

To what extent do existing nature-based lesson plans for outdoor learning experiences in the
Great Lakes region align to a nature-based sense of place framework?

by

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ABSTRACT

This paper answers the question *To what extent do existing nature-based lesson plans for outdoor learning experiences in the Great Lakes region align to a nature-based sense of place framework? A Sense of Place Rating Rubric for Individual Nature-based Lessons* was created to evaluate the extent to which the lessons are aligned to the Sense of Place framework (Mathews et al, 2020). The framework outlines three elements: social context, activities and experiences, and actions to maintain/refine with subcategories. Social context has the subcategory of people and history and specificity of place, activities & experiences has the subcategory of activity location, sense making experience, and student engagement, and actions to maintain/refine has the subcategory of maintaining/refining actions, students identifying problems/needs, student-led choices, student-led reflection, and sequential adaptability. Ratings were prescribed on a scale of 0-3 with a target of 2. Twenty lessons were provided by six organizations in the greater Great Lakes region and rated using the Sense of Place rating rubric. The element with the highest rating was social context with 25% of the ratings falling within the *target* or *exceeds target* range. The element with the lowest rating was actions to maintain/refine with 2% of the ratings falling within the *target* or *exceeds target* range. Suggestions are provided for how to meet the target for each subcategory with examples for practical implementation. The white paper concludes that in the best examples of sense of place, individuals have social and cultural connectedness, engage with a specific place with all senses, and have responsibility for maintaining or refining the place following an experience.

Introduction

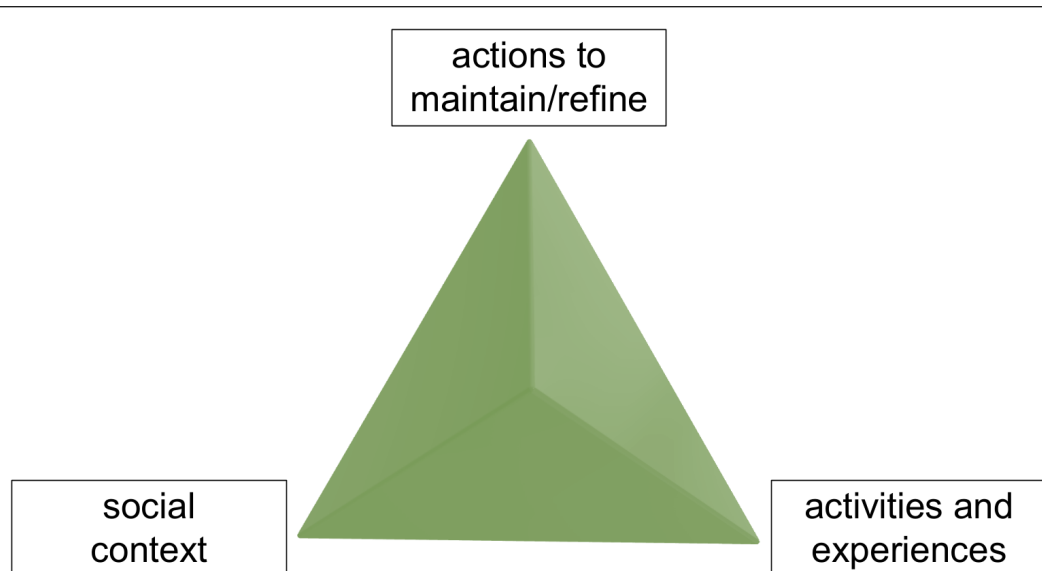
Sense of place revolves around place meaning, place attachment, social and historical understanding, and responsibility. Sense of place is developed through experience, contextualized social and historical knowledge, and repeated time spent in the place (Tuan, 1977). It develops in three phases: first, place belonging, then place attachment, and then place commitment (Shamai, 1991). These ideas have informed the Mathews et al. (2020) framework for developing sense of place. The framework aids in planning outdoor experiences where students begin with social context, participate in an experience, and then work with some maintaining and refining post-experience activities. In this White Paper, I will discuss how I reviewed twenty lesson plans from six organizations in the Great Lakes region for sense of place development opportunities.

Sense of Place Framework and Rubric

To address the question *To what extent do existing nature-based lesson plans for outdoor learning experiences in the Great Lakes region align to a nature-based sense of place framework?*, a rubric was created based on the Sense of Place framework (Mathews et al., 2020) for sense of place seen in Figure 1. The Sense of Place framework outlines social context, activities and experiences, and actions to maintain/refine as the three elements required to develop sense of place. In the next section of this paper, I provide the rubric with justification/explanation for each element included in the rubric.

Figure 1

A Planning Framework for Developing a Sense of Place Through Outdoor, Nature-Based Education



Note. From “A Planning Framework for Developing a Sense of Place Through Outdoor, Place-Based Education” by J. Mathews, M. J. Benus, and N. Reed, 2020, February 11, *Presentation at the 49th Hoosier Association of Science Teacher Inc. Conference, Indianapolis, IN.*

In the next sections, I will explain the rubric, summary ratings for all lessons, and discuss the target as an aspiration.

Rubric Description

I created the *Sense of Place Rating Rubric for Individual Nature-based Lessons* to evaluate the extent to which the lessons are aligned to the Sense of Place framework. The framework outlines three elements essential to develop a sense of place through outdoor learning experiences: social context, activities and experiences, and actions to maintain/refine (Mathews et al., 2020). The rubric addresses each element and its relevant subcomponents. Social Context has the subcomponents of people and history and specificity of place, Activities & Experiences has the subcomponents of activity location, sense making experience, and student engagement, and Actions to Maintain/Refine has the subcomponents

of maintaining/refining actions, students identifying problems/needs, student-led choices, student-led reflection, and sequential adaptability. Each subcomponent is rated on a scale from 0-3. A rating of 0 does not meet the target. A rating of 1 somewhat meets the target. The target rating of 2 describes a reasonable and adequate inclusion of elements of the Sense of Place framework (Mathews et al., 2020). The rating of 3 exceeds the target, is fully inclusive of all the aspirational elements, and represents refined interconnected thinking of the subcomponent. The rubric is depicted in Table 1 (See Appendix).

Social Context

Social context outlines the people and history of a particular place and the importance of historical social context to the area. For instance, social context could include historical and contemporary work, hobbies, customs, or traditions of a particular place.

People and History. A description of the culture or heritage of people and their use of land meets the target for the people and history subcategory. The exceeding target for people and history in the rubric contextualizes the culture and heritage of people and their use of land. Contextualizing culture and heritage includes how people, culture, land are all interrelated. While one could describe the culture and heritage of people by outlining one's language, family, and location, contextualizing those factors would take it a step further. Contextualizing one's language, work, family, and location brings meaning to the factors and describes why each factor plays an important role in a sense of place. For example, stating that "In Minneapolis, elementary students keep an extra pair of pants and boots at school in winter to play outdoors" describes people and their use of land, but stating, "In the traditional, ancestral, and contemporary lands of the Dakota and Ojibwe people, known as Minneapolis, students representing the Dakota, Ojibwe, Hmong, Somali, Mexican, Swedish,

and more cultural backgrounds keep an extra pair of snow pants and insulated snow boots at school during the winter months to play outdoors. Students participate in recess outside in all weather conditions, with a bitter cold cutoff temperature of -20 degrees Fahrenheit” this gives exceedingly clear context to the description. In this latter example, there are explicit descriptions of how particular pants and boots matter, but also that playing outdoors is an all season and nearly all temperature experience.

Specificity of Place. The next subcategory for social context is specificity of place. To meet the target of specificity of place, location is indicated or setting described to suggest a place or setting. For example, stating that the lesson will happen at Lake Phalen Regional Park in St. Paul, Minnesota. An exceedingly clear description of place in the lesson could be stated as “at Lake Phalen Regional Park in St. Paul, Minnesota on a summer day near the boat launch in the sand on the east side of the park where students can safely access water to go canoeing.” In this latter example are explicit descriptions of the exact location and setting on the large property.

Activities & Experiences

Activities and experiences include the act of students engaging with a particular place. The activities and experiences happen in the place and sense of place can be developed when students actively engage.

Activity Location. Activity location ensures that students are doing activities in a place made familiar from prior use or intentional pre-planning. The target for activity location is an outdoor place that is somewhat familiar to students or where plans are shared in advance of the location of the experience. This could be an outdoor space that students have heard of, or learned about, but they may or may not have visited the place before the

experience. An exceedingly clear description of location would be a familiar location to students and/or the planning for the location heightens the experience. For example, a routine visit to a familiar park or a thoughtfully planned experience to a new adjacent wetland, where students are familiar with the trail map and are excited to look for new and familiar flora and fauna.

Sense Making Experience. Tuan (1977) demands that all five senses are used in order to develop a sense of place. The target for sense making experience is when students use all senses to experience and engage with the place. Exceeding the target is when students have a multi-sensory experience that pairs more than one sense within that place. An exceedingly clear description of location would include all five senses and tell students to smell a Ponderosa Pine tree, feel its bark, taste its needles, hear the native birds of the area, and watch birds and people interact with the park. Students could connect being in the park with the five sense experience of meeting the Ponderosa Pine tree.

Student Engagement. Student engagement addresses how students interact with the elements of the lesson. The target is for individual students to use some of the tools or resources to engage in most of the aspects of the activity or experience. For example, one student wades in a pond to collect water samples while another uses tweezers and a microscope to look at pond water macroinvertebrates. An exceedingly clear description of engagement has each individual student using each tool or resource appropriately in all aspects of the activity or experience. Students would participate in all steps of pond water macroinvertebrate investigation; students would choose the pond, collect the water, look for macroinvertebrates, and identify their findings.

Actions to Maintain/Refine

Shamai (1991), Smith (2002) and Gruenwald (2003) echo the Sense of Place framework (Mathews et al. 2020) demanding actions to maintain/refine place and learning. Actions to maintain/refine include maintaining and refining place as well as maintaining/refining learning. Many times, this includes student reflection on an experience, choice, and then student-led action to refine their learning and to refine the place. The subcategories capture all these actions.

Maintaining/Refining Actions. The target for maintaining/refining actions is for students to mostly lead the maintenance of place through routine actions. The target includes student leadership because Shamai (1991), Smith (2002) and Gruenwald (2003) note that a sense of place develops when one has a feeling of personal responsibility for a place. To exceed the target, students have leadership roles in the maintenance and refinement of place through routine and purposeful actions. An example of this could include a routine stewardship trip to a place students are familiar with, where students lead and execute a garden clean-up.

Student Identifying Problems/Needs. Student identifying problems/needs is based on student responsibility in their response. (Gruenwald, 2003), (Shamai, 1991), (Smith, 2002). If the leader identifies and guides problems through a discussion the target is somewhat met. The target is for students to identify problems/needs through shared discussion. An exceedingly clear description has students identify problems/needs through shared discussion and then students propose solutions. Falling short of the target includes leader identifying problems or leader guiding students to identify problems through a discussion.

Student-Led Choices. Student-led choices are based on the level of choice a student

has following an activity or experience. Following Shamaï (1991), Smith (2002), and Gruendwald (2003), choice and responsibility are critical. Somewhat meeting the target could look like leaders making all choices or students picking from a few options given by the leader. The target for student-led choices is for students to have choice (derived from those given to them and those students chose) in their actions to maintain/refine following the activity or experience. To exceed the target, students take responsibility for developing and implementing a plan.

Student-led Reflection. Gruenwald (2003) explains reflection as a critical element of sense of place development. Gruenwald also describes how feeling responsibility for and ownership in a place matters. The target is somewhat met when the leader engages students to reflect on experience but connections to place, activity, and experience are not clear. The target for student-led reflection has students mostly leading/developing their reflection and connecting their activity or experience with the place being studied, so student responsibility for leading reflection is included. An exceedingly clear description has students leading or developing their reflection by connecting how their activity or experience maintained or refined place.

Sequential Adaptability. Hutson (20011) and Stedman (2008) describe the development of sense of place with repeated connecting experiences with a specific place, so sequential adaptability is included in the rubric. The target for sequential adaptability has at least one repeated visit and more visits can be added or adapted. An exceedingly clear description has the lesson as part of an ongoing sequence of repeated visits to a place.

Meeting the Target

A rating of two or three when using the rubric indicates that the target has been

met or exceeded. To meet the target or rating of two, the lesson adequately and appropriately displays a subcategory of an element of the Sense of Place framework (Mathews et al., 2020). The rating of a three is intended to be an aspirational or well intentioned refined element.

Data Collection and Procedures

Set of Lessons

The lessons were provided by six organizations in the greater Great Lakes region: Friends of the Boundary Waters, Voyageurs Conservancy, Minnesota Valley National Wildlife Refuge, Wilderness Inquiry, Cleveland Metroparks, and Purdue University's School of Agriculture. The organizations were chosen as they all fell within the Great Lakes region and actively teach outdoor nature-based lessons. Friends of the Boundary Waters, Voyageurs Conservancy, and Minnesota Valley National Wildlife Refuge fell within the protected places category, while Wilderness Inquiry, Cleveland Metroparks, and Purdue University's School of Agriculture fell within urban or suburban outdoor settings. When asking for materials, I outlined my project as a comparison of existing lessons to a sense of place framework. I was looking for ideally 4-6 sequential lessons that related to environmental education or sense of place development. I received 2-6 lessons from each organization and retrieved three lessons from the Purdue School of Agriculture Nature of Teaching resource.

Procedures for Rating

While rating 20 lesson plans from various organizations, ratings were assigned according to the *Sense of Place Rating Rubric for Individual Nature-based Lessons*. All lessons received from organizations were used for the purpose of this project and none were rejected. Ratings are depicted in Tables 2.1 through 2.3. When rating the lessons, I reviewed

the lessons with the rubric description in-hand. I began with social context which usually was covered in the beginning of the lesson plan or as part of a pre-lesson to set the stage. When looking for components of the rubric's requirements, I was looking for any trace of the target. For the activities and experiences element, I usually found the target within the students' on-site activity or the bulk of the lesson. Actions to maintain/refine were found at the end of the lesson and usually following or as part of a reflection or wrap-up. I looked for any indication of the target explicitly mentioned. I was the only person that rated the lessons.

Data Analysis

In the following section I will discuss results of the rubric ratings, then outline possible explanations for strengths and weaknesses. Next, I will outline the sum ratings. Finally, I will identify common themes from results. Themes from the ratings will provide possible opportunities to enhance elements for future lesson development.

Results

Strengths and Weaknesses

Through rating the lessons, strengths and weaknesses were identified among lessons that relate to each element of the Sense of Place framework (Mathews et al., 2020). The strongest element was social context with 25% of the ratings falling within the *target* or *exceeds target* range. The weakest element was actions to maintain/refine with 2% of the ratings falling within the *target* or *exceeds target* range. In the following sections, I will describe ratings associated with each framework element and subcategory, then I will identify strengths and weaknesses.

Social Context

With 11 out of 40 possible ratings falling within the *target* or *exceeds target* range,

social context is the strongest element represented from the 20 lessons evaluated. At the same time, 29 out of 40 possible ratings remain in the *did not meet* and *somewhat met* ranges. The majority of lessons evaluated did not meet the target for social context.

Table 2
Social Context Results of all Sense of Place Ratings for Individual Nature-based Lessons n=20

	Did not meet (0)	Somewhat met (1)	Target (2)	Exceeds target (3)
Social Context				
<i>People and History</i>	9	9	1	1
<i>Specificity of Place</i>	11	0	5	4

People and History. In the people and history subcategory, 18 out of 20 lessons fell within the *did not meet* or *somewhat met* range. Culture or heritage of people or their use of land was not mentioned for nine of the lessons. The other 9 lessons did mention culture or heritage of people or the use of land. Only one lesson met the target and one lesson exceeded the target where culture or heritage of people and their use of land was described to meet the target or contextualized to exceed the target.

Specificity of Place. In the specificity of place subcategory, 11 out of 20 lessons rated in the *did not meet* range where location was not indicated or described. Five lessons met the target where location was indicated or setting was described to suggest an appropriate place/setting. Four lessons exceeded the target where the location was explicitly indicated or setting was carefully described to ensure appropriate understanding of place/setting. Four lessons exceeding the target is the highest number of lessons exceeding the target from any one subcategory.

Activities & Experiences

The activities and experiences element is not the strongest or weakest element on the table. Activities and experiences fall in the middle with 14 out of 60 ratings in the *target* or *exceeds target* ranges and 46 out of 60 ratings in the *did not meet* or *somewhat met* ranges.

Table 3
Activities & Experiences Results of all Sense of Place Ratings for Individual Nature-based Lessons
n=20

	Did not meet (0)	Somewhat met (1)	Target (2)	Exceeds target (3)
Activities & Experiences				
<i>Activity Location</i>	10	10	0	0
<i>Sense Making Experience</i>	13	3	4	0
<i>Student Engagement</i>	2	8	8	2

Activity Location. In the activity location subcategory, all 20 lessons fell in the *did not meet* or *somewhat met* ranges. Ten lessons did not include any outdoor place or any plans for any outdoor location. The remaining ten lessons used an unfamiliar outdoor place and some planning for the location was included. No lessons met the target for activity location, meaning no lesson occurred in an outdoor place somewhat familiar to students or no plans were shared for the location of experience. Activity location had the weakest ratings of the activities and experiences element.

Sense Making Experience. In the sense making experience subcategory, 16 out of 20 lessons fell in the *did not meet* or *somewhat met* ranges. Thirteen lessons included students using one or two senses to experience or engage with a place. Three lessons included students using three or four senses to experience or engage with a place. Four lessons meeting the target range where students used all senses to experience and engage with the place. No lessons exceeded the target in the sense making experience subcategory.

Student Engagement. In the student engagement subcategory, 10 out of 20 lessons

fell in the *did not meet* or *somewhat met* ranges, while the other 10 lessons fell in the *target* or *exceeds target* ranges. Two lessons did not meet the target, while the leader used tools or resources during the activity or experience and students merely observed. Eight lessons somewhat met the target where individual students used a tool or resource to engage in an aspect of the activity or experience. Some tools were only used by the teacher. Eight lessons met the target where individual students used some of the tools or resources to engage in most of the aspects of the activity or experience. With eight lessons meeting the target, student engagement has the highest number of target ratings for any subcategory. Two lessons exceeded the target where individual students each used tools or resources appropriately to engage in all aspects of the activity or experience. With 10 lessons meeting or exceeding the target, student engagement is the strongest subcategory.

Actions to Maintain/Refine

The actions to maintain/refine category was the weakest element with 61 out of 100 possible ratings falling within the *did not meet* or *somewhat met* range. Only one subcategory had one lesson that met the target and another subcategory had one lesson that exceeded the target.

Table 4
Actions to Maintain/Refine Results of all Sense of Place Ratings for Individual Nature-based Lessons
n=20

	Did not meet (0)	Somewhat met (1)	Target (2)	Exceeds target (3)
Actions to Maintain/Refine				
<i>Maintaining/ Refining Actions</i>	12	8	0	0
<i>Student Identifying Problems/Needs</i>	15	5	0	0
<i>Student-led Choices</i>	17	3	0	0
<i>Student-led Reflection</i>	10	9	1	0
<i>Sequential Adaptability</i>	7	12	0	1

Maintaining/Refining Actions. In the maintaining/refining actions subcategory, all 20 lessons fell within the *did not meet* or *somewhat met* ranges. Neither the leader nor students took the lead to maintain place in some fashion for 12 of the 20 lessons. In the remaining eight lessons, the leader often supervised students to maintain place in some fashion. No lessons included student led maintenance or any routine actions.

Students Identifying Problems/Needs. In the students identifying problems/needs subcategory, all 20 lessons fell within the *did not meet* or *somewhat met* ranges. The leader identified problems/needs and students received information in 15 of the 20 lessons. In the remaining five lessons, students are guided by the leader to identify problems/needs through a leader-led discussion. No lessons included students identifying problems through discussion or any student proposal of solutions.

Student-Led Choices. In the student-led choices subcategory, all 20 lessons fell within the *did not meet* or *somewhat met* ranges. Students had no choices following the experience for 17 of the 20 lessons. In the remaining three lessons, students had a choice from a few opinions given by the leader following the experience. No lessons included students having a choice in their actions to maintain/refine following the activity or experience. No lessons included students taking responsibility for developing and implementing a plan to maintain and refine following the experience.

Student-led Reflection. In the student-led reflection subcategory, 19 of the 20 lessons fell within the *did not meet* or *somewhat met* ranges. Students did not reflect in any identifiable way with or without the leader for 10 of the lessons. The leader engaged students to reflect on the place that they were studying, but connections were not clear for 9 of the

lessons. One lesson included the target where students mostly led/developed their reflection connecting their activity or experience with the place being studied.

Sequential Adaptability. In the sequential adaptability subcategory, 19 of the 20 lessons fell within the *did not meet* or *somewhat met* ranges. The lesson was not specific to a place and was not sequential for seven of the lessons. Lessons were not specific to a place but had some sequential elements for 12 of the lessons. One lesson was part of a sequential unit and included repeated visits to a place, which exceeded the target.

Discussion of Common Themes

Social Context

The two sub categories for social context were people and history and specificity of place. People and history included 18 out of the 20 lessons rated below target. Authors Tuan (1977), Hidalgo and Hernandez (2001), Stedman (2008), and Perez (2019) urged social context as a critical component to the development of a sense of place, but 18 of the 20 lessons reviewed did not mention people. One lesson outlined first peoples, land stewardship, and how to travel in a particular place as a discussion to give social context to the Boundary Waters Canoe Area Wilderness and through such, exceeded the target. The second part of social context is specificity of place. To meet the target for social context, the people and history must relate to a specific place, explicitly indicated or carefully described to help students gain understanding of people in a place historically and contemporarily. More than half of the lessons evaluated did not indicate or describe any place, with the other half indicating some location. If a lesson seeks to develop a social context they must include people and history and a connection to a specific place.

Activities & Experiences

The three subcategories for activities and experiences are: activity location, sense making experience, and student engagement. All 20 lessons were rated below the target for activity location because none of the lessons happened in an outdoor place familiar to students. To develop sense of place, students need a connection to the place or some basis to build from. This could include a shared location for the experience or planning for the experience, but no lessons included planning for the experience. If students do not have context of the place they are visiting, they could have trouble to understand how the place they are in is special or to develop attachment or responsibility for the place. Tuan (1977) outlines experiencing place with all of the senses. Of the 20 lessons rated, 75% of the lessons did not meet the target of students using all senses to experience and engage with the place. A simple activity of “5-4-3-2-1” would elicit students to identify 5 things they can see, 4 things they can hear, 3 things they can touch, 2 things they can smell, and 1 thing they can taste, and would engage each of the senses in a place. Student engagement had half of the lessons rating at or exceeding the target and half of the lessons missing the target. Tuan (1977), Shamai (1991), and Stedman (2008) claim engaging with a place as the most important part in the sense of place development. It seemed like most of the lessons I evaluated focused heavily on the activity and experience, so it could be that student engagement has some inherent ease of integration due to the experiential nature of outdoor and nature-based education.

Actions to Maintain/Refine

The five subcategories for actions to maintain/refine were: maintaining/refining actions, student identifying problems/needs, student-led choices, student-led reflection, and sequential adaptability. Overall, actions to maintain/refine was the weakest rated element in

the 20 lessons. Only one lesson met the target for student-led reflection and another lesson exceeded the target for sequential adaptability. All of the other lessons did not meet the target. It seemed that primarily teachers were responsible for leading maintaining/refining actions by organizing maintenance trips or with no maintaining actions included. Teachers identified problems and needs or gave students prompts. Teachers outlined choices for students to make following the experiences. Teachers led 19 of the 20 lessons' reflections. Lastly, 19 of the 20 lessons were not specific to a place and had little or no sequential elements. Smith (2002) and the Sense of Place framework (Mathews et al. 2020) demand maintaining or refining actions as part of the sense of place development. With place attachment and a feeling of responsibility for a place, student-led maintaining or refining actions must follow. This could look like routine visits to a place to track changes throughout the school year or a citizen science project involving advocacy and community engagement to steward a place.

Considerations for Lesson Plan Development

When evaluating 20 nature-based lesson plans from outdoor learning programs, it became evident that some lesson plans do not include all three elements of the framework and have emerging opportunities where aspects of the framework could be added to help students to develop a sense of place. According to the framework, existing literature, and my analysis of data, the critical element of actions to maintain/refine presents the greatest opportunity for lesson plan developers to help students develop a sense of place. Giving students explicit social context, activities, and experiences also present opportunities to improve sense of place in lesson development.

Conceptual Outlines of Target Lesson Plans

In the next paragraphs, I will outline examples of how the Sense of Place framework (Mathews et al., 2020) could be incorporated to achieve a greater sense of place development.

Social Context

In the social context element of the Sense of Place framework, people, culture, and history must tie into a specific place in a way that students can understand and relate to. The first step is to explicitly indicate or carefully describe a place to ensure students appropriately understand the place. For example, a specific place could be Bishop's Bog in Portage, Michigan. The lesson could include a short description of the words "Portage," "Bog," and "Bishop". Before French settlers named it "Portage", this area was Peoria and Potawatomi land. "Portage" is a French word that describes the long carry of a canoe over land, an act that Indigenous people and also French fur traders did regularly in the very area that they are studying. "Bog" describes a marshy wetland with peat and mosses. "Bishop" was given as the name for the original Bishop family that settled in Portage, Michigan. The lesson would outline the landscape of the park they are visiting, and the necessity to carry a canoe through a marsh, and could connect students to the culture and heritage of the place. This would likely include only a 2-3 minute conversation to meet the target before continuing to the next part of the lesson. While the target would include one or two of the above discussed topics, exceeding the target would include two or more. Discussing place-specific examples could connect students to the social context of their neighborhood park.

Activities & Experiences

Through the rating of 20 example lesson plans, student engagement was inherently part of many nature-based outdoor learning experiences, however growth could occur in sense making experiences and the location of activities. Tuan (1977) outlines an engaging sensory experience as one of the critical activities to build a sense of place. Activity location also provided an opportunity for growth. Half of the rated lessons did not include any outdoor place, while the other half included outdoor place but in an unfamiliar area. To develop sense of place, the outdoor place should be somewhat familiar to students so they can build on previous experiences and dive deeper to connect to the place through sense making experiences with all five senses and actively engage in activities for experiential learning. For example, if students are visiting Bishop Bog in Portage, Michigan, it would help students to better develop sense of place if the park is one they regularly visit. To experience a familiar place in an engaging and meaningful way could help students to develop place meaning, and repeated visits could aid in place attachment. Moreover, the familiar place, in this example, Bishop's Bog, could become so familiar that it could serve as a reference for students in new but similar spaces. Bishop's Bog then becomes a benchmark to help develop place-based thinking and awareness.

Actions to Maintain/Refine

With only two ratings out of 100 meeting or exceeding the target, actions to maintain/refine likely have the largest opportunity for growth of inclusion in the sense of place lesson plan development. Maintaining actions should include students mostly leading the maintenance of place through routine actions and could include refining of place with routine and purposeful actions. For example, students could routinely visit Bishop Bog to lead monthly park maintenance including trash pickup. To exceed the target, students could

create a master maintenance plan so when they age out of the school, the next class already knows what to do to continue the community garden or trail plan updates. The next subcategories, student identifying problems/needs and student-led choices, students should be responsible for identifying problems and needs and should have choice in their actions to maintain/refine following their activity. For example, students could identify problems like trash or a need for gardens in the park and propose solutions. Students could plan a map of where trash receptacles should be placed in the park in order to facilitate usage and municipal pickup. They could present the plan to the city.

Reflection was commonly found in the 20 rated lessons, but in 19 of the 20 lessons, it was led by teachers. To develop a sense of place, which includes responsibility or stewardship over the place, students should mostly lead or develop their reflection connecting their activity with the place being studied. For example, in the Bishop's Bog example, students could work in a group to discuss what they learned or experienced at Bishop's Bog. Reflection could be a discussion or could be a reflective action. Students could be responsible for creating a poster, performing a skit, or sharing in some way that they choose to reflect. While creating the reflective poster, students would discuss parts of the experience to land on a connection to display. Students would reflect in a way of their choosing, and would choose which parts were the most meaningful to them. Lastly, sequential adaptability is critical according to the Sense of Place framework (Mathews et al. 2020), the authors mentioned previously, and through my data analysis. Without sequential components with at least one repeated visit to a familiar place, students cannot develop a sense of place. Reflection should also be sequential. For example, after each visit, students

could revise their skit, poster, or sharing to reflect the sequentially more developed content and to show concept awareness.

Conclusion

In summary, with a familiar, explicitly identified place which includes social context, students should engage in the place with all five senses in a meaningful way. Following the experience, students should lead discussions, have choice in their actions following the experience, identify problems/needs, and lead maintaining/refining actions. Students should take the lead for their maintenance and refining of a familiar, socially contextualized, personally familiar place, with sequential and repeated visits. With these steps a sense of place can begin to develop. Through these additions, exceedingly satisfactory inclusion of each element of the Sense of Place framework (Mathews et al., 2020) could lead to a strong development of sense of place.

Appendix

Table 1 *Sense of Place Rating Rubric for Individual Nature-Based Lessons*

	Did not meet (0)	Somewhat met (1)	Target (2)	Exceeds target (3)
Social Context				
<i>People and History</i>	No mention of culture or heritage of people or use of land.	Mentions culture or heritage of people or the use of land.	Describes culture or heritage of people and their use of land.	Contextualizes culture and heritage of people and their use of land.
<i>Specificity of Place</i>	Location is not indicated or described.	Location or setting is somewhat described for the place /setting.	Location is indicated or setting is described to suggest an appropriate place/setting.	Location is explicitly indicated or setting is carefully described to ensure appropriate understanding of place/setting.
Activities & Experiences				
<i>Activity Location</i>	Outdoor place is not used and no plans for any outdoor location were included.	Outdoor place is not familiar to students and some plans for location were included.	Outdoor place is somewhat familiar to students or plans are shared for location of experience.	Outdoor place is already familiar to students or planning for location heightened experience.
<i>Sense Making Experience</i>	Students use only one or two senses to experience or engage with a place.	Students use three or four senses to experience or engage with the place.	Students use all senses to experience and engage with the place.	Students have a multi-sensory experience that engages them with the place.
<i>Student Engagement</i>	Leader uses tools or resources during activity or experience while students merely observe.	Individual students use a tool or resource to engage in an aspect of the activity or experience. Some tools or resources are only used by the leader.	Individual students use some of the tools or resources to engage in most of the aspects of the activity or experience.	Individual students use each tool or resource appropriately to engage in all aspects of the activity or experience.
Actions to Maintain/Refine				
<i>Maintaining / Refining Actions</i>	Neither leader nor students take lead to maintain place in some fashion.	Leader often supervises students to maintain place in some fashion.	Students mostly lead the maintenance of place through routine actions.	Students lead the maintenance and refinement of place through routine and purposeful actions.
<i>Student Identifying Problems/ Needs</i>	Leader identifies problems/needs. Students receive information.	Students are guided by leader to identify problems/needs through led discussion.	Students identify problems/needs through shared discussion.	Students identify problems/needs through shared discussion. Students propose solutions.
<i>Student-led Choices</i>	Students had no choices following the experience.	Students have a choice from a few options given by leader following the experience.	Students have choice in their actions to maintain/refine following the activity or experience.	Students take responsibility for developing and implementing a plan to maintain and refine following the experience.
<i>Student-led Reflection</i>	Students do not reflect in any identifiable way with or without the leader.	Leader engages students to reflect on the place they are studying. Connections are not clear.	Students mostly lead/develop their reflection connecting their activity or experience with the place being studied.	Students lead/develop their reflection by connecting how their activity or experience maintained and refined place.
<i>Sequential Adaptability</i>	Lesson is not specific to a place and is not sequential.	Lesson is not specific to a place but has some sequential elements.	Lesson has at least one repeated visit and more visits can be added or adapted to this or other lessons in the sequence.	Lesson is part of a sequential unit and includes repeated visits to a place.

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