APPLYING THE LEARNING CYCLE LENS TO OUTDOOR INSTRUCTION

An instructor can dramatically improve an extended field experience by making the whole experience follow a learning cycle. A "pretty good" individual trail activity can explode into excellence by making it learning cycle-based. If you come across organisms or other interesting finds during a hike, your time spent with each of them can also be a productive mini-learning cycle. There are many opportunities for cycles within cycles. To help you make sense of how to use this tool and plan for teaching, we are providing suggestions for applying the learning cycle phases at three different grain-sizes:

Short: Quick Learning Cycles With Exciting Finds

Medium: Individual Field Activity Learning Cycles

Long: Extended Field Experience (whole hike) Learning Cycle

As you begin using a Learning Cycle lens to plan and look at instruction, remember that it's often not neat and tidy. For example, applications don't always immediately follow concept invention, and a single cycle may have a series of back-and-forth phases (i.e., concept invention—application, then back to concept invention—application, and moving to reflection). We recommend that you use the Learning Cycle as a lens and a guide for instructional planning, but avoid being rigid or mechanical about how it is applied.

Short: Quick Learning Cycle With Exciting Finds

Invitation. Interesting organisms and phenomena in nature are engaging for students without gimmicks, especially if they find the object or creature themselves, and if the instructor shows enthusiasm along with the students. First make sure everyone can see, (form sitting and standing circles, pass an organism around in a container to make it accessible for everyone, etc.). Move quickly into student-generated observations, questions, connections, and explanations. Avoid providing names and/or facts until after students have observed and explored.

Exploration. Ask questions to encourage observations, questions, connections, and explanations (e.g., What do you notice? What does it make you wonder? What does it remind you of? Have you ever seen anything like that? What might be an explanation for that? How might that feature help it survive? Why do you think it's doing that?). Keep everyone involved by asking questions and facilitating sharing.

Concept Invention. Point out some things they might not have noticed. Don't share everything you know, but only name/facts/ideas that help students to understand or describe what they're seeing and stimulate their curiosity.

Application. Students should have a chance to try to apply a new piece of information they've learned about or figured out for themselves (e.g., "Let's see if that's how it moves when we set it back down." "Let's see if it raises those things by its head if we move a finger towards it." "Let's gently test and observe the slug's tentacles to see if two of them really are for touch and two for seeing." "Let's test a snail's tentacles to see if it does the same as the slug." "Do its coloring and shape camouflage it where we found it?").

Reflection. Provide a brief pair/share (or whole group discussion) about the experience (e.g., "As you walk with a partner, share interesting observations, and questions you have about the organism you just saw," "Describe what you just observed and what you learned from the observations as if to someone who isn't here."). Or you can have pairs discuss an unanswered question about the organism, e.g., "Discuss whether you think its yellow color camouflages this creature or makes it stand out in its surroundings, and use evidence to support your ideas."

Medium: Individual Trail Activity Learning Cycle

Invitation: If you are about to lead an activity on tracks, spider webs, or whatever else, have students begin noticing something and talking with each other about the topic before you officially begin the activity (e.g.,

"Discuss with a partner what kind of evidence animals might leave behind." "Point out to a partner any spider webs you see along the trail."). An efficient way to do this while getting to the main activity site is to provide them with prompts so they can talk with a partner while walking along a trail. If it's an activity about a concept, such as food chain, get students discussing related questions, such as brainstorming what organisms might live here, the possible connections between organisms in the area, and which might eat which, etc.

Exploration: Exploration is perhaps the most important phase of an activity. It's when students develop their curiosity (and a positive relationship with nature). Give enough structure, guidance, and equipment so they are on task, know how to find organisms, and can investigate the environment safely. It helps to provide some autonomy from the instructor by having them work in pairs or teams. Make sure to model enthusiastic exploration yourself, and encourage any other adults present to do so too— particularly focusing on students who may be struggling with their involvement in exploration.

Concept Invention: Make sure the activity begins with invitation and exploration before you share or discuss science concepts with students. Try to encourage students to struggle with ideas and build on their understanding. Remember to primarily focus on helping students *invent concepts for themselves.*

- Ask questions such as, "What did you notice?" "What questions do you have?" "What are some possible explanations for that?" "Can you explain what makes you think that?"
- Try to help them make connections to what they already know.
- Encourage them to notice patterns and cross-cutting ideas that help them make sense of concepts and ideas.

Application: If students have discussed a new idea, been turned on to an organism or community, or have learned a new skill, now give them opportunities to apply these things for themselves. Encourage them to continue making new connections throughout their outdoor experience (e.g.,"Find a different organism, and compare it with the one we found earlier." "Now that you have looked at the adaptations of an animal, do the same with a plant." "We noticed those fungi were growing on wood, so pay attention as we hike to the surfaces that different fungi are growing on." "Let's compare the organisms in a grass land with the ones we found in the forest.").

Reflection: Try to get students to go beyond simply repeating back facts they have heard—"I learned that raccoons blah, blah"). Instead ask questions such as: "What are some skills you used during the activity?" "Describe a new way of thinking about this that you have." "What other questions about this do you still have?" "How have your ideas changed about this, and what made them change?"

Encourage them to think/talk/write about new thoughts, ideas, abilities, and feelings the experience brought up for them. A series of thoughtful *Walk & Talk* questions, a guided *Solo Sit*, or some journal writing time can be effective reflections. Also, try to provide opportunities for students to share their reflections with the whole group.

Long: Extended Field Experience (whole hike) Learning Cycle

Invitation: Provide engagement in the topic, help students access their prior knowledge, and encourage an inquiry mind-set. Other possible goals: to help them learn each other's names, to encourage them to break out of their shells and/or become energized, to help all students feel included, and to reduce anxiety about the outdoors. Give them opportunities to think about and share their prior knowledge on the topic. A series of activities, such as an active name game, an inquiry tone-setter, such as *I Notice, I Wonder, It Reminds Me Of*, and a series of thematic *Walk & Talk* questions can help achieve these goals. Try to avoid much content introduction. Tantalize them with your theme, but don't go deeply into it yet. Be patient with your students, in terms of their curiosity, interest in exploration, and participation in discussion. Use this time to get to know your group, and work up to your content goals later in the field experience.

Exploration: Don't avoid content altogether, but avoid content-heavy activities toward the beginning of the field

experience. Instead, focus on activities/routines that are mostly exploration and inquiry-based. They will then be more open to learning and discussing concepts later in the experience. This is a great time for activities that lead to "Inquiry Fever."

Concept Invention: This is a good time for a focus on activities or questions that introduce content related to your theme. In order to ensure that students are making meaning of the topic, make sure each full-on concept invention activity contains its own learning cycle within the larger cycle.

Application: This is the time for students to actively try to apply the big ideas of your field experience in some way. For example: "Choose an organism, make observations, and try to figure out which body structures and behaviors are adaptations. Then be prepared to share your findings with other students."

Reflection: A series of thoughtful *Walk & Talk* **questions, a guided** *Solo Sit***, or journal writing time can be effective reflections, depending on the mood and flavor of the group.** Students sharing their reflections with the group can encourage deeper reflections from everyone. For example: "What are some things you got better at during the field experience/hike?" "What are some discoveries you and your classmates made?" "Describe a new way of thinking about this that you have come up with." "What other questions about this do you still have?" "How have your ideas changed about this, and what made them change?"