**Examples of Learning Cycle Designed Activities**

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| **Learning Cycle Phases** | **“Two Balloons”** | **“Primary Productivity Data Lab”** |
| **Invitation*** How will the task get learners interested in learning about the topic?
* How will the task provoke learners to access their prior knowledge?
 | A demonstration is introduced with a thought experiment, followed by observing the phenomenon. Learners share their ideas and reasoning with peers as they are challenged to construct an explanation for the phenomenon. | * Homework completed before the activity asks learners to recognize patterns in a graph of chlorophyll over a year and attempt to explain the underlying causes using concepts from prior class
* Think-pair-share question challenges learners to recall physical and chemical factors that affect primary productivity.
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| **Exploration*** How will the task provide learners with experiences that produce concrete observations and discoveries to help them make sense of the topic?
* How will the task urge learner to relate prior experiences with new ones?
 | Learners discuss what additional information would be helpful to make an explanation. They gather more information as they explore an animation and a reading to make sense of the phenomenon. | Learners work in pairs to examine chlorophyll concentration over a year in either temperate or high latitude locations.  |
| **Concept Invention*** How will the task encourage learners to struggle with their understanding and negotiate ideas with others?
 | Learners engage in peer discussions to make sense of the concept. Educator guides them to connect their observations and provide an evidence-based explanation. Educator synthesizes and summarizes the main points. | Educator leads class discussion of seasonal patterns, comparing temperate and polar patterns, evidence and questions. |
| **Application*** How will the task demand learners to apply what they learned to a new situation?
* How will the task invite learners to make connections that are meaningful to them?
 | Learners are asked to relate how this phenomenon is the same as or different from what happens in the Earth system. | Learners apply concepts of seasonal variability and primary production limiting factors to data from neighboring continental shelf moorings.  |
| **Reflection*** How will task prompt learners to think back on the learning process to reinforce understanding & make them better learners in the future?
 | Learners reflect on what questions have been answered, what questions remain, and why this content is meaningful to them. | During the next class, learners reflect on the patterns they observed in the data and compare to the textbook picture of seasonal primary productivity cycles. |