Watersheds, Communities, and Collaboration

Place-based peer mentoring in the field

By Joshua Boling, Max Longhurst, and Kimberly Lott
Gleeful shouts resonate from every direction, and from my vantage point in the center of a small gravel-and-grass marina, I can see a "well-oiled machine" at work. At various learning stations, upper grade peer mentors coach their lower grade buddies in the nuances of padding a canoe, guide them through various water quality tests along the reservoir's shoreline, or prepare them for a game to simulate how local water fowl survive in a habitat. Each learning experience carefully fosters student-to-student verbal exchanges leading to collaborative sensemaking and interpretations of the effects of water quality (Eun 2019). These experiences are the fruits of a blossoming cross-grade level relationship focused on developing and reinforcing the vertical alignment of students’ field-based inquiry skills, collaborative skills, and academic standards.

**A Collaborative Sense-Making Strategy**

This project was framed around Vygotsky’s Zone of Proximal Development (ZPD), which has been defined as the difference between what a child can do alone and what can be done with the support of a more capable partner, be that a peer or adult instructor (Vygotsky 1978). Utilizing the ZPD allows our cross-grade level team to achieve the vertical alignment goals mentioned above. Sixth graders bring a wealth of knowledge and experience in field-based inquiry gained from several years of engagement in our school’s scaffolded field program curriculum. Thus, they are able to help third graders develop more sophisticated skills while honing their own field-based inquiry skills. For example, within field experiences older peers are placed with younger learners to engage in Socratic dialogue as a means to co-construct meaning, enabling both learners to internalize and develop independence in using new knowledge from the experience (Eun 2019). Nature-based field trip experiences that facilitate academically rich dialogue offer learners these types of opportunities that increase persistence, problem solving skills, teamwork, and resilience (Kuo, Barnes, and Jordan 2019).

Peer-mentor relationships allow students to play the role of expert and to glean from their peers’ expertise. This affirms and empowers both the mentor and mentee. Of course, a peer-mentor field experience is most effective when it is intentionally developed around shared learning outcomes. It is critical that teachers plan to thoughtfully address academic standards and desired skill sets that have been vertically aligned throughout the field experiences in the field.

**Vertical Alignment Is Key**

Our school’s field experience program vertically aligns and intentionally scaffolds disciplinary core ideas, crosscutting concepts, and science and engineering practices. For students to be successful in this field experience, several classroom and field prerequisites were met by both grades. They are described below. The collaborating teachers recognized these prerequisites in the field program’s vertical alignment, and their shared learning outcomes served as the impetus for this peer-mentor project.

By mid-April when this field experience took place, third graders had already completed two large, in-depth units of study—one focused on animals’ survival in their habitats and the other investigating how humans use natural resources to meet their needs. Previous field experiences that supported both of these units developed students’ abilities to make objective observations and draw inferences through critical thinking. By the time each third grader arrived at the marina with their sixth-grade buddy to investigate water quality and watershed communities, they were prepared with a strong foundation for deepening their prior knowledge and developing more sophisticated field inquiry skills.

As the oldest grade in the school, the sixth graders’ field experiences had been culminating in nature with an emphasis on solidifying the field-based skills and connections to core academic standards students had spent the past seven years developing and mastering. One particularly applicable field experience combined rafting, the study of watershed resources, and investigations into cultural dynamics and human uses of natural resources. The peer-mentor experience provided sixth-grade mentors with the opportunity to put contextual knowledge and inquiry skills to use by guiding their third-grade buddies at the marina.

When it came time to begin pairing students together, peer mentor teams were carefully crafted in order to maximize the most productive zones of proximal development. Several criteria were considered, including students’ performance across content areas, behavior, and areas of interest. Students were already familiar with one another as well, having had a previous peer-mentor experience in a classroom writing workshop. This prior experience helped inform students’ expectations for the day at the marina, and the collaborating teachers were able to guide their respective classes toward some specific, student-centered goals which included (a) staying safe, (b) learning new things, and (c) having fun! After that, a free local marina was located approximately five miles from the school that could host 52 energetic and curious students ready to engage in a variety of inquiry-based activities.

**Peer Mentorship in Action**

On the day of the site visit, students completed four different learning stations: water quality data collection; a floating Socratic seminar in canoes; waterfowl survival games; and documentary film-making (see Supplemental Resources for station descriptions). Scientific inquiry would be student-centered and conducted within cross-grade partnerships; but adults were there to provide critical guidance when necessary and to ensure a safe learning environment. Ensuring a safe
learning environment included explicitly instructing each group in canoe safety skills, the safe and efficient use of each water quality testing device, and behavioral expectations unique to each learning station. Follow your school or district guidelines for field experiences, in particular the adult-to-child ratio.

At the water quality data collection station, students met with an adult ready to guide them through the use of five different tools with which they were to test the quality of the reservoir’s water. Students worked in their peer-mentor pairings to test the water’s pH, dissolved oxygen and nitrate levels, turbidity, and salinity. Each peer-mentor pair conducted each test, recorded their results, and ultimately compared their findings with the findings of other pairs. Afterward, students used macroinvertebrate nets, microscopes, petri dishes, and a dichotomous key to collect, analyze, and identify their samples.

Although sixth-grade mentors had never used these specific water quality tests, their uses were intuitive even for the younger learners, and adult guidance was always available when necessary. Generally, though, students were able to easily record observations (pH, salinity, and oxygen levels, etc.) and begin drawing inferences. During their tests, sixth graders were responsible for using their own inquiry skills and background knowledge to help their buddy develop a grade-level vocabulary that would help interpret their findings (i.e., turbidity = cloudiness of water). Moreover, sixth graders helped third graders understand how each water quality indicator (oxygen, salinity, etc.) might affect living organisms in and near the reservoir. After each partnership finished conducting all five tests, the entire group came together to discuss and synthesize their data with the help of their adult leader. If students’ findings were inconsistent with the group’s, or if there were no reliably consistent data points, students discussed possible reasons for the inconsistencies—user error, contaminated samples, etc. Once a general water quality consensus was reached, students hypothesized about what life forms might be found at the marina before grabbing nets, petri dishes, and a dichotomous key to see for themselves.

Directly adjacent to the dock was a boat launch where students eagerly readied themselves for their floating Socratic seminar. Following explicit instructions and reminders of skills developed throughout the year, sixth graders coached their third-grade buddies into a life jacket and then into a canoe. Adult instructors traded turns guiding the excursion but with tight lips. Adults were there for physical support and to help the Socratic seminar stay on track. Before leaving the boat launch, students were asked two questions: “What is this body of water used for?” and “How do the uses determine where people live?” (see Table 1 for a guide to facilitating Socratic seminars.) Part of an answer to both questions would be obvious, of course; but the goal of the Socratic seminar was to guide students’ thinking first toward the effect of water on their own communities and then toward how humans more broadly use and orient themselves around water. Sixth graders were particularly adept at guiding this discussion after participating in the field experience described in the previous section. After a short paddle around the reservoir, we regrouped and discussed possible answers to our questions. The obvious answers were given first, of course—the reservoir is used for recreation and hydroelectric power; people live near water because they need it to survive. Eager to guide their buddies toward deeper thinking, sixth graders began probing their younger peers with follow-up questions. Third graders, inspired and guided by the example of deep thinking being modeled for them, responded insightfully! (See Table 1 for examples of sixth-grade follow-up questions and third-grade responses).
At the waterfowl survival game learning station, sixth-grade mentors led third graders in various games designed to educate students about how local waterfowl and other wetland animals survive in their environment. In one game, students took on the identity of a species of local waterfowl and used a literal roll of the dice to determine their fate (see Supplemental Resources for game information). In round one, students followed instructions based on the dice roll and a “normal” lake level—for subsequent rounds, a “low” lake level was used. After students had completed a predetermined number of rolls (or their bird perished), they analyzed their data and drew conclusions as to what the real-life consequences might be. Sixth graders, who had learned the game during a science lesson early in the year, were skilled at helping the younger learners understand the real-life consequences of the game’s scenarios. “What would really happen if a baby pelican’s mother doesn’t return from a food-gathering trip?” one sixth grader asked her partner. “If the bird was old enough, it might be able to find food on its own; but if it was too young, it would probably die!” the third grader lamented.

Under the marina’s pavilion, the older students—armed with a refined technological expertise thanks to prior learning...
Student partners created documentaries sharing what they had learned.

experiences—guided their buddies through the use of iPads and a video editing app in documentary film-making. The purpose of the films was to informally assess students’ ability to consider the experiences of various living (and nonliving) things present in the habitat we were visiting. Students’ subject matter was wide-ranging, including rocks, trees, animals, and even a piece of trash found in the water along the reservoir’s shore. Some documentaries were silly; others were quite serious. All of them, though, had important things to say about not only the experiences and interactions of the living and nonliving things found in this environment but also the experiences of our students and their interactions with the place they were visiting.

The use of technology added a nuanced level of difficulty to the older students’ responsibility load. As was mentioned, they had plenty of background knowledge and skills developed in the classroom to bring to this activity; but it was important for each of the sixth-grade students to think through their creative process so as to be able to explain to a younger buddy how that process might be adapted to the task at hand. It was also critical that the older students help their buddies learn by doing. Storytelling came easily to the third-graders, but refining the details of that story and being able to tell it through a new medium was the crux of this activity, and third graders wanted to play a big part in that task.

As was expected, there were questions from students about how the creative process might be explained to a younger, less experienced peer. There was a bit of troubleshooting to be had as well. For the most part, though, the sixth graders were more than capable of meeting this challenge with enthusiasm!

Later, back at school, both classes gathered as a large group, and peer-mentor partners presented their documentaries. Teachers observed presentations with a formative lens. They were looking to see if students considered water quality, identified human impacts on natural resources, or discussed human reliance on natural resources when they were hypothesizing about the experiences of living (and nonliving) things in the environment? If so, we considered the activity and student products successful. For a formal assessment, we have shared an appropriate rubric online (see Supplemental Resource).

Conclusion

Using cross-grade peer mentoring as an integral component to field trip experiences can help educators realize the learning potential of nature-based experiences. When young students are paired with older students, Socratic peer dialogue deepens interest, investment, and ultimately ownership of new learning. Keys to successful enactment of cross-grade peer mentoring include:

• Practice mentoring experiences for older peers
• Development of Socratic dialogue question prompts
• Purposeful connections to real-world meaning

It is possible to have field trips that go beyond mere visits to locations. Using peer-supported inquiry experiences has been a positive way to enhance the effectiveness of field trips in achieving multiple learning outcomes.

REFERENCES


SUPPLEMENTAL RESOURCES

Download the station descriptions, bird game data collection sheet, and video rubric at https://bit.ly/3JSFw6I.