>	<p>We should -----</p> <p>This is supported by these 3 pieces of evidence:</p> <ol style="list-style-type: none"> 1. Evidence from my outdoor investigations at home and school: 2. Evidence from my community interviews: 3. Evidence from other research: <p>Values that are guiding our decision:</p>



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What action should we take now?	We should...
How are we thinking about the places we live when we make our decision?	The places we live are important in this decision because...
How does our decision change our lives--now or in the future?	This decision changes our lives now because... This decision changes our lives in the future because...



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Who does this decision affect?	This decision affects the more-than-humans in this place because:
	This decision does NOT benefit:
	This decision affects our family because:
What questions do we want to investigate next?	



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LE 10.1b: Student tool: Time to decide and take action!

LE10.1b Time to decide and take action!

You've worked so hard on making a decision around your "Should We" question that now it's time to share with others about what you've found, what your decision around your "Should We" question is (for now), and what you think we should do! This chart was one that you filled out with your families. will help you think through your final sharing and keep track of all of the ideas and evidence that you've collected.

<ul style="list-style-type: none">• Why was this "Should We" question important to our families and our communities?	
<ul style="list-style-type: none">• What options are we considering?	Option 1: Option 2:
What is our decision?	We should _____ This is supported by these 3 pieces of evidence: 1. Evidence from my outdoor investigations at home and school: 2. Evidence from my community interviews: 3. Evidence from other research:



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LE 10.1b: Student tool: Time to decide and take action!

	Values that are guiding our decision:
What action should we take now?	We should...
How are we thinking about the places we live when we make our decision?	The places we live are important in this decision because...
How does our decision change our lives--now or in the future?	This decision changes our lives now because...
	This decision changes our lives in the future because...
Who does this decision affect?	This decision affects the more-than-humans in this place because:



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LE 10.1b: Student tool: Time to decide and take action!

What questions do we want to investigate next?	
	This decision does NOT benefit:
	This decision affects our family because:



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