Nature-Culture Relations Framework

Why is thinking about nature-culture relations important for educators?

The natural world makes human life possible. The ways that humans understand, interact with, and make decisions about the natural world has varied across cultural communities, as well as over history. From our everyday choices, to how we build communities (even in dense urban environments), to national and global policy, nearly every aspect of our sensemaking, decisions, and societal infrastructure are shaped by culturally constructed conceptions of human relations with the natural world–what we refer to as **nature-culture relations**. The complexity of nature-culture relations and the ways they permeate all aspects of life are studied across a wide range of fields from ecology and physics, to history and anthropology, to sociology and economics, and many others. Nature-culture relations are especially central to science and the ways in which scientists imagine, conceptualize, and investigate phenomena. Many 21st century challenges to social and ecological systems' health and resilience are caused by unsustainable and imbalanced human-nature relationships and practices. These imbalances are changing ecosystems across the earth to the point that scientists have called this a new era in the earth's history–the anthropocene. A key opportunity and need of the 21st century is for local and global communities to adapt to changing lands and waters and develop sustainable relations with the natural world. Importantly, issues of power and historicity continue to shape nature-culture relations and our ability to cultivate just, sustainable and culturally thriving societies. It is important for educators to recognize how nature-culture relations and the demands of the 21st century pervade all aspects of learning in formal, informal, and everyday learning environments–particularly in science education.

This framework describes two predominant cognitive models of nature-culture relations: 1) humans **"apart from"** the natural world, or what we call nature-culture divides; and 2) **humans are "a part of" the natural world**, or what we call **nature-culture complementarities**. There is a growing body of work demonstrating that "a part of" models support more complex understandings of the natural world and more sustainable decision making. However, research has demonstrated that in the United States "apart from" models are prevalent - particularly in educational environments and in educational materials (even in children's books!). The Learning in Places project is focused on developing learning environments that reflect and cultivate "a part of" models through intentional learning in and across places, lands, and waters to support learning about complex socio-ecological systems and decision-making.

This framework also highlights five dimensions of **nature-culture relations** that structure everyday life for students, families, and educators and play out in routine learning interactions.

How to use this framework

Learner Sense-Making: Use this framework to scaffold learner sense-making about socio-ecological phenomena in ways that position humans as a part of the natural world instead of apart from. Relational models vary by culture, so it is important to intentionally draw on learners' family and community knowledges and practices in learning activities both indoors and in the field.

Collaborative Practice: Collaborate with other educators, community partners, and families in field based and indoor activities. Collaborative activities can make visible whether lessons and activities are aligned with nature-culture divide or nature-culture complementarity relational models.

Educator Reflection: Use this framework to reflect on your own nature-culture model. Do you view humans as a part of or apart from the natural world? How does this orientation show up in the lessons and activities you plan? What assumptions do you make about your learners and their families regarding their nature-culture orientations?

Planning and Implementation: Use this framework to guide your planning and your teaching about socio-ecological systems. Consider whether the lesson or activity is intentionally (or unintentionally) positioning humans as apart from or a part of the natural world. For example, are you engaging in activities in which humans are considered dominant? This can show up in subtle ways,such as referring to the natural world as a "resource" or not referring to humans when talking about animals.

Co-Design and Assessment: Use this framework to guide your co-planning with other educators, community partners, and families to incorporate multiple human-nature perspectives. Audit your lessons and activities to see which relational model they are aligned with, and collaboratively re-design learning activities that are aligned with nature-culture divided perspectives.

Part 1: Core Cognitive Models of Human Relationships with the Natural World

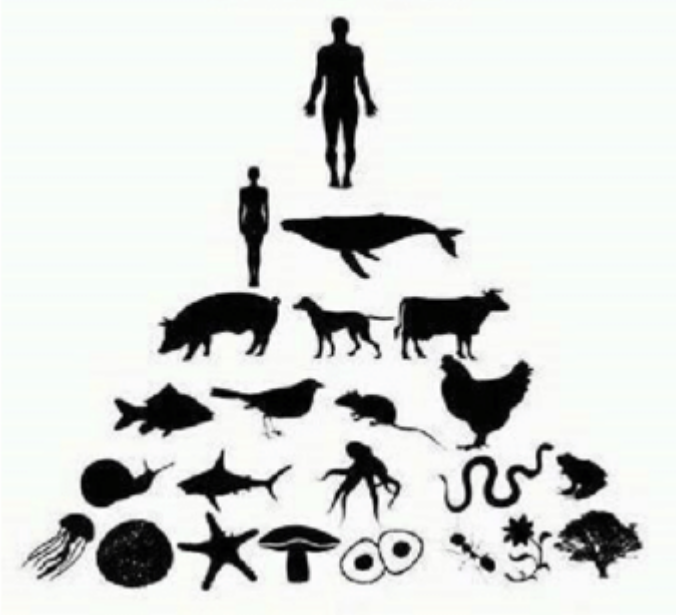


Diagram 'Ego-Eco'-Humankind is part of the ecosystem, not apart from or above it. This diagram depicts this simple fact clearly (diagram: S. Lehmann, 2010).

NATURE-CULTURE DIVIDES

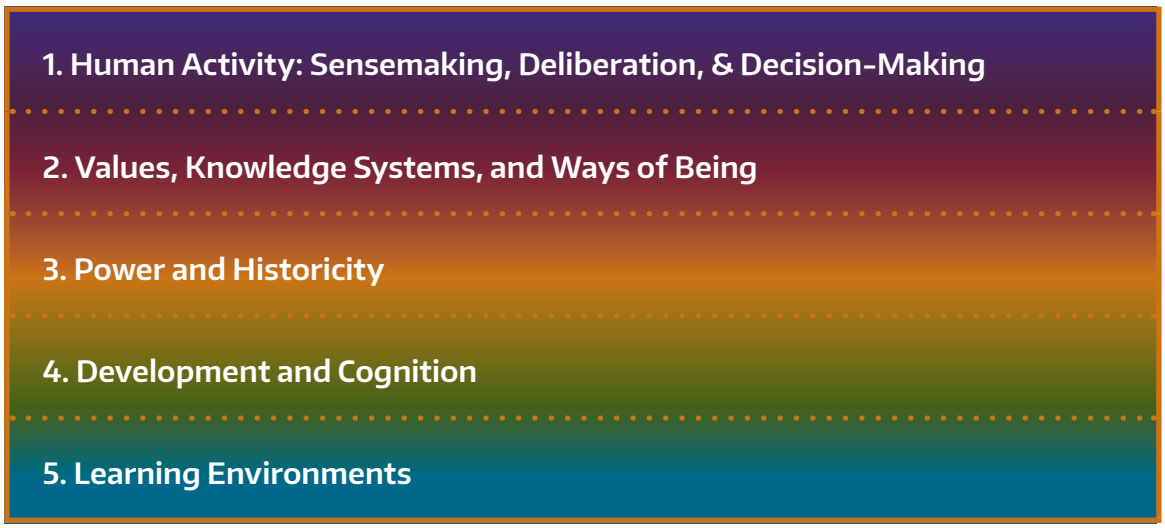
In nature-culture divides, humans are generally positioned as apart from or on top of the natural world. These "apart from" relationships tend to position humans in the powered position and can have both positive and negative valances. Consider the national park systems in the United States. This system both values maintaining aspects of the natural world but also does so by creating lands and waters where humans can not live and can only visit. At a broader societal scale, our food systems or our energy systems increasingly reflect nature-culture divides that tend to privilege human relationships of consumption, extraction, and degradation of the natural environment. Importantly in nature-culture divides "more than humans" (including lands, waters, plants, animals, etc) are often positioned as resources without agency, intentionality, or rights that humans are entitled to. In many ways colonization, industrialization, urbanization, and globalization have been predicated on nature-culture divides and have created challenges for ecological systems, as well as our social systems. The image above reflects how "apart from" models also tend to reflect powered social systems particularly with respect to gender and race.

NATURE-CULTURE COMPLEMENTARITIES

In nature-culture complementarities, humans are generally positioned as a part of the natural world. These "a part of" relationships tend to position humans as one of many actors in the natural world and often reflect deferential or reciprocally powered relationships and tend to extend dignity and rights to more than human life. Gardens and other human efforts to grow geographically and ecologically sound flora and fauna can be an example, particularly restoration or perma-gardens that are cultivated in densely populated areas. At broader societal scales, 80% of the world's biodiversity is found in Indigenous controlled territories and their systems of governance tend to reflect reciprocal nature-culture relations. These systems have enabled human communities to thrive with the natural world. There are growing efforts to develop new systems that reflect nature-culture convergences for example in Bolivia and New Zealand more than humans have legal standing and are part of the each nations' constitution. In addition to these societal infrastructures, increasing evidence is showing that people who have "a part of" models of human-nature relations tend to have more sophisticated reasoning about ecological systems, support more sustainable decisions and policies, and are invested in collective and just well-being.

Part 2: Dimensions and scales of nature-culture relations

The core models of nature-culture relations are also systemic and are reflected across different scales and dimensions of life. In this framework we highlight five key dimensions including: 1) Human Activity, 2) Values, Knowledge Systems, and Ways of Being, 3) Power and Historicity, 4) Development and Cognition, and 5) Learning Environments. Understanding these different dimensions is important for educators to understand how culture, learning and identity are importantly intertwined with learning science. Understanding that teaching specific kinds of nature-culture relations is never a neutral endeavor. Culture, power, and historicity are always present and thus matter for the kinds of learning opportunities we create and for whom. Science education has typically adopted a nature-culture divided orientation, and this often persists even when learning about ecosystems and conservation. The Learning in Places project (http://learninginplaces.org/) is working toward learning environments that engage all of these five dimensions in order to create just and equitable learning environments that prepare young people for the challenges and opportunities of the 21st century.



1. **Human Activity: Sensemaking, Deliberation, & Decision-Making:** What we do, with whom, and why are shaped by nature-culture relations. These include the everyday human interactions like going to the grocery store or walking your child to/from school,as well as our policy decisions at local, national, and global levels, such as energy sourcing or lands management. School often privileges nature-culture divides. For example, most school-based science learning takes place indoors, away from the places where phenomena occur in the "real-world." Being outdoors, making relationships with lands, waters, and more-than-human others, and learning about healthful human impacts to the natural world are all human activities that can support nature-culture relationality.

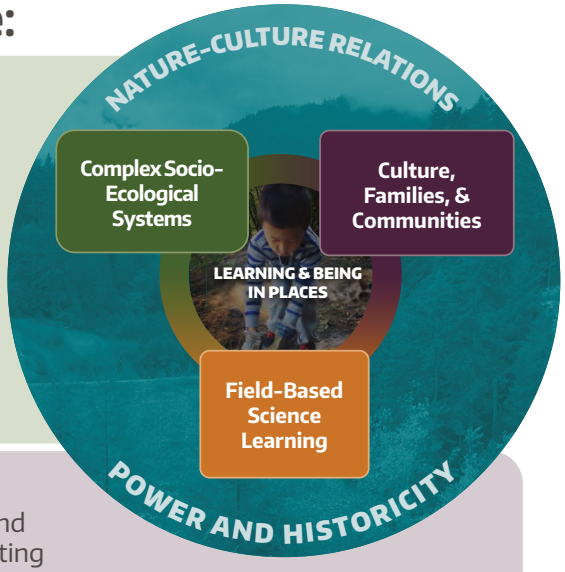
2. **Values, Knowledge Systems, and Ways of Being:** Humans across the globe develop **culturally varied relationships** with the natural world that reflect our 1) values (what we hold to be right and ethical); 2) knowledge systems (what we hold to be true and how we know things); and 3) being (how we live our lives). Schools often do not recognize that they are predicated on western knowledge systems and they routinely fail to recognize the knowledges and expertises of families and communities.

3. **Power and Historicity:** Nature-culture divides reflect historicized power imbalances between humans and the natural world (e.g.,resource extraction, habitat destruction for human use); and between humans (e.g.,slavery, forced removal of people from homelands, exploitation of immigrant labor). Unexamined nature-culture divides routinely reinforce and serve unsustainable and unjust systems. In the United States, and other settler-colonial nations, nature-culture divides serve settler dominance and entitlement. Cultivating nature-culture complementarities is both about repairing **systemic injustices** between humans and the natural world and among human communities.

4. **Development and Cognition: Mental models are organizational frameworks** that help us make sense of what we observe and learn and how we make decisions. Our mental models are learned, beginning at birth and developing across the life-span and across multiple generations through participation in routine activities across multiple places. Our mental models of how the world is organized and works are shaped by nature-culture relations and part 1 of this framework (divided or complementarities) is a specific version of this dimension.

5. **Learning Environments:** All learning environments facilitate particular nature-culture relations (divided or complimentary) through **curricular choices, pedagogical decisions, and interactions among learners, educators, and the materials of the environmen**t. Many students, particularly students of color, come to schools with nature-culture relations that are robust and cultivated through intergenerational human activity on and with lands, waters, and places, but encounter schooling as a place where their values, knowledges, and ways of being are unwelcome, discouraged, or punished.

Connections to the Learning in Places Rhizome:



Complex Socio-Ecological Systems: The underlying premise in complex socio-ecological systems is that humans are part of the natural world, and all of our systems (e.g. social, political, institutional) are always in relationship with ecological systems. Relational models (nature-culture divides or nature-culture complementarities) impact how individuals and communities understand and engage with complex scientific phenomena, and these models vary by culture. However, formal and informal learning environments often position humans as apart from the natural world (nature-culture divide). Orienting to nature-culture complementarities in learning environments can foster deeper understanding of socio-ecological systems.

Culture, Families, and Communities: All learning is cultural, and creating learning environments that build with family and community knowledges and practices is critical for creating equitable learning environments and supporting children's academic identities. This can be done, in part, by recognizing, valuing, and incorporating multiple nature-culture perspectives in learning environments. Furthermore, fostering deeper socio-ecological sensemaking and decision-making stems from a nature-culture complementarity perspective, which reinforces that humans are a part of nature and therefore our knowledges, practices, institutions, and decisions are intertwined with ecological systems.

Field-Based Science Learning: Field-based science learning can support complex socio-ecological sensemaking. Understanding humans as part of the natural world supports students' understanding of the various histories of places of the field sites that they study. Through scaffolded observations, rigorous data collection across multiple places, times, and with community members, learners can deepen their understanding of components of a system, including humans, and how these components interact.

Power and Historicity: Nature-culture relations are deeply powered and historicized. Communities and industries with power have a disproportionate impact on the decisions that get made related to socio-ecological systems. Moreover, these decisions are steeped in historicized relations with nature, and conceptions of the role of humans in nature. For example, extractive and exploitative practices are steeped in white supremacy and settler-colonialism, and serve to marginalize Indigenous, Black and Brown, immigrant, and other communities.

Connections to expert thinking:

Indigenous peoples have lived with and shaped lands and waters since time immemorial, and for communities living in fire-prone areas, this includes engaging in fire management technologies and practices. As white settlers colonized these areas, Indigenous people have not only been banned from engaging in cultural burn practices, but they have also been forcibly removed from their traditional lands. Coupled with settler nature-culture divided orientations, which falsely view certain landscapes as 'untouched wilderness', shifts in nature-culture relations drastically re-shaped lands and waters. Fire, which has been an important technology for Indigenous communities, was something that settlers feared–and continue to fear today. Lands that had seen frequent and large-scale fires pre-colonization were now managed in ways that prevented fires, or efforts were made to immediately quell any fires that started. Large swaths of unmanaged underbrush are now dry and serve as tinder, ready to ignite and rapidly spread fire in weather events (such as lightning) or human malpractice (such as reckless campfires or neglected power lines). Now, in the first two decades of the 21st century, we have been experiencing historic and fast-spreading wildfires that are the result of a rapidly changing climate largely fueled by human activity. The fire management practices that local and national governments are employing reflect the powered and historicized nature-culture orientation adopted by settlers that presuppose human dominance and land stasis (rather than recognizing land as dynamic and changing). Powered and historicized relationships of white settlers and Indigenous communities have also led to this. More recently, emerging management plans and initiatives are turning to tribal partnerships as a way forward in fire management practices. These "management practices" are also deeply rooted cultural practices for Indigenous communities, and reflect nature-culture orientations that may be different (e.g. complementarities) than the settler orientation that persists in governmental strategies. Who gets to make decisions, and for whose purposes, are always an important to considerin land management.

Appendices

The following appendices provide examples and other supports to help educators use and deepen their use of the Nature-Culture Relations Framework over time. Appendix A is a vignette that showcases one example of how a teacher used this framework. Appendix B contains some example data to highlight how nature-culture relations show up in learner sensemaking. Appendix C is a set of educator prompts and questions to make visible and incorporate learners' nature-culture relations by connecting to family and community knowledges and practices. Appendix D is a self-assessment of nature-culture related practices or concepts educators may already engage in, and ones they may want to explore and learn more about.

APPENDIX A

Vignette

PLANNING FOR INSTRUCTION:

Ms. Peterson's first grade class is exploring the question, "Should we create a rain garden next to our school?". The class has been learning about the histories of the school grounds, engaged in a series of field observation walks, and now are getting ready to do an investigation. Ms. Peterson has read the Complex Socio-Ecological Systems Framework and has learned that *toggling across scales*–such as observing something very close up and very far away–is one way to support socio-ecological reasoning. The students have already done an investigation where they have drawn their observations of what is above, around, and below an area with a lot of water. In the next activity, they will look at "living" and "non-living" things from this area under a microscope to zoom in even more. To do this, they will go on a field walk, and in small groups they will find something to bring back to class and observe closely.

DURING ACTIVITY:

Mila is a first grade student in Ms. Peterson's class. Mila loves science activities, especially going on outdoor walks with her class and at home with her family. During the field activities at school, Mila is often reminded of her family and cultural practices. For example, when walking along a trail with her class, she will notice familiar plants and animals, and think about harvesting and hunting with her family. During one of the field investigations, Ms. Peterson tells the students that they will be collecting "living" and "non-living" things and bringing them back to the class to look at under a microscope. The students are instructed to collect something from above, around, and below an area with lots of water. During the field walk, Mila notices the teacher and other students pulling plants out of the ground and taking leaves off of plants and trees in ways that seem disrespectful. It is not the way Mila's family has taught her about respectful harvesting practices and to take what you need. Mila decides that she will not participate in the activity because it goes against what she has been taught by her family and community.

REFLECTING ON INSTRUCTION:

Ms. Peterson reflected on why Mila would not participate in the field activity that day, and decided to follow up with her. When she asked Mila what was going on, Mila expressed that she was uncomfortable with the activity because the other students were being disrespectful to the plants. Mila shared that she had always been taught respectful ways to harvest plants when she was with her family.

After this, Ms. Peterson re-read this Nature-Culture Relations framework, and the Culture, Learning, and Identity Framework, and reflects on the design of her lesson. She realized that she had facilitated a classroom culture that fostered a nature-culture divided orientation in which humans were viewed as **apart from** and **dominant over** the natural world. This happened in some subtle and some overt ways. For example, by not providing clarity for why they were collecting plants, she reproduced an extractive model of nature-culture relations, in which humans were positioned as apart from the natural world and studying phenomena but not recognizing their own roles. She also realized that this model was not necessarily shared by all of the students in her class. Ms. Peterson reflected on the dimensions of Nature-Culture Relations, and began to see how her *values* were embedded in the design of class activities, and influenced the design of the learning *environment*. Also, by separating the natural world into "living" and "non-living", she realized that her language came from Western ideas of the "living" world. After reading the Nature-Culture Relations framework, she realizes that she could use the language of "humans" and "more-than-humans" instead.

RE-FRAMING IN CLASS:

Ms. Peterson's reflection on the values that were embedded in the learning environment led to changes in curricular materials and pedagogical practices. For example, she had a discussion with her class about how they could zoom in to closely observe species and kinds without pulling or killing lots of plants. One thing they decided to do was bring hand-held magnifying glasses out into the field. Ms. Peterson also encouraged the students to do community-based and book research on different uses for plants (ethnobotany), and how plant-human relationships vary by culture and over time.

CONNECTING TO FAMILY AND COMMUNITY KNOWLEDGE AND PRACTICES:

Ms. Peterson realized that in order to reframe the values and nature-culture orientation in her class, she needed to also connect with families and communities. She reached out to other teachers and families, and collectively they decided to start monthly place-walking groups in which they could take turns leading walks or other activities outdoors. These place-walks were sometimes on the school grounds or in the adjacent park, and other times were in local neighborhoods where families lived. This ongoing practice opened a space for families and educators to share their practices and knowledges.

In this vignette, Ms. Peterson realized that she had fostered a set of powered and historicized values, curricular materials, and pedagogical practices that reflected a nature-culture divided model. She was unaware of how pervasive this orientation was until she listened to her students and audited her learning environment. She realized that redesigning activities was only one part of addressing this, and that she needed to deeply engage with other educators and families.

APPENDIX B

Example 1: Learner Thinking about Nature-Culture Relations

The following transcript segment is from an interview with a kindergarten student. The interviewer showed the student a photograph of an outdoor place that included a person standing in what looks like a pond or flooded area in a forest, and some of the trees have evidence that they were chewed by a beaver. The interviewer then asked various questions about the photograph (for example, about what the student observed in the photograph, what season the student thought it was in the photograph and why, what the student would be doing if they were in the place in the photograph and why).

1 Interviewer: Are there ways that people might have hurt that place?
2 Student: Some people hurt it.
3 Interviewer: How did people hurt it?
4 Student: People hurted the trees by cutting it down.
5 Interviewer: Okay.
6 Student: Nature is a part of animals. If they don't have those trees, they won't be able to survive and trees
7 are very important. Trees make oxygen for us.
8 Interviewer: Yeah.
9 Student: Trees are very important. If we cut down all these trees, we wouldn't have enough oxygen to
10 survive. We'll have to rebuild all of that back up.

The student's response to this question demonstrates a **nature-culture complementary** model for the role of humans in the natural world. While the student recognizes that humans can have harmful and extractive relationships when they say "people hurted the trees by cutting it down" (line 4), the student also recognizes the important role that trees play for animals and humans. In lines 6-7 the student says that "nature is a part of animals" and talks about why they need trees for survival. This child also says "trees make oxygen for us", signalling that humans, too, are part of this web of relationships. This student is also attending to the impact of human decision-making, and the values that are embedded within these decisions in lines 9-10 when they talk about the responsibility of humans to rebuild when they cut down too many trees.

Example 2:

1 Interviewer: What would you be doing if you were in this place?
2 Student: I cut lots of trees so don't make the fire.
3 Interviewer: Okay so you would cut the trees down?
4 Student: And then take the wood to other places and then the people make the wood into make a house
6 Interviewer: Oh, you would take the wood to make a house.
7 Student: To the city.
8 Interviewer: Into the city? Interesting.
9 Student: Get a dump truck and outside parking. Come in and take the wood
10 Interviewer: Wow, with a dump truck?

The response in this example demonstrates a **nature-culture divided** orientation in which the role of humans is positioned as *apart from* the natural world. Although the student recognizes an important relationship between humans and trees, the student describes the role of humans as a dominant powered relationship, extracting wood from the forest to bring to the city (line 7).

APPENDIX C

Example questions to ask that promote nature-culture complementarities and that are related to the 5 socio-ecological dimensions

(see the Complex Socio-Ecological Systems framework)

SOCIO-ECOLOGICAL DIMENSION	RESEARCH QUESTIONS AND OTHER PROMPTING QUESTIONS TO ASK STUDENTS	PLACE MAPPING QUESTIONS (TO USE WHEN PLANNING AND DESIGNING INSTRUCTION)
Species, Kinds, Behaviors (SKB) 	• What species, kinds, and behaviors exist around our school? • Who used to be here? Who is here now? • Make sure to ask questions about more-than-humans AND humans	• What species, kinds, and behaviors can I observe around my school? • What is a good time of day to explore/ observe species, kinds, and behaviors around the school? Why? • What kinds of behaviors can we realistically expect to see? When?
Relationships 	• What relationships occur between the species and kinds around the school? Why might those relationships be important? Who benefits from the relationships, how, and why? • When in the year do these relationships become visible (if at all)? • What are human relationships to these species and kinds?	• What relationships can we observe around the school? What relationships exist at different scales (for example, a tiny spider web on a leaf vs. trees in relation with each other in a forest)? • What nature-culture relations can we observe around our school?
Places, Lands, Waters (PLW) 	• What is the topography of the land around the school? What did it used to look like? How is it different now? • What waters does the land around the school interact with? What are significant water-land relationships in the area? • How is human activity or human decision-making affected by the lands and waters in the area?	• Walk around your school and see how the land dips and rises. Notice what happens to the water when it rains--where it puddles, where it drains. • Walk around your school and notice if there are different kinds of soil and plants in different parts of the school and where the land is higher versus lower.
Ethical deliberation and decision-making 	• How is human activity or human decision-making affected by the lands and waters in the area? • What decisions were made about the land to build the school? What did the land around the school look like before the school was built?	• Walk around the school grounds and notice what evidence of human decision-making you can collect. What kinds of decisions were made? What kinds of decisions are **still** being made? • What decisions do you (and students) make every day around the school? Where and what are they?

Continued next page...

SOCIO-ECOLOGICAL DIMENSION	RESEARCH QUESTIONS AND OTHER PROMPTING QUESTIONS TO ASK STUDENTS	PLACE MAPPING QUESTIONS (TO USE WHEN PLANNING AND DESIGNING INSTRUCTION)
Thinking across scales 	**Temporal scales** • What are Histories of Places around your school (temporal scales)? • Also thinking about shorter and longer temporal scales: how do places change from morning to night? from hour to hour? from minute to minute? **Size scales** • What are examples of different **scales of size** that you can think of? How do these show up in your own life? • How does your perspective on something change as you look at it under a microscope, then gradually look at the entire object, and then the object in its natural environment? **Spatial and perspectival scales** • How do your perspectives change when you learn about what is above, below, and under focal objects? **Population scales** • What are examples of different **population scales** that you can think of? What is the difference between studying one tree versus a group of trees, or one bird versus a group of birds versus a population of birds that inhabit a large region?	**Temporal scales:** • Connect to the Histories of Places framework and see what evidence you can collect of the different timescales. • Think about how the school grounds change over the school year, across one season, across a day/week/month? **Size scales** • What are different scales of size to notice outside, from a grain of sand to the whole beach, or from a small tree to a towering cedar? **Spatial and perspectival scales** • Go outside and notice the different spatial scales at which you can observe. How do you understand a place differently when you only look at eye level versus when you look above your heads, at your feet, and even dig beneath the ground? **Population scales** • How will you support your students in observing and wondering about **aggregate** groups of kinds (groups of plants versus just one plant)? What species and kinds are in your area where you can ask population-level questions?

APPENDIX D

Self-Assessment for Educators

Use the following self-assessment to reflect on the educational practices you currently use related to the Nature-Culture Relations Framework, and to identify those practices that you want to begin to use.

Return to this self-assessment periodically to continue to reflect on your educational practices as a way to deepen them.

Dimension of Practice	I do this well!	I do this but want to get better	I have not yet tried this
I give opportunities for students to show what models they hold of nature-culture relations.			
I consider how learners may have different models of nature-culture relations.			
I provide scaffolds for learners to engage in sense making that is grounded in nature-culture complementarities.			
I provide scaffolds for learners to consider how human activity is mediated by our nature-culture relational models			
I provide scaffolds for learners to consider how our values impact and are impacted by nature-culture relational models.			
I collaborate with families and communities to better understand the diversity of nature-culture relations.			
I consider how power and historicity are present in my own life and how this impacts my model of nature-culture relations.			
I critically examine my curriculum or program materials and look for apart-from models of nature-culture relations.			
I know how to re-design lessons or activities towards "a part of" models of nature-culture relations.			
I build relationships with and incorporate multiple perspectives–from learners,families, stakeholders, and communities–to understand the connections between nature-culture relations and complex socio-ecological systems.			

Self-assessment continued next page...

Reflection questions:

Now that you've taken the self-assessment, take a minute to reflect on what you do well and set some new goals for yourself.

1. **What supports might be helpful to you as you continue to deepen your practice?**

2. **What practices do you already do well and how do you know?**

3. **What are 3 practices you could try to include in your instruction this year?**

Suggested Citation

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