



Deep Learning in Grade 6 Buranakan at Roong Aroon School

By Robin Martin

Deep Learning in Grade 6 Buranakan

Term 2, 2020

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Introduction to Buranakan

At Roong Aroon School in primary grade 6, Teacher Kloy approaches teaching with active attention toward learning in a holistic way. Thinking of her students, she says it is especially important to develop mindsets for seeing connections and becoming more aware of the world in a systematic way. This implies **integration** in which she explains, “Everything is combined and related to each other. So all these connections will come back to you and then you can use that knowledge for something else in your life.”

The subject that Kloy teaches is called Buranakan, which in Thai means **integration**. Buranakan (pronounced as *booo raana gaan*) is a common word in the Thai language that means interdisciplinary learning, usually through the integration of subjects. At Roong Aroon, Buranakan is more than interdisciplinary; it is also embedded in a carefully crafted **values-oriented curriculum** and delivered with a holistic approach to student development. It is designed to deepen students' knowledge of their world through meaningful experiences and connecting with people who inspire them to want to learn more. **In sync with their emerging interests, students' knowledge, skills, and values develop together, as they become motivated to take actions that benefit themselves and their community.**



Grade 6 students collaborate to build model rivers in Week 4.

In Term 2 of 2020, Teacher Kloy and her integrated science partner Teacher Kaotu were blending together holistic learning and systematic thinking within their Buranakan Grade 6 classroom. With mind-sets cultivated to face expected and unexpected challenges, the Buranakan teachers guided their 25 students toward weekly learning objectives in ways both inviting and collaborative. In the process, students made many choices about their focus for delving into knowledge about their local water-systems, formulating their own guiding questions. This is what the teachers refer to as “**an open approach teaching process,**” **which they combined with active learning throughout the term to foster the students' deepening values about water conservation.**

An essential element of Buranakan is each teacher's **wise reflections** in relation to the students and to the content that they are teaching.

“Wise reflection” (or “yonisomanasikara”) is not only a Buddhist term, but a learning process that has been developed by the school's founder Ajarn Prapapat in relation with the school community (Niyom, 2018). The application of wise reflection is “to generate deeper thinking skills” (p. 3). It integrates different types of thinking, including suitable reflection, reasoned thinking, and effective thinking. As teachers take the role of “virtuous friend,” they learn to guide students into seeing the “value aspect of whatever subjects are challenging enough for students to learn independently” (Niyom, 2018, page 13).

In discussions with Teachers Kloy and Kaotu about their Buranakan class, they rarely use the terms “wise reflection” or “virtuous friend”, yet both concepts are embedded in their behaviors, attitudes, and ways of guiding students. They are careful in guiding students toward listening to others, being available for help when needed, while encouraging students to do their own thinking and processing of information. *For these two Grade 6 teachers, core aspects of facilitating wise reflection involve observing students carefully and asking the right questions. By having “eyes to see the big picture,” the teachers can realize how to ask the appropriate content-focused questions that engage students in critical thinking for opening their minds, in the right way at the right moment.*



Ketsarat Masri (Teacher Kloy)

เกศรัตน์ มาศรี (กลอย)

Grade 6 Buranakan,
Social Studies/Thai Teacher



Wanidtee Soysuwan (Teacher Kaotu)

วนิดฐี สร้อยสุวรรณ (ข้าวตู)

Grade 6 Buranakan,
Science Teacher

Listening carefully to and learning from each other helps students to acquire right information, a prerequisite for doing wise reflection. Both teachers and students learn to listen, think, and synthesize without interrupting, without judgement. No answers are considered as wrong. Together, they are learning to think about how all the pieces fit together, but they are not judging (or critiquing) the answers and responses of others.



Teacher Kaotu guides students when they ask questions about a task-at-hand.



Teacher Kloy connects with students about their brainstorming in small groups.

The single most important factor that both Teachers Kaotu and Kloy agree as engaging students deeply with learning is their relationships with students. They believe that none of the tools, methodologies, curricula, or lesson plans would be effective without the strength of their student-teacher relationships.

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Learning in Buranakan: Seeing the Connections between Self and World

One of the Roong Aroon School directors, Sakunee Boonyabancha (Cru Jiew is her Thai nickname) has worked closely with Primary School Buranakan teachers for over two decades. According to Cru Jiew, **Buranakan students learn deeply about the value of seeing connections between themselves and what they are studying.**

One core concept of Buranakan's deep learning process at Roong Aroon is that learning must start close to the students. Then, it spirals outward in relation with their immediate environment. *In Grade 6, students learn to question and understand for themselves core concepts being examined-the water system from the mountains to Bangkok where they live. They need the direct experiences of observing for themselves about the water coming out of their taps at home, asking questions about pipes and water pressure and how the water gets into their homes. They meet the people who take care of the pipes and see why those jobs are important, and to discover why filtering systems are necessary. The most important thing is for students to circle outward from themselves in their learning process, so by the end of the term, they will see how the forest and the spring water are relevant to their own lives.*

When the term is finished, the Grade 6 students should understand the value of all the steps involved in how water arrives at their homes in Bangkok, and that it's not an easy process, and that there are many steps and people involved in bringing healthy water to them. Every step has its own complexity and reasons for being, such as the building of a dam near the headwater in the mountains, that affects the lives of many people and animals, with its own

history of how it came into existence. As they learn knowledge and skills around real world situations, their values deepen so that they can eventually see for themselves the reasons for taking actions in the conservation of water.

Learning from Real Situations

In Term 2 of 2020, from September to December, Teachers Kloy and Kaotu guided students to creating their own journey along the water pathways that lead into their homes. As with **place-based learning** (Gruenewald, 2003; Boss, 2018), the starting place needs to be where students are, moving outward from students' life experience toward new connections as their knowledge and experiences expand. Learning should begin as close as possible to the students' own lives -- in this case, the water coming from the pipes in the sinks of their own homes. The selection of the starting point is as important as every step in the journey so that students can continually see the relevance of the learning process to their own lives.

The real situations and places that students visit are often pivotal to the development of their values, knowledge, and skills for forming a more holistic and complete understanding. Direct experiences are the easiest ways for students in getting value from what they are studying, according to Cru Jiew.

When learning in holistic education, important knowledge comes through direct observations in real-world contexts. Students need to talk with people who care deeply about the purpose of their jobs, for example in protecting the water purity or working to improve a system. Finding good people who care about their jobs and how their work affects others and the environment as a primary source for gathering information supports the learning processes of Buranakan. Books and Internet-based resources are also important as secondary sources for inquiries and investigations after the initial sparks of inspiration have begun for students.

Direct experiences are helpful to be in-person when possible, but with modern technology, the social, emotional, and intellectual aspects of experience can occur in virtual ways that are non-physical too. Still, the in-person aspects of actual situations in their fullest contexts (such as in field studies or when studying the transpiration of trees on the school campus) can help students to make connections more easily.

The Essential Role of Teachers

In the story that follows, the Grade 6 Buranakan curriculum was developed over many years, with adjustments made in collaboration and with observations of many teachers who have been Grade 6 Buranakan teachers at Roong Aroon. The process of learning from experience was not always as smooth as it appeared in this story from 2020.

In whatever grade level these connections and wise reflections are happening, it is not easy to learn how to facilitate this kind of learning. Teachers must learn to anticipate where the students are going in their learning processes, to provide the necessary scaffolding along the way. They must have patience to go at the pace of the students, as well as to reflect carefully with colleagues about adaptations needed in each year's new curricula. They also serve as guides to help students as they keep asking deeper questions along the way.

Important to wise reflection, RA teachers are careful not to tell the students if they are correct or incorrect, but let students discover for themselves. “The role of the teacher is more to get the kids to think critically about the topic. So teachers have to be well-rounded and be able to think from different perspectives,” Komen Orchaiyaphum (Cru Toiey) explains.

The inner mind of teachers is a core ingredient for what makes the curricular designs of Buranakan flow in relation with students. The teacher must profoundly understand the value that the students are moving toward, to be able to make an inspiring, relational, and workable plan with details for guiding students as they learn. The term plans are called “roadmaps,” and allow the teachers to uncover and talk with other teachers about the objectives for knowledge, skills, and values, and show ways that they intend to step the students through a step-by-step process. The roadmaps are then developed into weekly lesson plans that must be adjusted as the term goes along.

Buranakan teachers are each part of a professional learning community (PLC) with other Buranakan teachers on their grade level, holding many meetings before/after each term, along with weekly meetings too. Through PLC teams, the teachers learn in relation with colleagues, agreeing on the roadmap for each term so that all Grade 6 students go in the same direction as far as the objectives, learning processes, and evaluations. As the term moves along, each teacher then makes adjustments to the needs and class dynamics of their particular students.

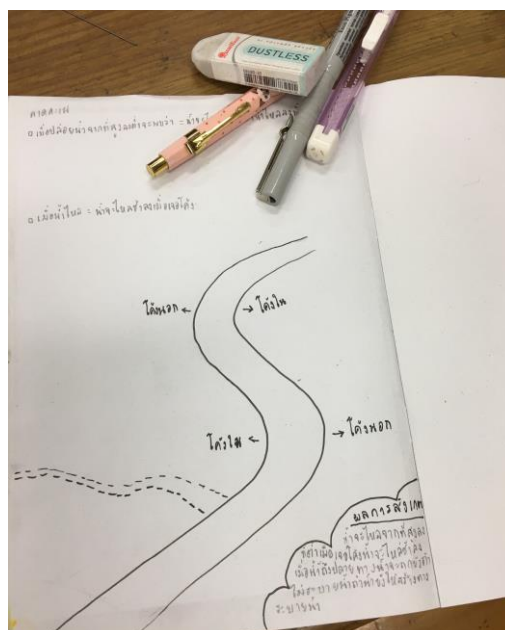
Purpose of the Roadmap

The term “roadmap” captures the sense of a journey that shows the starting place, the tools and techniques, places to go along the way, and end destinations. Among teachers, the roadmap should not be confused with the territory, and shifts can be made on the journey to take different routes to arrive at the same place.

Each teacher works with their grade level Buranakan colleagues to develop new roadmaps every year, thinking through the process afresh.

The process of mapping out the terms helps teachers to visualize the details of where they are intending to go with students. It gives teachers ownership for understanding the learning processes for working toward the integration of knowledge, skills, and values, as they guide students into learning for a purpose.

To help internalize and see more deeply into their own planning processes at the beginning of each term, RA teachers share their roadmaps with a team of colleagues, explaining the approach they’re taking and why. It helps to ensure that teachers are planning outputs and assessments of what relates to goals or objectives on the map, then to keep on track as they move along through the term.



For curriculum planning by the teachers, the details of the roadmap are critical to understand. Cru Jiew explains that if a teacher doesn't understand what he/she is going to do, the plan may lack necessary details. Whenever a teacher jumps ahead of the students' reasoning about the system being studied, the students may get lost or be unable to ask relevant questions. They may listen, but it will be without comprehension of the whole system, learning about the pieces without understanding the whole.

Integrating Knowledge, Skills, Values

At Roong Aroon, the integration of knowledge, skills, and values (head, hands, and heart) is done systematically, while at the same time learned and understood gradually and in relationship between the teachers and students over time.

As knowledge and skills are acquired, students can go more deeply, as they sink into realizing new aspects about the water system in Grade 6, for example, which then shifts into sincere concerns about water usage and its relation to themselves. Wise reflection can happen in relation to knowledge and skills, but often it circles back and spirals onward with attention to the value of each task or project. Teachers are continually asking students questions to ensure they understand the reasons and purposes for every task, so the students understand why they are seeking the next spiral of knowledge outward.

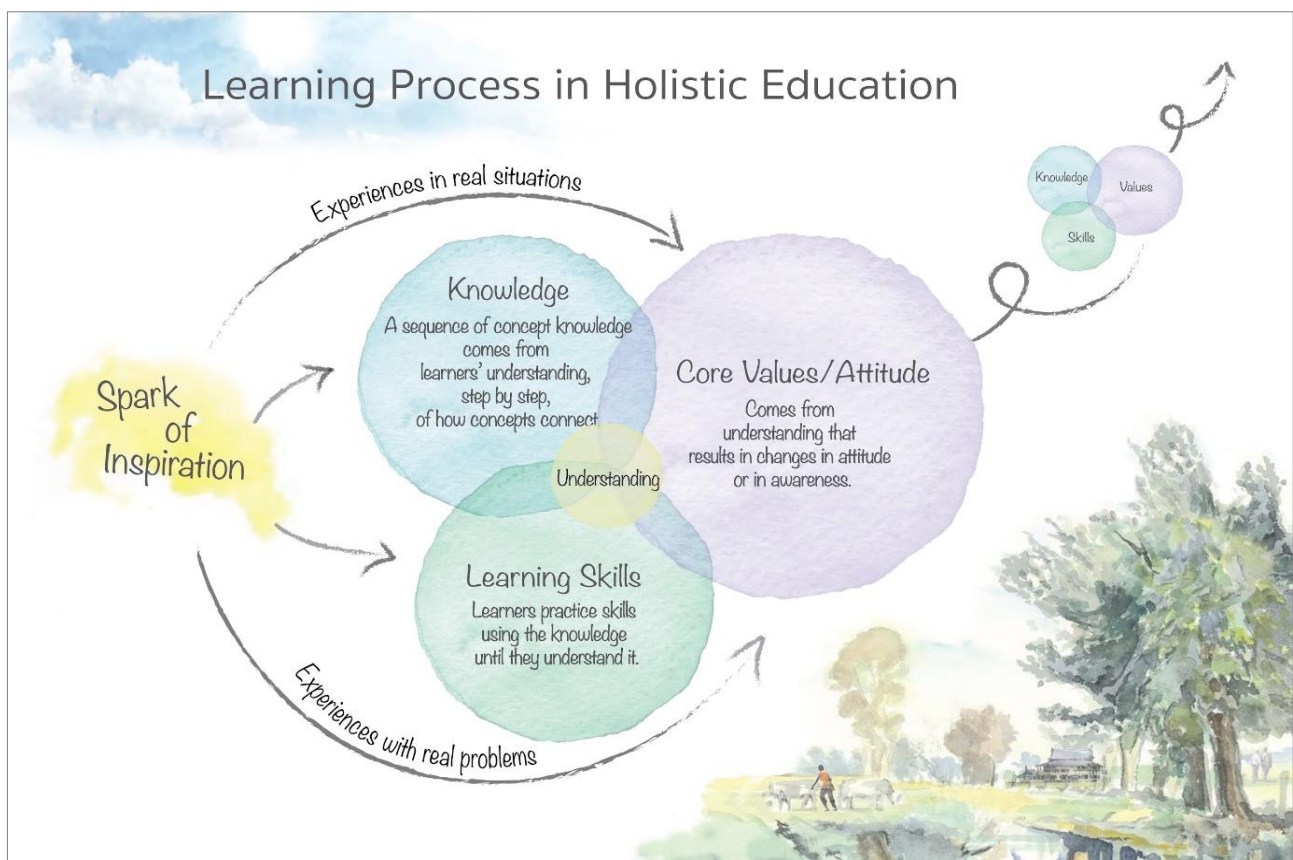
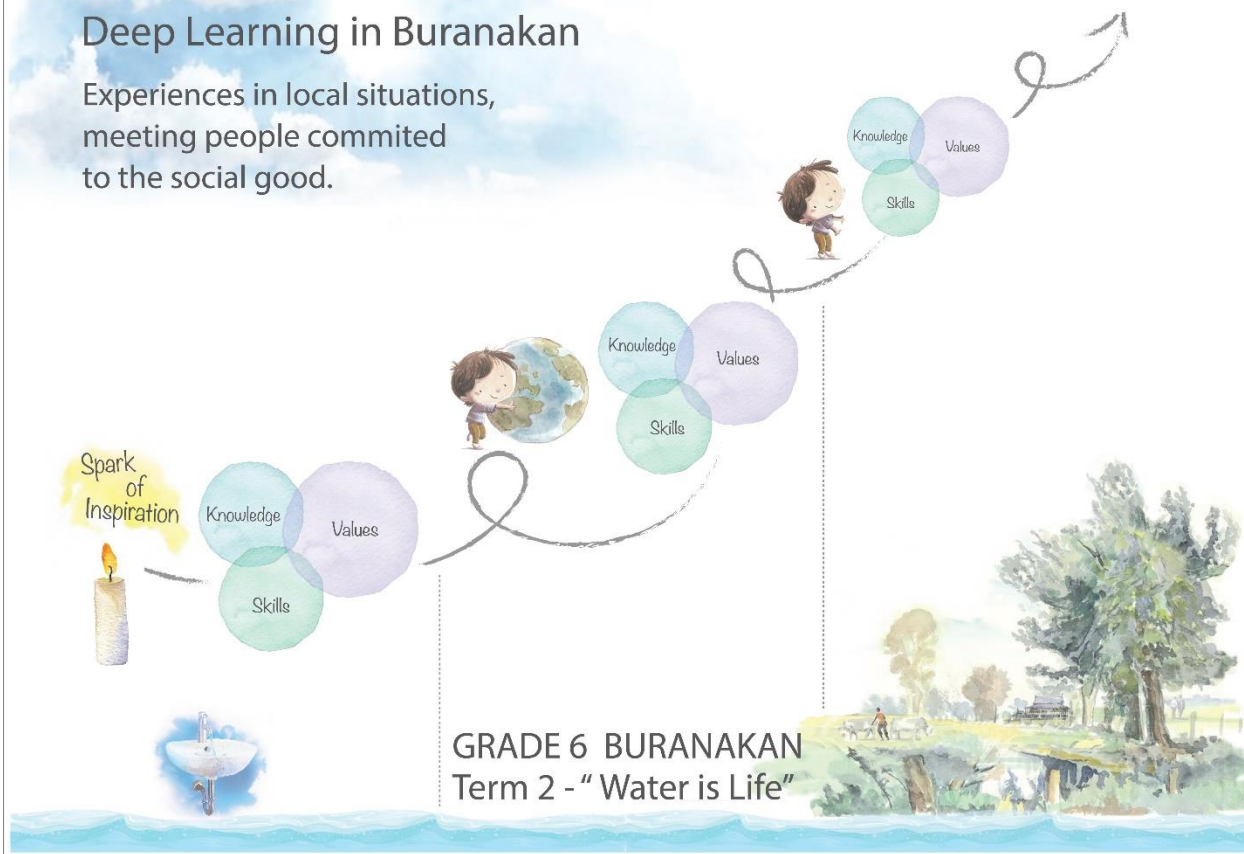


Figure 1. A simplified view of the three core elements of complex, often messy, holistic learning processes that integrate knowledge, skills, values.

Deep Learning in Buranakan

Experiences in local situations,
meeting people committed
to the social good.



Phase 1 (Weeks 1 - 4)

Engage and explore
factors in making pipe water.

Understand the water
collection system that
supports a healthy way of life.

Phase 2 (Weeks 5-9)

Explain and elaborate
on the water's full path
from the Mae KLong River.

Plan & Prepare : Collaborate
for 2 day Field Trip

Follow the route of
natural water
used to produce
pipe water

Study ways of managing water
e.g. Weirs, dams.

Phase 3 (Weeks 10-13)

Synthesize & Evaluate :
Realize and
make sense of
water's deep significance.

Reflect on
how to bring
knowledge together
for sharing in
meaningful ways.

Use skills step by step
related to water

Do more research.
Teamwork expands.

Students initiate questions, listen to others. Knowledge expands step by step.

Teachers listen and guide with goals, process and current situation all in mind.

Smaller concepts are linked through synergistic inquiries to **spiral toward core concepts and value.**

Figure 2. A spiral of complex learning processes across the Grade 6 Buranakan curriculum.

Suwanna Chivapruk (Cru Toi), a Roong Aroon School Director, says,
“Teaching and learning used to belong to teachers but now it belongs to students.”

*Buranakan is designed as a spiralling process from the initial inspiration for inquiry or investigating a problem or local issue, into collecting information and knowledge, using skills to research and think through or communicate how the facts fit together. Simultaneously, teachers watch out for how new knowledge and skills are opening students' minds, allowing them to refine their values around what is being studied. **Teachers look for what is sparking each students' interests for going to the next level of learning and inquiry.** This helps them learn how to ask the right questions as they go along too.*

Why are the steps in a system so important? A Grade 5 Example of Growing Rice

The details of the steps in any learning process are critical so that students develop a sense of orderliness, ***being tidy*** within their thinking about the food systems, water systems, or other systems that affect the health and well-being of their community.

For example, in growing rice during Grade 5, it is the teacher's responsibility to go into each step so students see the value of how it contributes to the end product, the quality of the rice grown. From choosing the seeds to planting to sowing to harvesting, even the distance apart that the grains are planted, every single step affects the quality of the rice that is produced. If the students or the teacher may not understand all the details, finding experts who can explain the rice-growing process is important.

Teachers lead students into discovering how the entire process is guided by human beings who care about the safety and details that lead to the final outputs of the systems they are managing.

Buranakan as Inquiry-Based and Place-Based Learning

Buranakan can be considered as both an inquiry-based and place-based approach to learning nestled within its encompassing values-oriented curricula shaped by Roong Aroon's unique approach to curriculum design.

Inquiry-based learning has expanded over the past few decades, especially in the sciences and in relation to learning cycles for teaching elementary education, with an array of variations (Bruce, 2008; Pedaste et al., 2015). Based on both cognitive learning and constructivist learning theories, the well-known 5-E approach to the inquiry cycle was developed in the 1990s as a tool for helping students to internalize and interpret their

conceptual understandings (Duran & Duran, 2004). Ideally, it derives from students' own questioning of scientific phenomena that they are naturally curious about.

The 5E cycle of inquiry is found implicitly within many weekly tasks of Buranakan. However, the RA Buranakan approach to inquiry came from neither American research or western practices in inquiry-based learning, but rather evolved in relation to Buranakan teachers and their students, along the systematic thinking practices of Buddhism. Sometimes, the inquiry approach in the sciences resembles the 5E cycle, and sometimes when they are learning about history or other topics, it may be mixed up a bit according to the learning process that fits the situation.

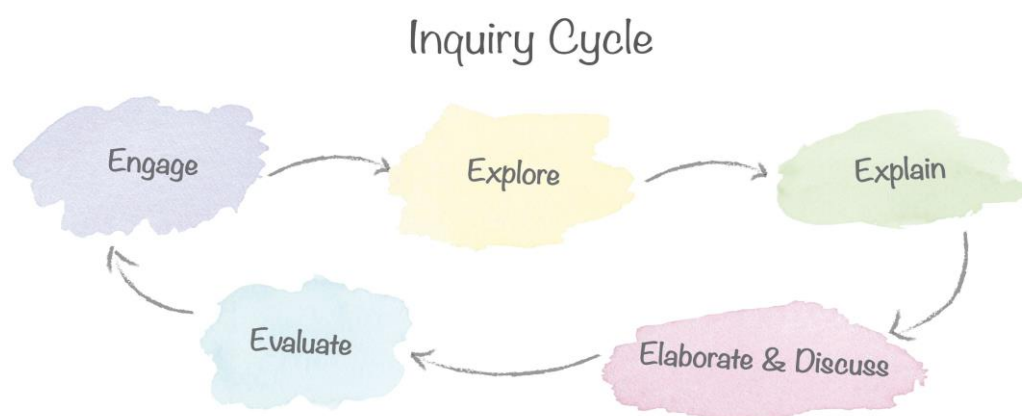


Figure 3. The inquiry cycle for Buranakan science topics may look like this common model (used internationally); for other topics, the steps of inquiry are adjusted according to the topics that are being investigated.

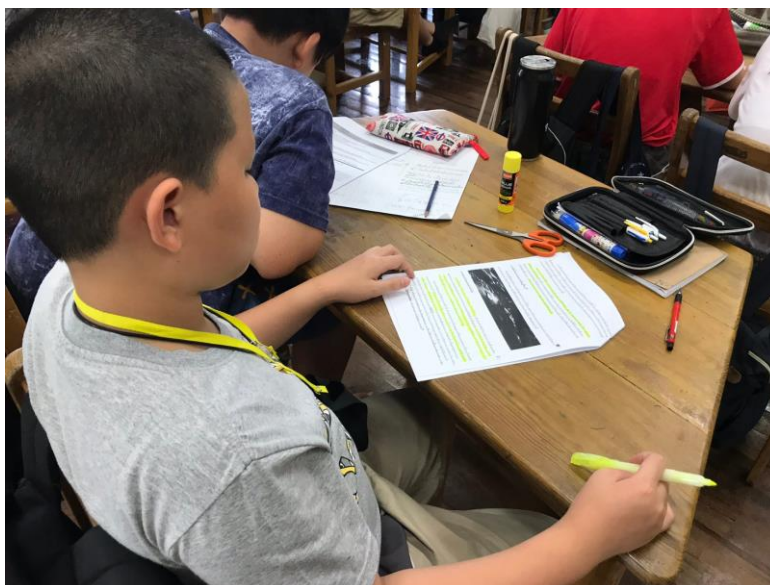
Nowadays, inquiry-based learning is used extensively worldwide, such as in the International Baccalaureate's Primary Years Program (Powers, 2018) or in well-known Ontario Curriculum (2013). At its best, inquiry-based learning is student-led, and can be facilitated in a number of ways, as teachers themselves acquire the skills for guiding students within the inquiry process (Powers, 2018). One common form of Inquiry-Based Learning is known as **project-based learning** for systematically investigating real-world science-related problems.

According to Oxford Learning (2015), the components that a school or learning institute needs to support inquiry-based learning involve the entire learning system: A culture of inquiry, professional development supports for teachers; educator guidance for students; use of higher order thinking questions to better understand students' prior knowledge of inquiry process; along with open-mindedness and spontaneity among students. At Roong Aroon, school curricular leaders work to embed these facets of inquiry into the school community; inquiry-based learning is particularly well-supported by RAS Buranakan teaching teams.

Moving beyond the inquiry cycle as a learning process, Roong Aroon School, especially Buranakan, also uses an approach to learning now called "place-based learning" (Boss, 2018; Gruenewald, 2003; Huntly & Sobel, 2019). The Buranakan program at RAS grew as its own approach to place-based learning before the approach gained wider recognition in ecological and green school movements. Nonetheless, some of the issues faced are similar to those noted by American educators who now strive to construct more integrated curricula

that go beyond single-subject approaches to help students focus on ecological problems close to home (Boss, 2018).

The Grade 6 Buranakan case story that follows is an example of Roong Aroon's particular approach to both inquiry-based and place-based learning. With the teachers' careful guidance, the students themselves learn to identify local water issues for inquiry, later discovering the value of creating projects to raise awareness about water conservation.



*The curriculum in Grade 6 Buranakan leads into projects, activities, and holistic tasks that encompass both **place-based** and **inquiry-based learning**.*

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Class 6/2 Buranakan, Term 2 Begins

In Term 1 (June to August), class 6/2 students had developed their own water filter devices, from research and with materials of their choice. It was an exploratory process that got them questioning and inquiring into the nature and importance of clean water. Term 1 was designed explicitly to lead into Term 2, where students would discover more about the many facets of local water processes for inquiring into where our water comes from.

In this year's Grade 6 class, Teachers Kloy and Kaotu were learning to work together. In past years, integrated classes were the integration of Thai language with social studies (including local and national history, physical and social geography) for learning about the local water system as a form of transdisciplinary learning. Science had also been added informally since the start of the school in 1997. This year, science was formally integrated. As the year began, Kloy served as an assistant to Kaotu when the science lessons were the core focus. Early in the term, students referred more to Kaotu for their science questions. As the two teachers worked together in supporting each other, they noticed how this built trust in the students. As the term went on, Kloy gained confidence in supporting the science inquiries, and students began to turn to her for help, which made the team-teaching stronger.



Teacher Kloy listens and responds to students' thoughts.



Teacher Kaotu shows two students how to cut a leaf to look at it with a microscope

According to the two Buranakan teachers in this case study, their Grade 6 students struggle at times with listening especially. So, lessons are designed to ensure variety so students will never have to listen to teachers lecturing for too long. The teachers' step-by-step guidance into the learning processes and content is another key to their success. They also aim to expand their own awareness of students' personalities and daily moods, enabling them to create holistic learning tasks, experiments, or activities that match the students' immediate learning needs, making each lesson more engaging and naturally motivating.

From using videos to reviewing geographic charts or interpreting infographics, outdoor experiments, and microscopic investigations, teachers consider how each lesson can involve and deepen students learning: thinking about content, moving and doing, reflecting, observing, interpreting, doing more, discussing, or summarizing. The variety of holistic learning tasks is integral to the process of deepening students' values in relation to content knowledge and skills.

From Roadmap to Action

At the beginning of each term, the Roong Aroon teachers make new roadmaps around a core theme for reconsidering the signposts of the learning process that they will guide students through. While the roadmaps may shift in their content, they are designed to include core knowledge concepts along with goals for skills, knowledge, and value, along with evaluation plans. Evaluation includes both summative and formative techniques.

Teachers Kloy and Kaotu began Term 2 with the theme of "Water is Life" and the overarching objective for students to "Understand the origin and importance of water in relation to other natural resources affecting human lives; make students aware of using

water and other natural resources with value.” ***See Appendix A for a partial sample of the Grade 6/2 roadmap for Term 2.***

In moving from roadmap to action, Buranakan teachers at Roong Aroon talk often about the need for observations, flexibility, and adapting to the emerging needs of students and the realities of each new situation.

Core Concepts and Wise Reflection

Early in the term, students are guided to acquire the knowledge and skills, which advance as the term goes on and their inquiries spiral outward geographically, as students

Core knowledge concepts and wise reflection strategies were used in many ways throughout Term 2 of Grade 6 in 2020. **Appendix B gives an overview of the knowledge concepts and tools/strategies for supporting the students' wise reflection that occurred from Week 1 onward.** Students discover emerging values in light of their developing knowledge and skills, within their own **meaning-making**.

In Grade 6, students work on the skills of critical thinking, language, and communication, all of which support the development of inquiries about water systems. Inquiries emerge from their own curiosity or inspirations; though teachers must be aware of what can guide students toward taking next steps while staying aware of goals for the term.

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Engaged, Active Learning that Links One Week into the Next

As Term 2 begins, Teacher Kloy challenges students to think about the reasons why it's important to drink clean water. She elicits a discussion about things they already knew (prior knowledge). Listening to each other's answers, they become more aware of the breadth of responses about the many reasons about the importance of drinking clean water. Such discussions also give students confidence as they see how their own observations contribute to the bigger discussion.

From week to week, the Grade 6 Buranakan students seem continuously curious, engaged in each day, each activity, each moment. In Week 1, they investigate how water flows to their homes; by week 2 they've explored questions about a local Bangkok water treatment plant, inquiring about how water travels, the processing and production of pipe water, water quality checks, the costs of processing water, and the tools and substances needed. They bring their questions on a daylong field trip to a local water treatment plant to look for answers in relation to workers who care deeply about the quality of their efforts.

In Week 3, they take what was learned in Week 2 to explain it in infographics and articles, to develop communication skills for sharing what they've learned about pipe water production. This spirals them outward from the water in the city toward the rivers that flow into the cities, and learning about how rivers flow – considering the many features of river maps, erosion, blowing and silting. The river models that they create in Week 4 lead them into a deeper

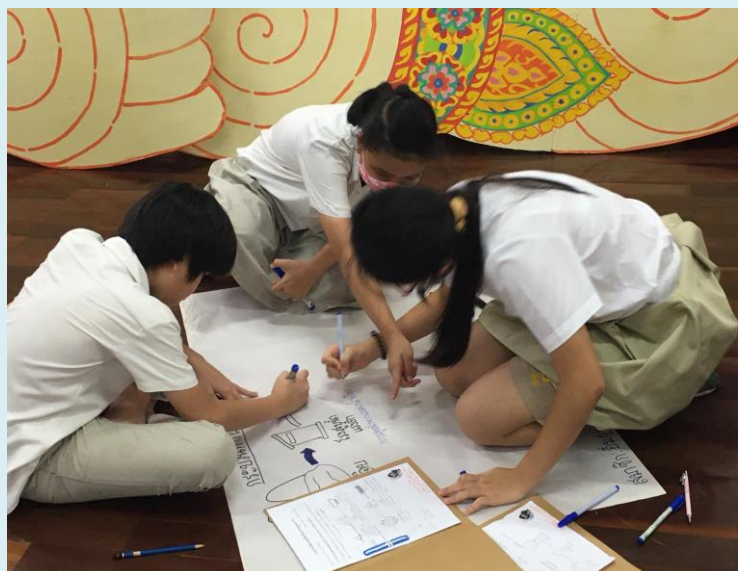
questioning in Week 5 about the movement of water from the mountains toward the city. By Weeks 6 and 7, they have been guided still further toward realizing that the transpiration of leaves and translocation of trees are also part of the great water cycle.

Appendix C gives a detailed weekly journal-like description of how the knowledge, skills, and values within the students' learning processes flowed and spiraled together throughout the term from one point to the next, so that the students were gradually gaining an appreciation and knowledge of the full water system that linked back to themselves. Through their own observations, they could see what was happening and ask increasingly well-informed questions.

As the learning process goes along, the Grade 6 teachers never hesitate to slow down if students are not following, especially for understanding how the parts of the water cycle connect with each other and with students themselves. It is critical that all students are engaged and involved in their own learning processes, not just a few students. It never hurts the students who are quicker to slow down by reviewing the knowledge so far, explaining it from new angles. The teachers facilitate in a way that students look more closely at the value of a topic, rather than feeling they are repeating something already known.

The more that students understand the whole system being studied, the more they inquire and take ownership of their learning. This implies careful, detailed planning on the part of the teachers to guide students in a way that they feel the learning belongs to them.

Students help each other in a small team, working to combine their ideas together. This engages them in collaboration, while reviewing the steps of the homework and internalizing the knowledge more deeply.





Nearly every week, Teacher Kloy used well-designed mind maps to help students see how their knowledge and ideas fit together. The mapping process was created in relation with the students.

QUESTION/ANSWER processes and MIND MAPS in a Buranakan classroom:

An important feature of Buranakan is that the teachers pose questions, but do not give answers. Using an **inquiry-based approach**, they ask open-ended questions for which students can uncover answers for themselves. They accept all answers given, recording them onto a big mindmap. At the front of the room, students see the big picture of all their ideas together. This happens nearly every week, in different ways.

Mind maps are a tool commonly used in classrooms around the world, a way of drawing visually the mental connections between concepts. What makes the Buranakan mindmaps unique is how they are facilitated with groups of students, not individually. It is part of a wise reflection process, with each student listening to the ideas of all the others.

Notably, the teacher draws forth any missing elements in their group-created mind maps by the questions asked, not by giving the students answers. Buranakan mind maps help students to expand their thinking, to learn together from their experiences, to notice the complexity of ideas shared with others in relation to the social and/or natural system being examined



*A student-initiated circle around mid-term
for a friendly exchange and break from in-class work.*

Planning a Journey to the Water's Source

By Week 8, all four Grade 6 classes are planning trips to learn more from real world experience about the water's source. Anticipation for their upcoming trips is building, as students themselves look at what more they can learn by going into the field that will support their own growing inquiries. For the teachers, the challenge is to create an inquiry-based field study so that all the students engage in the inquiry process, searching for new facts and information, not just tagging along and following their friends. Moreover, how can the teachers guide the planning process itself so that it sets the stage for the deepening of values and real behavioral changes?

Students volunteer to work on different planning teams. Each team takes a specific duty that requires research and/or communication of different kinds. One team does extra research about the dams they will visit, another makes the 2-day schedule of where they will go and when. Others organize the vans, write letters to parents, plan the meal options, make a budget, coordinate with lecturers, and so forth.

Each team sees the importance of their own task and works at their own pace. They are given flexibility about where and how to do the needed work. Playful fun is part of the process, as they also come to realize how much time their tasks take to do their jobs well.



Students must request formal permission to go on the field trip. Teacher Toiey, the Primary School Principal, leads a questioning process to confirm they are ready.

Why is the school principal's involvement so critical?

Before finalizing their trip, the students must explain their rationale and preparations to the school principal, Komen Orchaiyaphum (Cru Toiey), another example of wise reflection. Questioning by a caring person of authority helps students move beyond the isolated facts of planning so they look again, more rigorously, at their purpose. There are four Grade 6 Buranakan classes at Roong Aroon, and how the primary school principal interacts with each one is according to its readiness.

School principals at Roong Aroon are curriculum guides who also understand the importance of their social role. Cru Toiey was aware of the extra impetus that his questions and presence would play in the classroom in activating students to keep looking more at the trip's importance for their own learning and awareness, and why it would be important for later sharing with others what was learned.

The Field Study

After much preparation, the field study days arrive. The most important objective of the trip, according to Teacher Kloy, is that students will “realize how important water is.” This objective is reached by ensuring that the students plan enough stops along the way to get the fullest sense of the main junctures in the water's path, going backwards from their school location as receivers of the water, moving outward toward the water's source. Below is a summary of the journey, for a fuller overview of the 2-day trip, see Week 9 of Appendix C.

Day 1: Reaching the Srinagarind Dam and Beyond

On the first day, students journey from the school to see six stops along the water's pathway. Teachers help their students to understand the big picture with maps and mapping activities, while students are pleased at following their own schedule of stops that take them from human-made canals in the nearby Kanchanaburi province all the way to the enormous Srinagarind Dam and then into a nearby village, where they learn how the water comes from the mountain into the reservoir below, and the history that made it all possible.



Teachers use maps to show connections between the places on the path of the rivers and the places where they are stopping.

All day, they have been excited to be on the journey, discovering the profound beauty and details of the geography of places they had been studying, seeing them all in context. By dinner time, after a home-cooked meal prepared by local villagers, the Grade 6 students are exhausted yet still engaged in the learning process. After Teachers Kloy and Kaotu review the day's journey with them, reconsidering the significance of each place, the students bring the day's learning into a values-based conclusion with a letter to themselves.

Samples from Student Drafts of “Letters to Me” -- written to themselves

To me who uses water.

Today we continued from our last field trip to learn about using water. First, we went to the water receiver at Tah Muang, which was 6 km. It was far and water didn't flow too much and never ran... We should use it sufficiently to save our resources.

We then went to the Srinakarin Dam, which is useful, but the space of the forest was used in building it so that we wouldn't be thirsty. Then we saw the difficult lives of the villagers. Even for the electricity that has been passing the village, they had to suffer since they no longer have the water from the stream. I started to understand why I need to save water. The forest was destroyed in order to make a dam that used up the place of the villagers.

This is why I want to tell myself why I need to save water.

From Earth to Earth (a boy whose name is Earth)

... Once we left school, we went to the water gatherer at Muang Chum Area at Ta Muang District in Kanchanaburi, where the water came from the Mae Klong River (its old current) towards the Pipe 2... Then to the Mae Klong Dam that helps to trap the water. This dam takes the water from Achirajwakorn Dam (Minor River) and the Srinakarin Dam (Major River) coming together into Mae Klong River, which is the source of the tap water. Then we went to Din Don, Pak Prak Triangle, the city district at Kanchanaburi, we were at Sri Sawat Area, Ta Kradan District, which is the place where they trap the salt water to purify it and then make electricity with water and deliver it to the Major River. Next Station was Ban Nam Jon. Ban Nam Jon then sends the water to Sri Nakarin Dam.

Today was fun because I got to play at the waterfall.

Tomorrow we will see the natural spring! I want to save water because the staff were tired, and the humans + animals had to sacrifice their land in making pure water from their river. But it was a price to pay for me to be able to use water. So, I am going to save water.

From Jin

Such letters could not be written without the direct experience of being there in a real situation, observing and inquiring together, seeing the facts for themselves in the fullness of their actual context, the real situation of people whose lives and work directly affect the quality of water that flows downstream to the students and their families in Bangkok.

Day 2: Adventure to the Headwater

The final adventure before heading back to Bangkok is a forest hike that some local villagers take every day. They go to the waters' source, where students can see for themselves “Tad Nam” -- the eye of the water, a springwater source that flows into the reservoir above the

dam, then downward into the big rivers and to the water treatment plant, ultimately becoming the tap water that supplies Bangkok.



Hiking through the forest, students pause to appreciate a glorious big old tree deep in the woods.



Students cross a fallen tree to arrive at "Tad Nam" -- the source of the springwater.

Arriving at the spring's source, Teachers Kloy and Kaotu lead wise reflection activities in writing, listening, and asking questions to the village leader Pa Nong. The students are learning together in a natural forest atmosphere unlike what many of these city-raised students have ever experienced. There are feelings of appreciation, wonder, and gratitude for being there, as students continue to sink into being now at the water's source.

Why is meeting local people so critical to learning on the field trip?

Students ask technical springwater questions to Pa Nong. Given the patience and calmness embedded in her responses, it feels as if her insights come from an unspoken relationship with the woods, with a love of this place, a different kind of wisdom.

Pa Nong's presence conveys a kind of deep place-based knowing that engenders listening more than questioning. She speaks not at all like the lecturer yesterday who knew the facts of history he had learned, but rather she speaks from her own lived experiences. With their teachers' guidance, the students are learning to notice the qualities of people who take care of the water at critical junctures on its pathway.



Pa Nong shares a guava fruit with the Grade 6 students. She is one of many village leaders across Thailand who meets with Roong Aroon students during their field studies each year. She has come to understand what students are needing to learn from her.

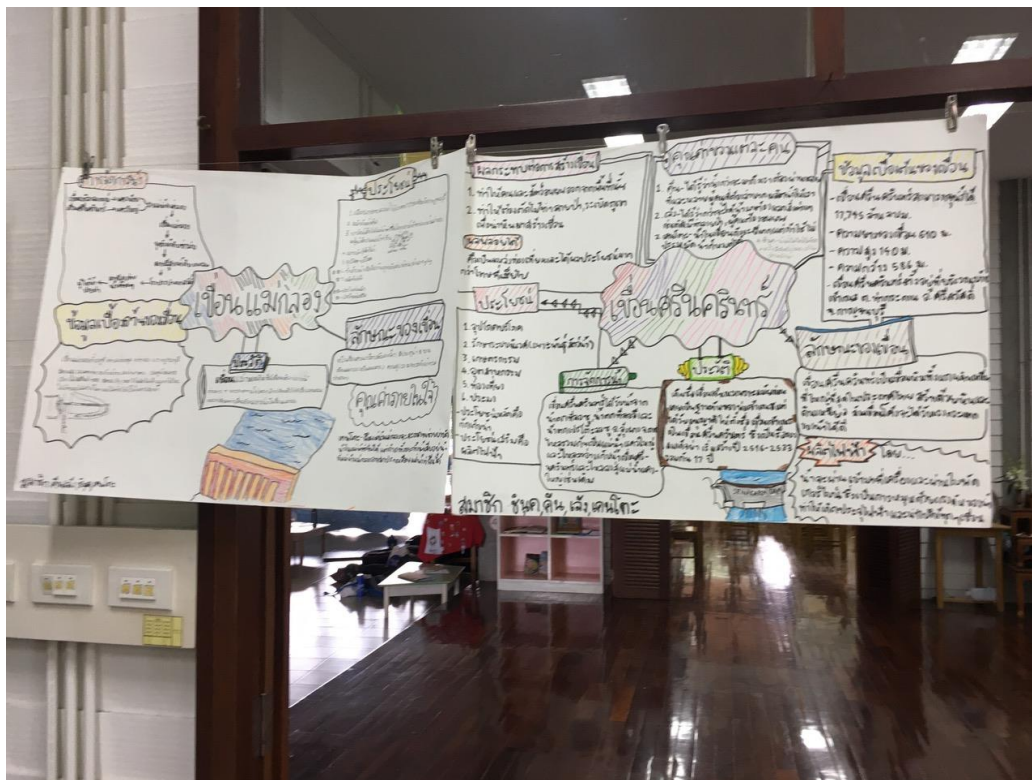
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Yod Nom – the Dew Drops of Learning

By the start of Week 12, a group of students are leading the others in a discussion about their aims for Yod Nom, a sharing time with parents at the end of each term. Yod Nom means dew drops. According to Cru Jiew, “We imply that it’s the same as the knowledge the students have understood at the end of the term after processes of learning.”

Over the next few days, teachers are available as needed, as students divide themselves into teams for planning, developing, and working out each part of their Yod Nom presentation. ***The preparatory work is all self-directed and student-driven to the extent that it can be, with students leading, helping each other.***

Friday arrives. Are they ready? Indeed, they are.



In Week 12, students develop more posters about key concepts to be integrated into their Yod Nom news show and video dramas.

Outputs at Term's End: Skills, Knowledge, and Values Gained

Their Yod Nom program begins with the emcees introducing their purpose. Then, one by one, each student makes a brief statement about how they had developed with a focus on skills and several repeating the theme of responsibility. Although some answers are similar, they each think carefully, expressing themselves in their own way based on their own observations and reflections. (See Appendix C, Week 12, Table 4.)

Next, they share news-style videos prepared with scripted interviews to reveal a synthesis of their acquired knowledge, especially from the field trip:

Thanyatorn Acharangkun: Hello, Thanyatorn here, and I am with a student who accompanied us on a fieldtrip. I am going to interview Mr. Thai Suporn on what he has learned about the process of the water we use.

Thai Suporn: I feel sorry for all the trees in the forest that were cut down, and I learned that water is something essential. When we use it, it will run out one day.

Thanyatorn Acharangkun: How do you feel about the process of the water we use?

Eyada Jirajaroen: I think that the pipe water is not as plentiful as I thought. Not many people think that. The dam has a lot of water, but to build a dam like that uses spaces in the forest, making people leave their homes and the dam is due to our needs in exchange for something important. Therefore, we must use water as conservatively as we can.

The students close with a lively song that they have written, showing their developing values and attitudes toward what they have learned.

Table 1. Lyrics to “Save Water,” song composed by Class 6/2 (December 2020)

*Water is something that gives us life, please give value to it
Now it is time for us to work together, the new generation should preserve nature together.*

*Water is a power source that can run out. Without water, how can life thrive?
It is time for us Thais to work together. Save water so we can save our world.*



Class 6/2 singing together at the end of their Yod Nom presentation, December 4, 2020

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The Challenges of Teaching Buranakan

The challenges of teaching within Roong Aroon's approach to Buranakan are multifaceted. According to Cru Jiew, one challenge is that teachers themselves must be willing and able to change their own thoughts and behaviors. For example, connected with the Grade 6 curricula, there are many factors that contribute to the local water systems and how it works, human factors as well as natural factors. The teacher must develop their own awareness of these interlinked factors along with a capacity for seeing their own impacts on water too. They must understand deeply and see the value, the responsibility, of how their own actions matter to the larger system. Without seeing their own responsibility clearly, how could they help the students to learn to see the importance of their own behaviors?

A second challenge that Cru Jiew points out is how teachers must learn to design activities so that their students can feel what the teacher felt. This is important because teachers must learn to use their personal experiences and understanding for guiding students. This allows teachers to set more clear target objectives in which students can be guided to find the value

of each lesson and its core concepts. For this to happen, the teacher must examine and understand their own learning processes first.

A third challenge is the lack of content knowledge that teachers may have, and that they must work to improve their own understanding of themes or issues selected for the core knowledge concepts that they will cover, or uncover, with students each term. Even in the Grade 6 example, the teachers were constantly reviewing core knowledge concepts in Thai curricular books or youtube videos that they were finding as sources for enhancing their own understanding of scientific concepts especially. The details are important.

The primary school principal Cru Toiey (who taught Buranakan and math for 20 years before becoming principal) sees further challenges that Buranakan teachers face in relation to both developing the knowledge base and critical thinking of their students. Teachers must have their eyes on the situation in the classroom (the immediate learning processes and social interactions as they are happening) as they keep their eyes on the target, and learn to link the two together. They must think quickly and ask good questions consistently, linking what's happening in the classroom with what's happening in the world. "They have to be quick and they have to be flexible," noticing when kids need to go more deeply into the knowledge or work on their skills. Flexibility means listening without judgement, allowing for both correct and incorrect answers as students keep learning for themselves.

Closing Reflections about Learning in Grade 6 Buranakan

In Grade 6 Buranakan, the depth of whole-class engagement, combined with carefree 12-year-old playfulness, in nearly every activity throughout the term showed how students were taking their water inquiries seriously. They felt connected to the content of the local water systems being investigated through each choice that led them onward.

The relationships and trust that the class 6.2 teachers built inspired the students into inquiries and explorations for finding their own answers. Mutual, open-relationships with ongoing learning between the teachers and students had developed throughout the term. Teachers gently "held" the learning space in ways that guided, without forcing the students toward discovering the next level of their inquiries. Learning to ask guiding questions to take students deeper into the topics, without giving students answers, was a theme that occurred over and over throughout the term.

Deeper learning happens when students can engage with their whole self: the body through skills (and movement in direct experiences), the heart through positive feelings (values about what they are learning), along with the use of their minds for systematic thinking.

By learning about water systems that touch their own lives, students' values, inner curiosities and deepening concerns for the place where they live are awakened. As students grow older, their circles of interests encompass an expanding world, with knowledge and developing values in relation to the communities and places where they live. Connecting with local adults

who care about the work that they do for the community also inspires the learning of complex skills while acquiring knowledge for a purpose.

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Appendix A: Sample of a Partial Roadmap for Grade 6/2

Theme: “Water is Life”

by Teachers Kloy and Kaotu, translated from Thai

Objective: Understand the origin and importance of water in relation to other natural resources affecting human lives; make students aware of using water and other natural resources with value

	ภาคเรียนที่ ๑ Term 1	ภาคเรียนที่ ๒ Term 2	ภาคเรียนที่ ๓ Term 3
Theme	ตามรอยน้ำประปามาจากไหน Route of pipelines	น้ำ : ของฟรีจากฟ้า หรือสมบัติที่แสนแพง Water: Free from the sky or expensive treasure?	Kids รักษา Kids preserve water
แนวคิด [Core] Concept	See value and origin of water that is coming from the natural water cycle and pipe water that puts emphasis on their system focusing on value, ranging from production, taking in and distributing water for the good of human way of life	See value of pipe water needing to go through human thinking stage, the technology behind the production and natural resources with the forest as an important factor in making pipe water Students need to understand the water collection system for production of pipe water, electricity, marketing for the good of people's way of life.	Present knowledge and problems encountered in previous two terms or real life situation of nature in the present and make into a project in order to show awareness of solving ecological problems as Thai citizens.
เป้าหมาย Goals	1. Research use of water at school in 2 locations, rain water and pipe water, using experiments about water cycle and value of water 2. Research difference about water quality in ponds and pipes up until purification and checking quality for marketing 3. Trace the routes of where the pipe water we use comes from by studying the water supply system from school to the metering station Ratburana to the Mahasawat Water Plant	1. Learning production of pipe water to see the cost and electricity used in the production process. 2. Follow the route of natural water used to produce pipe water by studying the path from the Mae Klong River to the source of the water in the forest. 3. Study various ways of managing waters such as dams and weirs. 4. Study benefits of water storage for various uses such as flood prevention, helping us to have water during times of drought or generating electricity	1. Research, analyze and present problems found from studying the source of water in two semesters or from the current environment situation, including studying methods and concepts of model people in solving problems 2. Design and plan projects of interest.

Appendix B: Core Concepts and Wise Reflections in Term 2, 2020

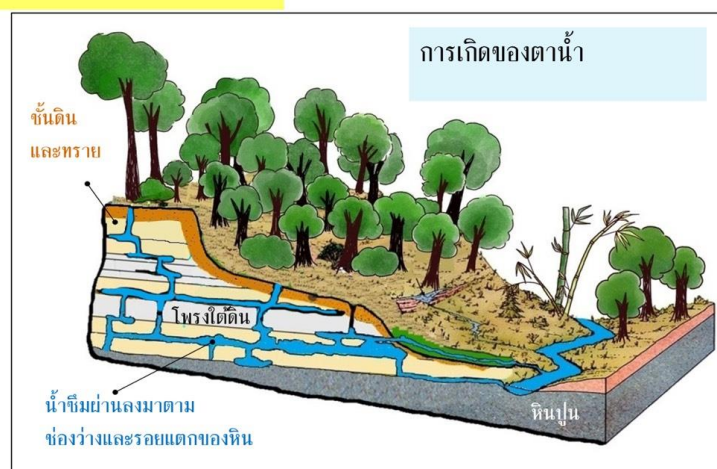
as noted by Teacher Kloy and from weekly observations

WEEK # Main Activity	Core Knowledge Concepts	Wise Reflection - tools/strategies for making connections
1. <i>Researching ways to make water clean</i>	Understand that freshwater used by the people of Earth is limited and has gone through a purification process since drinking it unclean would be dangerous to our bodies.	Set questions. (Such as “Why do we drink clean water?”) Research the effects of consuming unclean water. Find ways to make water clean.
2. Field Trip 1- Water treatment plant visit	Awareness that clean water goes through a complex cleaning process with a lot of funding and natural resources involved.	Writing, Speaking: What are the factors in producing clean water?
3. Creating infographics and articles	Know and understand that can help other people to become aware of using pipe water. Activities involve language and techniques for persuading.	<ul style="list-style-type: none"> - Concluding the process of producing pipe water - Making an infographic on pipe water production
4. Google Earth & river models in the sand	<i>Waterways from source to its destination (eroding, blowing, silting):</i> Knowing and understanding the factors of how untreated water [coming from] freshwater [sources] involves the flow of water from high places to low places, which reduces energy.	Writing reflection: What process is involved when sending untreated water towards the water plant? Why? * If you make your own water plant, where would you set it? (source, middle of process, destination) Why?
5. Formulating water questions		Guide students to ask their own questions about how water is going from the mountains to their taps at home.
6. Experiments on the transpiration of leaves	Plants along with the forest itself send out and transport water, as part of the water cycle (exchanging water with soil and atmosphere, a process called transpiration). The more trees there are, the more freshwater there is.	Answering the question: What happens to the water cycle and to us if the forest is gone?
7. Translocation of trees		
8. Prep for the 2-day field trip	Planning for a field trip needs to have a goal and process in setting up plans into steps which is the key to success. Realize how important water is by	<i>Be the owner of your own work; write reflections and evaluate your working process. Prepare to explain plans and purpose to the school principal.</i>

9. Big field trip and AAR	connecting directly with people in real situations who manage the water systems that flow into Bangkok.	Reflect: How does each location on the journey connect to the student? How does each part connect to the whole process? Afterwards: How does the water cycle connect to you?
10. Mapping water pathways and natural resources	Be aware that humans, animals and plants depend on the forest which is the source of the water and natural resources and therefore should adapt and live together for the sake of balance	Transposing information into large visuals helps students see the big picture of their journey, in review, and to take ownership of what they learned.
11. Using water and looking after water	Understand that people of each area use water differently and look after water according to their roles; what makes them the same is that they think about how they can still have water for use while thinking about the next generation too.	Presentation: Looking after water and what would happen if we do not look after water (Making videos, infographics, and articles to support group presentation.)
12. Yod Nam	Understand that language is the tool in communicating, for distributing ideas and knowledge so other people can better understand. Use communication technologies to reach goals.	- Producing creative communication for parents to see the value of the forest and water - Reflection in form and knowledge for presentation and development

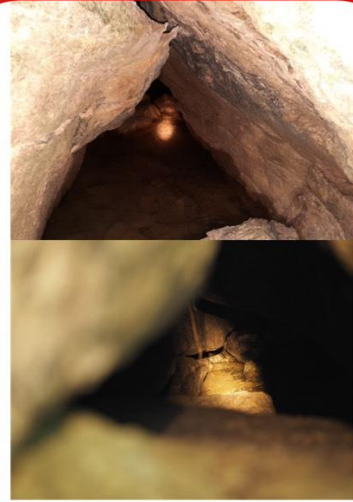
Infographics about the Nonghoi spring: How a natural spring occurs

นักเรียนคิดว่าของตาน้ำพุหนองหอย เกิดขึ้นได้อย่างไร



ตาน้ำพุหนองหอย เกิดจากการที่น้ำซึมผ่านชั้นดินและทราย ไหลลงมาตามช่องว่างและรอยแตกของหิน ลงสู่โพรงใต้ดิน ซึ่งมีหินปูนอยู่ด้านล่างเมื่อน้ำเต็มโพรง น้ำจะไหลออกมาด้วยแรงดัน มายังบริเวณที่มีรอยคดโค้งของหินด้านบนที่อยู่ระดับเดียวกับระดับน้ำใต้ดิน

นักเรียนสังเกตเห็นลักษณะของตาน้ำพุหนองหอย เป็นอย่างไร



ตาน้ำพุหนองหอย มีลักษณะเป็นทางน้ำไหลออกมาจากโพรงหิน ที่น้ำไหลออกมาอย่างต่อเนื่องออกมามีลำธารเล็ก ๆ

Do you see what the Nonghoi spring looks like?

The Nonghoi spring is a passage in which the water emerges from the rocky cavity. The place where water comes out continuously is like a small stream.

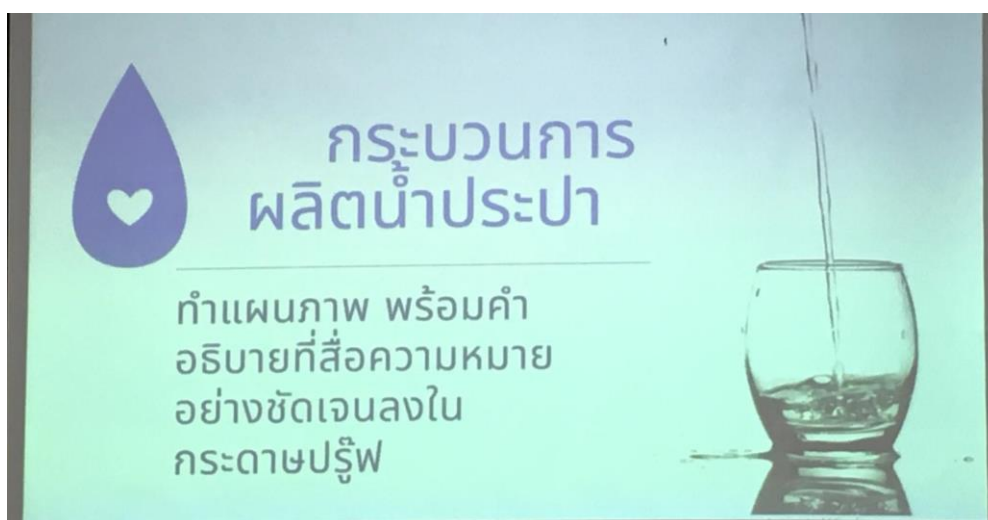
Appendix C: The Learning Processes, Week by Week

How do the teachers facilitate students' learning?

Week 1: Researching How Water Travels to Our Homes

During the break between terms, students had been asked to investigate water processes in Thailand. How does clean water get from the mountains of Thailand into people's homes?

The students began by acquiring basic knowledge about the main topic: Expanding their understanding of facts, found on the Internet, about the steps of how water gets from water treatment plants to their homes. This got them thinking about how the water stays clean and healthy from one place to another.



Pipe Water Production Project: Making graphic plans with explanations that convey clear meaning.

Clean water is so taken for granted that it goes undiscussed even in many biology classrooms. Yet, one has only to look in the klongs (the canals of Bangkok) to realize how dirty and polluted the city's water has become. Clean water is necessary for life. How does it get from somewhere central in the city to students' homes?

With such a place-based learning inquiry, students can explore, step by step, how their own local water system connects with the water necessary for healthy living.

This week's homework: After looking at a map of Bangkok, Teacher Kloy asks the students if they can find out how the water gets from a local water treatment plant to the school (or their home)? What route does the water take?



Students are guided around the water treatment plant.



They see the intricate water treatments.



Students listen to experts about chlorine storage.



They observe the importance of safety issues.



On their way home, they stop by two rivers that are sources of the water plant.



Students conduct some water quality tests.

All day long, students are guided into experiences and direct observations of the water treatment plant, real situations, where they can learn for themselves, meet people in the field who are doing good and complex tasks for their communities, working for a purpose. During such field studies, teachers point out to students to notice the workers whom they meet and the care the workers take in what they are doing.

Grade 6 students return to school the next day, jazzed about what they have learned. Their energy and liveliness feels like an exclamation point of how much they enjoyed the prior day. But how much did they really learn? This gets revealed in Week 3 as they scale up their language skills and communication competence to share their newly acquired knowledge.

As part of their holistic approach to encourage better listening, the teachers had asked students not to take any notes, to focus on being alert and attentive. Taking notes, Teacher Kloy explains, can be distracting to being present in a new experience. From her own experiences of leading past field studies, she has realized there is plenty of time for reflecting and synthesizing their new learning the next day and the following week. Indeed.

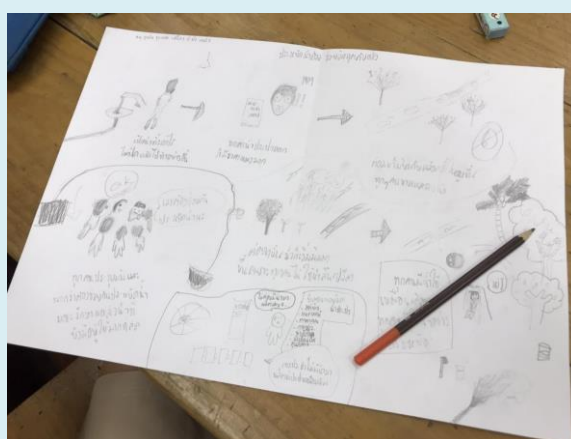
Week 3: Creating Infographics and Writing Articles

In Week 3, the target skill is using language to invite others to save water by designing their own creative infographics. The core concepts for knowledge centered on how their own knowing and understanding could help others become aware of using pipe water. Activities involve the use of language techniques for persuading.

Critical thinking is assessed about students' understanding of the water purification process and the path that raw water takes through pipes. After thinking together at the blackboard, each student completes a worksheet with some open-ended questions, synthesizing facts and reflecting on the implications of what they had learned about pipe water and water purification from last week's field trip. This sets the stage for creating an infographic with the purpose of educating others about the value and dangers of pipe water.



A student designs an infographic about the water treatment process and pipe water.



A hand-drawn infographic

Students are given plenty of time to go at the pace they need, to think through the details of how to design and present for others. Next, they use their infographics for writing a full article/paper, developing communication competency through writing as they go along.

Teachers consciously guide students to feel as if they are steering the direction of their own learning. In reality, it is a combination of both -- student inquiries and efforts follow in tandem with teachers who can play the part of good actors, surprised (yet not really surprised) by

what their students are discovering week to week. Of course, they give the students many real choices as the learning journey continues each week.

A Spiraling Technique for Learning Deeply

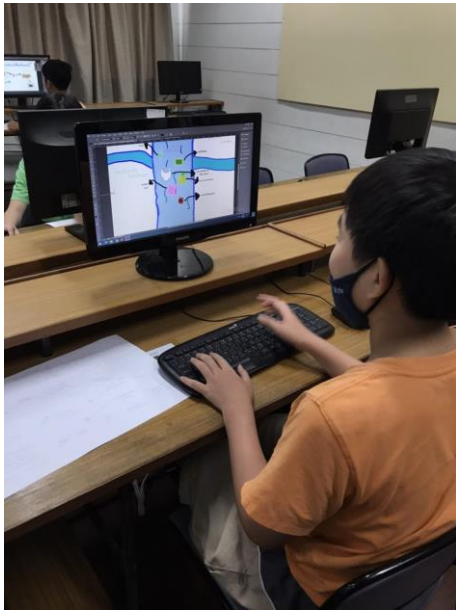
Covering a lot of material in a broad fashion can feel factually overwhelming to students. Instead, the curriculum at Roong Aroon takes students deeply into focused topics, as teachers aim for outputs directly relevant to students' daily lives in their community.

In the 1960s, leading cognitive theorist Jerome Bruner theorized about how any intellectual concept could be taught to children at any stage of development. The trick is to structure new material in the proper way, so that learners circle back to new concepts, using them in increasingly complex ways. This became the basis for what is now known as "mastery techniques" for learning. The technique of "[*spiraling*](#)" allows students to dig into core concepts so target objectives can be understood from a variety of angles. Working with several kinds of inputs, learning processes, and outputs, by the end of every term, Buranakan students acquire a deeper level of understanding about the systems and topics they are studying.

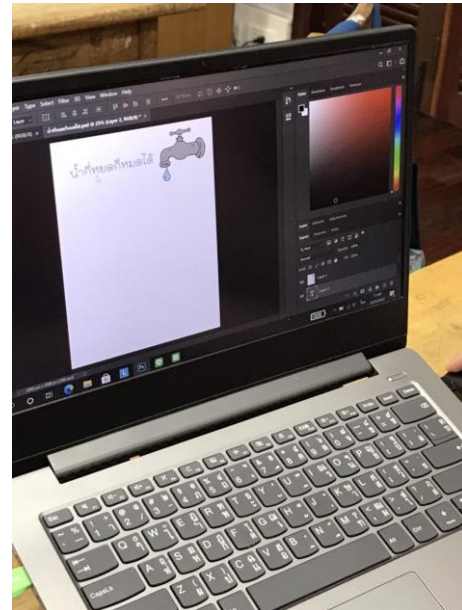
In Grade 6, each activity brings greater depth to the students' conceptual frameworks about the value of clean water and discerning the elements of the local water system that delivers it. This spiralling process gives students confidence to use their writing and speaking skills as they experiment with new ideas and skills.

Buranakan teachers use many questions to help students see the importance of looking for supporting facts and information through reliable online sources.

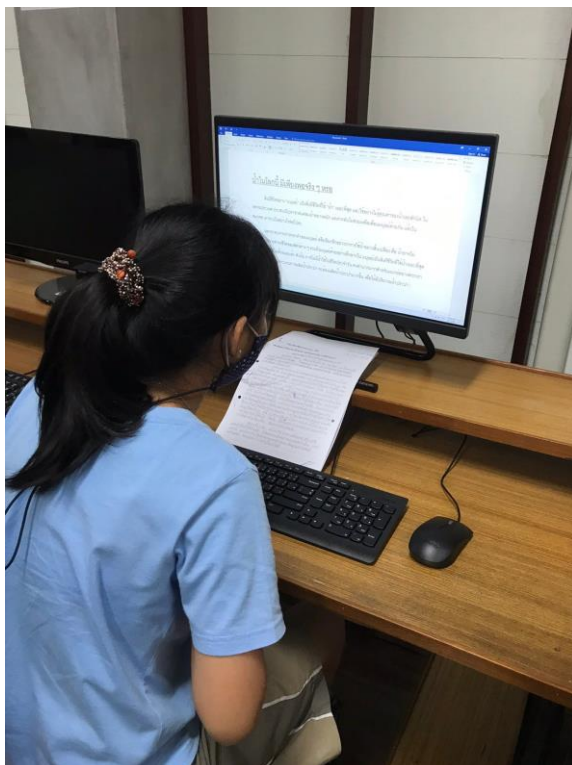
For supporting students' varied learning styles, students are allowed to work on the program of their choice (Photoshop, or something else), or they may make diagrams and drawings by hand for the infographic that they are designing. The information technology teacher, Cru Aey, works with them to learn how to also design computer-based infographics. The infographics themselves support visual learning styles too. Students work independently, or get the help of the teacher, as they need.



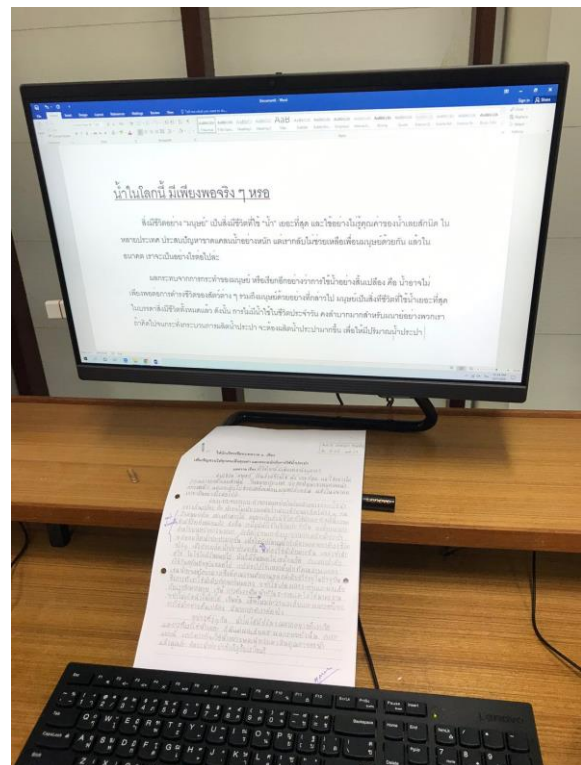
Making infographics about the importance of saving water during Week 3.



Students may choose the program that they wish to make their infographics.



Students use their infographics to write articles about the water treatment process.



Students draft their articles, and then write final copies.

Week 4: Inquiries with Google Earth, and Making River Models in the Sand

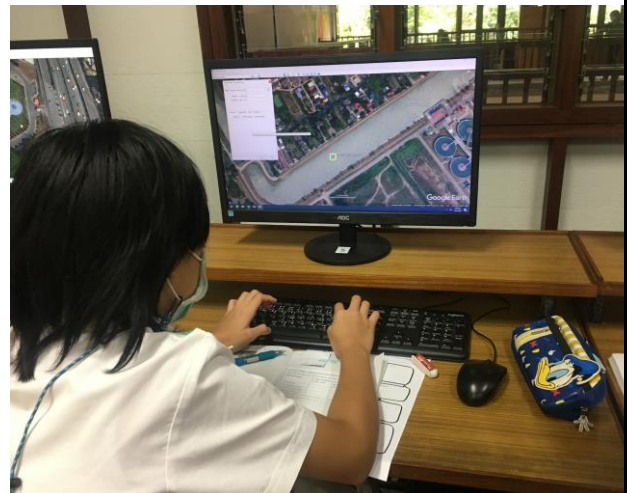
This week, the core knowledge concepts center around waterways from their source to their destination with the eroding, blowing, silting that happens along the way. Students are learning about the factors of how untreated water from freshwater sources involves the flow of water from high places to low places, which reduces energy.



In the computer lab, students are learning how to learn with Google Earth.



Teachers show students how to zoom in to find Roong Aroon School, so they can then search outward from there.



Students discover more about the elevations of “water drop off points” at four locations around and beyond Bangkok.

The next day is overcast and rainy in Bangkok, but it doesn't stop the class from going out to the primary playground to create model rivers for learning about how twists and turns in a river affect the water flow. With the guidance of Teacher Kaotu, they create models in the sand and find out how flowing water impacts erosion and sedimentation on the rivers.



Students learn from creating river models around the Primary playground.



The hands-on activity engages them directly with observations of how water movement impacts flow, erosion, and sedimentation along rivers.



Students work together.



They observe erosion and sedimentation at the turns of their river models.



Teacher Kloy looks and asks questions too.

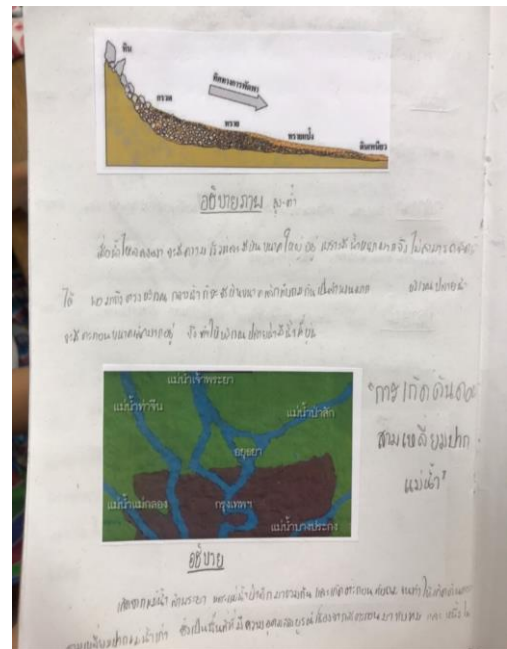


Students discuss with Teacher Kaotu about some finer points of the water flowing in their models.

Week 5: Formulating Water Questions

Building on their rivers-models-in-the-sand observations from the prior week, students create detailed river diagrams. *This informs their group decision-making about where to go for their longer field trip later in the term. Each activity leads into the next one, logically, so students can follow the reasons that they study one piece of the puzzle then the next*

Students are grasping the implications of the water system around Bangkok, both the natural system and the human-made system for supplying water to millions of people in the city. This gives them the grounding to begin to formulate their own questions about the water system that remain to be answered.



Preparing posters helps students develop their collaborative skills.



Giving short presentations to peers helps students internalize what they're learning.

Week 6: Experiments on the Transpiration of Leaves

To generate the rationale and learning activities for the big field trip of the term, students realized that they needed to learn about three more topics: 1) Transpiration of water (i.e., the water cycle within plants and trees), 2) Spring water in the forest, 3) MaeKlong River.



Lessons are carefully designed for active learning, both inside and outside.



Students conduct an experiment about the transpiration of nearby trees.



They check to ensure the experiments are set correctly.



They wait about a day to find out if the tree leaves will transpire water.



Students learn to use microscopes to examine the “stomata” on leaves that causes them to transpire.



Teachers draw on students' natural curiosities that arise each week.

Week 7: The Translocation of Trees, and a Summing Up

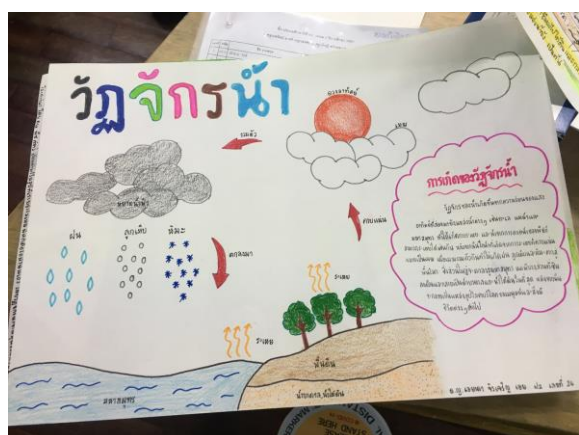
Group work feels animated and alive this week, as students investigate together the benefits of the forks in a river, a dam, and springwater too. They continue to learn more about the trees and their contribution to the water cycle.



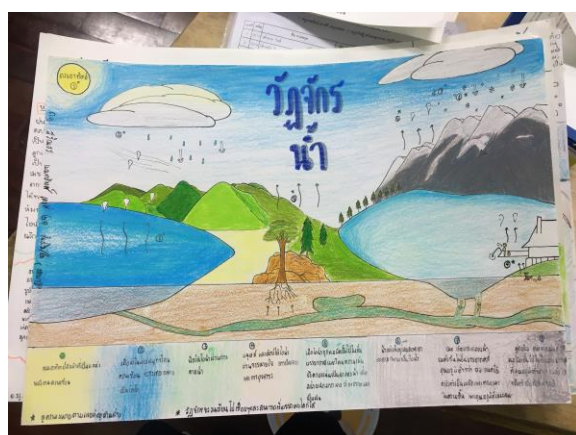
Teachers make adjustments each week to their lessons, to match students' learning styles, personalities, emerging questions.



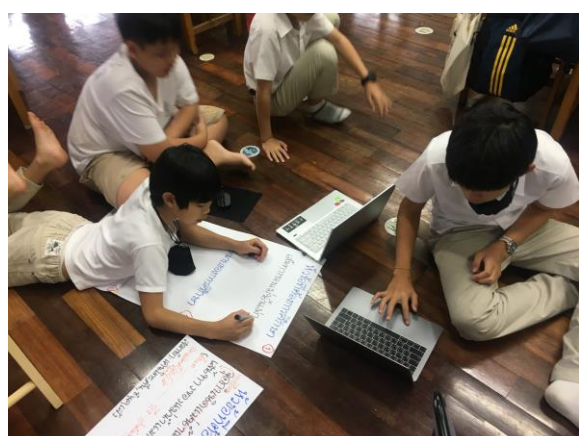
It's important that students engage in a variety of activities, stimulating creativity.



Each student depicts the natural water cycle in their own way.



Creativity and design skills show up in the posters they make.



Some students are eager to try new things; others watch and observe, go more slowly.



Students are learning to work together, learning to adjust to each other's strengths, weaknesses, and varied personalities.

There is a full discussion, again with “**wise reflection**” in which each student shares views on the benefits of trees. Appreciating knowledge about the trees, students express the value of why we need trees to live. **They listen without judgement to their friends’ ideas.**

As Teacher Kaotu facilitates the discussion, Teacher Kloy records each answer, so students hear the voice of Kaotu as they read words written by Kloy. Kaotu repeats what she hears from students in a kindly voice. Hearing and listening to the ideas of peers is required for “wise reflection.” Students are learning together in collaboration.

At week’s end, Teacher Kloy poses the wrap-up question for stimulating wise reflection and taking their understanding a little deeper: “**How does the water cycle connect to you?**” Students burst into reflective chatter as they work on this summative question, which helps them synthesize and connect with the diagrams recently completed

Why is listening without judgement so important?

Developing trusting relationships in the RA classrooms grows in part from the teachers’ capacities to listen and not judge the students’ ideas and responses. This builds trust as students feel their answers are being acknowledged, and treat their peers as their teachers treat them.

This approach to listening/learning is much different from a traditional “behavioralist” approach in which teachers use small “verbal rewards” of praise, which evaluates every answer with varied levels of reinforcements and students are aware of whose answers get the most praise. In this Buranakan class, there is no sense given of which answers are strong or weak. **All answers are valued without judgement**, other than an occasional observation about how the answer fits with the overall topic of inquiry.

In this way, students do not become egotistical that their ideas are better, nor do students lose courage for sharing ideas in fear that their ideas might be wrong. There are neither put-downs nor criticisms. Of course, the students are still 12 years olds, with some habits of shyness and judging themselves. So the teachers are watching out, encouraging students to trust themselves.



Students write a letter to parents to request permission to go on the 2-day field trip to Kanchanaburi Province.

Week 8: Working Together to Plan their Field Trip

Students are involved as much of the planning process as they are ready for, according to the teachers' skills for facilitating as well. In Grade 6, students volunteer to work in different planning teams. Each takes specific responsibilities: One team does extra research about the dams they will visit, another makes the 2-day schedule of where they will go and when. Others organize the vans, write letters to parents, arrange for the food, make a budget, coordinate with lecturers, and so forth.

Each team sees the importance of their own task and works at their own pace. They are given flexibility about where and how to do the needed work. Playful fun is part of the process, as they also come to realize how much time their tasks take to do their jobs well.

The time crunch is that, together, they need to be ready to share their plans and intentions, to explain and defend their rationale for the trip by the end of the week to the primary school principal Cru Toiey (full name Komen Orchaiyaphum). Teacher Kloy prepares possible questions that might be posed by Principal Toiey for a natural review process. While the class is usually participative, in Week 8, participation is heightened.

When Cru Toiey arrives, he does not go easy on students but guides them to look more closely at their true objectives (and value). Of course, he has already been in close contact with the teachers and knows the questioning role that he is needed to play. The seriousness with which he plays his role helps to raise students' awareness about the water sources and the importance of later communicating what they learn with others.



Students must request formal permission to go on the field trip. Teacher Toiey, the Primary School Principal, leads a questioning process to confirm they are ready.

Week 9: Fully Engaged in the Two-Day Field Trip

Day 1 - To the Srinagarind Dam and Beyond

All the students arrive by 6:30 a.m. Even with pokey siblings at home, bound to happen with a group of 25 students, everyone is on time. With sleeping bags, rain gear, extra shoes, water bottles and so forth, they set off in three vans for two days of adventure learning in the full context of what they've been studying, where the value of their learning can be set to deepen, in relation with the people they will meet in their real situations.

Stop 1: Ta Muang, the start of a concrete U-shaped canal path to Bangkok

The two teachers had prepared maps and diagrams to discuss with students about the geographical connections between the places they would visit along the water's path.

Students are lively, energetic, and attentive.



Teachers use maps to show connections between the places on the path of the river.

Stop 2: It's raining too hard to get out at the big dam on the Maeklong, so photos are taken from inside the van. Yet, the rain is not dampening anyone's spirits.

Stop 3: Bak Preak, a town in Kanchanaburi province where the Maeklong and Kwai Yai Rivers converge. *Students participate in a whole class discussion about what they've seen so far, features of each location stop, the dam structures and materials, their benefits.*



Students document the sites and places of the water's path.



The third stop on the trip provides a full view of the fork of two converging rivers.



Students paste mini-maps into their notebooks and write some of their own observations.

After lunch, there is a giddy happy feeling, as Teacher Wit, the senior teacher uses his humor to engage students with a few rounds of silly geography trivia. The boys are laughing uproariously, as the girls chuckle lightly. When energy levels are high, humor helps release the energy without any misbehaviors or mishaps. Experienced teachers know how to playfully focus the group so they can release their extra vibrancy in a positive way.

The social atmosphere of the trip is fundamental to the natural learning process: *Students are becoming versatile in balancing a pace of serious learning and fun playfulness in the field, far away from the classroom, seeing how their own attention ebbs and flows.*

Stop 4: the Srinagarind Dam, one of the largest dam projects in Thailand. Its hydroelectric plant helps to provide both electricity and water to the people of Thailand.

Before arriving at the dam itself, a lecturer presents a base of factual knowledge in a small auditorium of the EGAT (Electricity Generating Authority of Thailand) Center, one of the

lecturers lined up by peers. Students listen attentively. As the guide presents many facts, the teachers are keeping their ears open for questions to help students make more connections between the way things used to be, before the dam, and how it is now.

*After the guide departs, Teacher Kaotu asks the students, “How was the personality of the lecturer? What kind of person is he?” They talk about his professionalism and that he has a good heart. It is important for students to notice the people working around them, to consider facts in their fuller context. **Community members whom they encounter contribute to the students’ deep learning processes, so they can realize the value and goodness of work that people do to keep Thailand safe and healthy.***



From the dam site, the lecturer continues with students’ close attention.

At the end of the lecture, students are asked to give the lecturer a summary of key ideas that they’ve learned. **Reflection-in-context supports students in actively constructing their own connections to new facts learned, their own mental maps.** It helps the lecturer to feel appreciated as well.



FACTS: The Srinagarind Dam was opened in 1981 by King Rama 9. The work had been initiated some decades earlier by King Rama 5. It was a project long in the making, which required much planning.

Stop 5: Baan Nah Jon, a village far above the dam, close to the water's source



Students sit at the village's edge, listening to Teacher Kaotu, looking out over the River Basin Development Project far below.



The village leader, Pa Nong, is introduced. She talks about her understanding of the project, historically, how it affected village life.

The villagers live off one of the mountain springs that feeds into the dam. They were not happy about the dam as they didn't need it to survive, and it changed their ways of life as well as destroying much wilderness and wildlife. ***On Buranakan field trips, students study phenomena from multiple perspectives. It's important to hear the stories of the people whose villages were impacted by the dam.***



At the edge of the village, students walk along the small stream, feeling playful in the open beauty of the lovely lookout, taking water samples from the village stream.

Stop 6: A forest hike up a series of water-falls of a flowing stream, as the sun sets.

At day's end, students scramble up a series of waterfalls with great glees of delight, getting completely soaked. After changing into dry clothes, it is time for sharing the evening meal prepared by the villagers. ***They eat homegrown vegetables prepared by villagers, complete with fresh bamboo shoots and green beans. Appreciation and gratitude are shown for the meal.***

After arriving at their simple lodgings for the night, students reconvene for a review of the day. As 8 p.m. slips into 9 p.m., eyes are drooping. Keeping attention becomes difficult. Crowded into a tiny room, the teachers make mind-maps on big sheets of white paper, bringing together a synthesis of the day. Once, Teacher Kaotu gets stern as she feels their hearts are not all in it: "Come on, we're in this all together. Pay attention, share your ideas, everyone needs to contribute to the group."

To their sleepy eyed students, the teachers give an assignment to write a letter to themselves about what they have learned today and its value to them. The letter is due at 6:30 a.m., the meetup time at the start of the next day. Later, in a self-assessment, Teacher Kloy notes that they could have spent less time on the review that evening, more time on the letter writing; the letter writing was the wise reflection needed, but the letters could have been written the next day. Teachers are learning, along with the students.

Perseverance, fortitude, stamina – students are not only learning of the natural and human-made water systems that give Bangkok its water, they are developing characteristics for living to their fullest capacities. *Each letter shows different levels of cognitive development; most indicate the values that are taking root as well with respect to the water sources of Bangkok*

Day 2: Hiking to the Water's Source

After a hearty breakfast made by the villagers, it is time to pay respects to the Buddha, and to the statue of an old revered monk who looks after the area in spirit. Then, the students climb a stone staircase to another Buddhist shrine high above. As they climb, two grand, beautiful toucans, a rare species of ancient birds in southeast Asia, fly into the overlooking trees. The village men below say it's a good sign of luck for the day.



Arriving at the water's source.



At the start of Day 2, the village leader Pa Nong explains to students about the importance of a revered monk.

Another discussion encourages students to choose a few well-selected words to describe this shared experience and listen to what others have to say. They listen silently to their peers, and speak from a silence held by the forest. The listening itself, another wise reflection, seemed to awaken their awareness of being together in the forest, how special it was, so different from Bangkok. See Table 2 for a sample of some of the students' responses to this question, reflected on while in the depth of the forest.

Table 2: "How does the forest make you feel?"

[Translated from short videos taken while in the forest]

Girl 1: I feel that the atmosphere in Bangkok is different because it doesn't have many trees.... So it feels good to be with nature. I haven't been like this for a long time now.

Boy 1: I feel that this place is quiet, and coming here made me feel connected and have fun.

Boy 2: Well, I feel that this place is different from Bangkok. The atmosphere of this place feels better than Bangkok and it is more refreshing...and...that's all I have to say.

Boy 3: For me, it was fun to come and learn so many things.

Teacher: Explain. How did you have fun or learn something?

Boy 3: The spring does not just sprinkle, it flows. I thought at first it gives off drops of water.

Boy 4: I feel refreshed because back in Bangkok, when I walked in malls, they were only air-conditioned environments. But when I came to the forest, it is naturally cool, no different than the AC, the only difference is the trees. The space is wide, and it's refreshing.

Boy 5: I feel thankful for the villagers who look after this place to keep it peaceful and tranquil.

...

Girl 3: I feel that I got to learn so many things on this trip, especially about water. It makes me want to conserve and take care of water more.

Girl 4: I feel peaceful. I got to see that nature is really like this. The wind blows here and the trees here weren't cut like how the people did it in Bangkok, so it is natural, and I got to learn that the spring doesn't take a short time, it took a long time...

...

Boy 12: I feel that when I walk in the forest, when I took some pictures of the water that people use down in Bangkok, *it's like we walked the path of the water.*

Girl 12: *I want to thank the forest that gave to us the source of oxygen, food, and streams.*

After listening to the students, Pa Nong speaks. The students listen attentively as she talks about change over time and how people have different ideas.

Pa Nong, the village leader: We have water to use... which year will have drought, and which year will have rain? Our community has a belief that whoever sees a Bengal monitor, resembling the monitor lizard but it climbs trees, they must look at the tip of its tail. If it's dark, rain will fall... but if it's red, then a drought is coming. We often looked at them when we were concerned about our farmers. At that time, we didn't have meteorology or any modern technology... But then, when we started having the news, we no longer rely on that belief.

As for the forest, there are many ideas. The first one is the value of nature; a part of nature is our benefits from it. But some do not cherish the benefits, they do not preserve it. There are different parts, and every part depends on different ideas, both good and bad. Some people tried to take everything, but some tried to preserve them so that the next generation can use them...

Home Again

Back at school the next day students and teachers are a bit tired. The classroom tables are rearranged so they can sit in a giant circle on the floor, and listen again to each other, synthesizing and evaluating their learning experiences in greater depth. The discussion begins with each student reflecting “on the feeling of the field trip yesterday. Did you see beauty? See challenge? Learn more? Experience a sense of adventure? What do you remember?”

Students contemplated, with caring reflection, what they had learned from the field trip. Teacher Kloy reminds them that there are no wrong answers. Several students express that when they saw the tiny natural spring, they realized how little water there is and that they want to conserve for that reason—they could see the limits. Some mentioned the whole process of water that they were understanding better. Many students spoke twice before all the answers were finished.

Next is a keyword activity that prompts students to record individually main ideas about:

What have you learned? How have you changed? After morning snack, Kloy asks students to read their keywords. Some wrote whole paragraphs rather than sticking to keywords. Before long, they are talking about collecting their works and ideas together, thinking of how they will share with others.

Later, students take a written evaluation, summarizing in their own words what they learned before and during the trip, along with conclusions and self-evaluation too. It is a 4-page evaluation with many open-ended questions that students quietly complete on their own, showing evidence of the knowledge gained about the water and its value, along with the steps in the planning process and other skills.

Table 3. Open-Ended Evaluation Questions (translated from Thai)

<i>What have you learned from this field trip?</i>
<i>How is the knowledge important and connected to you?</i>
<i>What value and understanding have you attained from this field trip?</i>
<i>Do you think you were successful on this trip? Why? What are the indicators? (Explain and make clear examples.)</i>
<i>Next time you do another field trip, what do you think you need to develop, improve, or prepare?</i>

Weeks 10-11: Mapping Water Pathways and Looking After Water

Over the next few weeks, the students engage in carefully designed activities to continue analyzing and synthesizing what they have learned. This is a time of consolidating information, while constructing meaning in their own minds now that they have advanced their appreciation for the value of water.

What they experienced during their field study gives momentum to their continued inquiries. They make well-labeled maps to show the connections between places and facts learned along their journey. They present to each other how they learned about their own objectives and answers to the questions they had asked, what they learned about benefits of the dam.

They watch a video about spring water studied by another group of students on a field trip in a different year, expanding their knowledge of other streams and forests. Teacher Kloy does a workshop about Hill Evergreen Forest, a similar forest to the one they visited.

The learning process is not only about acquiring knowledge; as they are using their newly acquired knowledge and skills for the purpose of sharing with others about something that has become meaningful to them. Thus, their values are deepening too.

Week 12: Preparing to Share Their Learning at Yod Nom

The teachers are stepping back and letting the students lead themselves. Students agree together that the two primary aims this term for Yod Nom will be:

- 1) Present about how they were learning all term.
- 2) Present about awareness of water use and the forest

Then, they brainstorm about related details that were important to connect with these objectives and possible formats. It is an animated discussion with all students taking part to share their ideas about formats best for sharing. Teacher Kaotu summarizes their ideas on the board. They opt for a combination of their suggestions: Drama with a news program and video of the process.

On the day of Yod Nom, Parents begin to join Class 6/2's live video session about 1:30. Then, the class's three emcees (masters of ceremony) introduce themselves:

We are hosts of Grade 6/2. This term, we have gotten through a lot of learning processes which allowed us to practice. We are going to tell you all about what we have developed most during this term.

Table 4. Examples of what students told parents about skills developed in Term 2

Girl 2: This term I have developed responsibility since coming up to Grade 6, I have learned in this term more in taking responsibility in working and giving work on time.

Girl 3: I have learned responsibility and listening to people's opinions because we have worked as a team more.

Boy 4: This term, I have developed a lot about myself like working while thinking ahead from working at school and working in field trips.

Boy 5: I have worked on responsibility in editing during Yodnam, I edited my work so I needed to send my work on time.

Girl 4: This term, I learned teamwork, listening to people's opinions and expressing my own opinions.

...

Girl 8: I learned confidence in communicating with accommodations and other places and learning to work as a team and then express opinions.

Boy 9: I learned to take part in groups more, express my opinions more and be responsible in single work and group work.

...

The news videos reveal the knowledge they have gained, as well as showing their feelings about the knowledge gained through creatively composed drama performances. The first drama begins with a group of villagers:

The Narrator: At the forest of Mt. Gangliang.

M. Villager 1: Say, have you heard of the people fighting about the dam construction?

M. Villager 2: I know but shall we let them build the dam or not?

Their drama illustrates what they've learned about the differing perspectives of who and how people are affected when a large dam project is started. Of course, there is "Behind the scenes of Yod Nom" footage too, showing the funny bloopers and process of preparing for Yod Nom, how students all participated.

The class 6/2 students sit silently for nearly 40 minutes as the prepared videos are played, then comes their finale – the musical performance, revealing the collaborative values that they have gained together. After they sing, parents are given a chance to ask questions, to which the emcees respond.



Term 2 ends on a note of enthusiasm after completing Yod Nom.