

THE LEARNING CYCLE EXPLAINED

Invitation

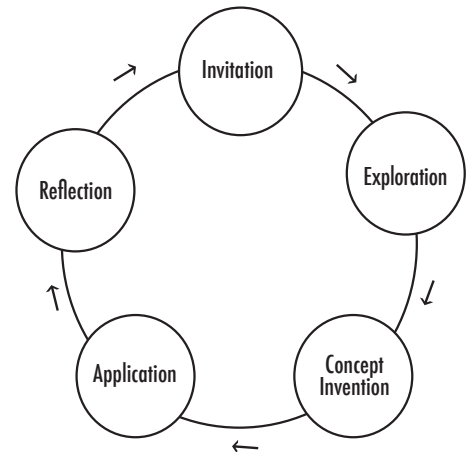
The learner becomes engaged in the topic and accesses relevant prior knowledge. Without engagement, learning tends to be rote, and less likely to be retained (“shallow and slippery”). Accessing prior knowledge sets context and helps the learner make connections to what they already know, which helps cultivate “deep and sticky” learning.

When planning Invitation phase ask:

- How does it get students interested and engaged in learning about the topic?
- How does it help them access their prior knowledge?

Instructor’s Role:

- Set the stage for learning, set context, create interest, curiosity, focus, and anticipation about topic to be explored
- Offer a question, a challenge, an observation, or an experience, to generate curiosity about exploring the natural world and the topic
- Encourage inquiry mind-set and abilities—inspiring students to make observations, ask questions, and make explanations
- Encourage students to discuss connections with prior knowledge and experiences.
- Listen to student ideas on the topic to learn where they are at, to guide your instruction
- Avoid delivering content until *after* student exploration of “stuff” and ideas.



Exploration

With some independence from instructor, learners engage in open-ended exploration of objects, organisms, or phenomena in the natural world, and/or ideas. Exploration generates curiosity and questions, as well as a struggle to make sense. Exploration also provides a common base of experiences for learners to develop new concepts, skills, and practices. It’s a great opportunity for students to spend time “falling in love” with some aspect of nature.

When planning Exploration phase ask:

- How will learners have experiences that provide observations and discoveries to help them ask questions and answer questions, and make sense of the topic?

Instructor’s Role:

- Encourage students to work together independently of direct instruction from the instructor.
- Provide only as much instruction and information as necessary to set students up for successful independent exploration.
- Observe and listen to students as they interact.
- Ask probing questions to redirect students’ investigations when necessary.
- Provide time for students to puzzle through questions.
- Be an enthusiastic and curious co-investigator.
- Act as a consultant and facilitator for learners.
- Share minimal information—only if you think doing so will increase curiosity and exploration.

Concept Invention

After interest and attention is focused through invitation and exploration, learners make connections and construct new meanings from experiences, often facilitated by an instructor. Ideally, this is largely student-generated, but if there is specific content you want them to understand, this is the time to introduce it. It's crucial to understand that no matter what is "delivered" to them, learners actively generate ideas and concepts, and make sense of the information for themselves. Each learner takes information and fits it into their own conceptual frameworks, and the concepts they walk away with are unique to each individual. What's the right amount of content? It depends! Some general guidelines: 1) If students can figure it out through their own observations, don't tell them; 2) Choose 1 or 2 points that are interesting, related to their observations, and relevant to content topics of your program; 3) Share information you think will stimulate further investigation and curiosity; and 4) Don't share everything you know!

When planning Concept Invention phase ask:

- How will learners be encouraged to struggle with their understanding and negotiate their ideas with others?

Instructor's Role:

- Encourage students to explain ideas, concepts, definitions, and science practices in their own words.
- Ask for evidence, results, and clarification from students, to help guide them to making sense of their experience.
- Provide formal definitions, explanations, and new vocabulary, as necessary, to explain concepts.
- Use students' direct experiences as the basis for explaining concepts.
- Sometimes you have to point out ideas that don't work and help them identify the reasons why.

Application

To truly understand new concepts and ideas, the learner needs to apply them to a different context. Learners apply new knowledge, vocabulary, and skills to solving a problem or meeting a challenge in a new situation, through activity, or through discussion. Learners gain deeper and broader understanding, gather more information, make connections to real-world issues, and develop transferable skills.

When planning Application phase ask:

- How will learners authentically use what they've learned and apply it to a new situation or context?

Instructor's Role:

- Provide opportunities for students to apply vocabulary, definitions, skills, and explanations to new situations or problems.
- Evaluate student progress and understanding and provide feedback.

Reflection

Learners reflect on their learning, compare new ideas to alternative explanations, and extend thinking. Through discussion, quiet thinking, writing, and/or drawing, they make connections and construct new conceptual frameworks. They examine and analyze how they arrived at their current understanding to help them understand how they learned what they learned.

When planning Reflection phase ask:

- How will learners think back on the process for learning to help reinforce their understandings, and make them better learners in the future?

Instructor's Role:

- Prompt students to reflect on activities to help them confront their former ideas and evolve new ones.
- Prompt students to solidify conceptual framework connections.
- Prompt students to help build meta-cognitive (thinking about their own learning) skills.