2.5.1 Curriculum Component Sequence Example - A STEAM Course

In this section, we will explore how to transform the elements of the Learning Design Triangle (LDT) into a Curriculum Component (CC) Sequence for a STEAM course. Considering that we are designing a course titled **"Factors affecting Rate of Photosynthesis: Learning through Scientific Investigation"**.

1. The Learning Design Triangle

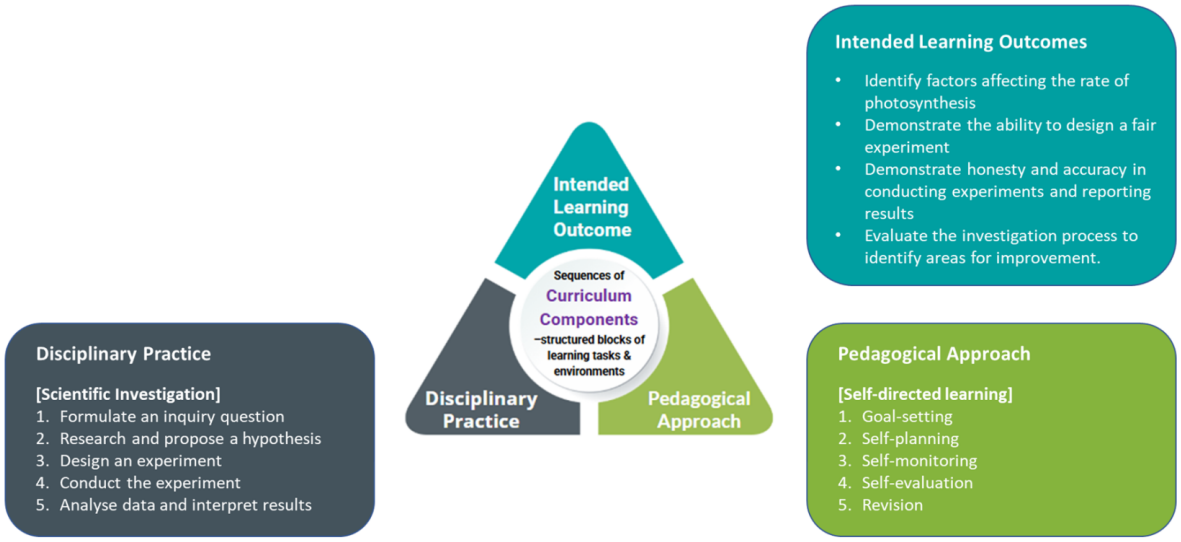

Figure 2.5: The Learning Design Triangle of "Factors affecting Rate of Photosynthesis: Learning through Scientific Investigation"

- To anchor the learning design within a contextual framework, we will use the Learning Design Triangle to define the intended learning outcomes, disciplinary practices, and pedagogical approach.

2. The Curriculum Components Sequence

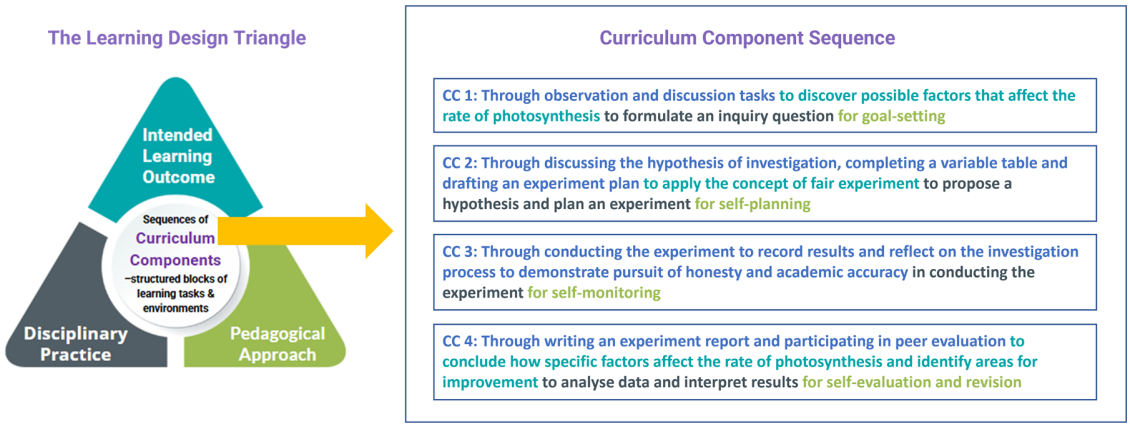

Figure 2.6: The Curriculum Component Sequence of "Factors affecting Rate of Photosynthesis: Learning through Scientific Investigation"

- To make the learning process more manageable, we divide it into distinct phases within the learning design, guided by the workflow steps of disciplinary practice. Each phase targets a specific set of learning outcomes and is supported by the pedagogical focus of the chosen approach, such as self-directed learning.
- In the Learning Design Triangle framework, we use Curriculum Component to structure and organize each phase of learning around targeted outcomes. The collection of curriculum components that represents all phases of learning in a course is called a **Curriculum Component Sequence**.

3. Assign learning tasks to each Curriculum Components

- To put the Curriculum Components into practice, we need to assign learning tasks and assessments to enhance and evaluate learners' development in knowledge, skills, or values.

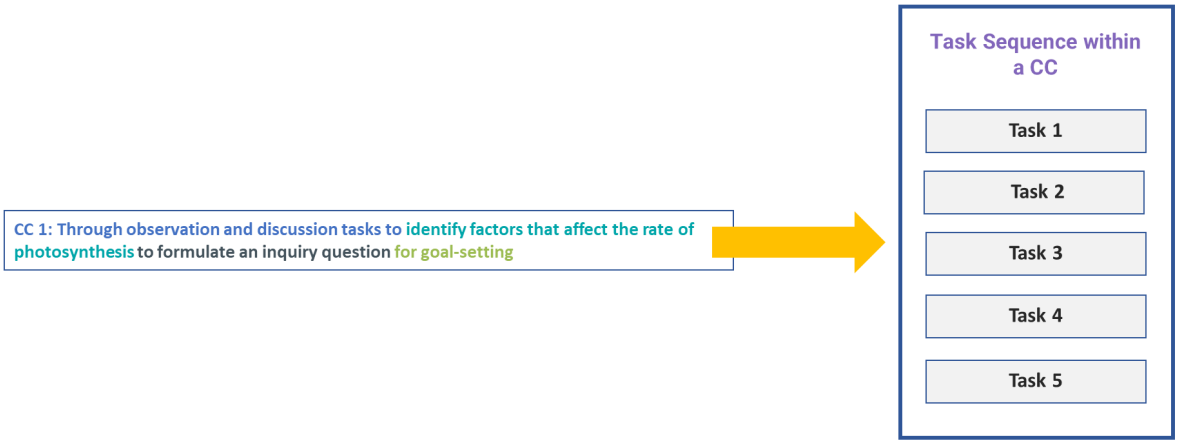

Figure: 2.7 Task Sequence within a Curriculum Component

- Now, we will explore an example of a Curriculum Component (CC) focused on the **"goal-setting" phase.**

CC Name	A CC name is formed by combining four components. 1. **Focal task(s)**: Observation and discussion tasks 2. **Main intended learning outcome**: Discover possible factors that affect the rate of photosynthesis 3. **Workflow step(s) of a disciplinary practice**: Formulate an inquiry question 4. **Focus or foci of the pedagogical approach**: Goal-setting E.g. **Through observation and discussion tasks to discover possible factors that affect the rate of photosynthesis to formulate an inquiry question for goal-setting**
Linked Intended Learning Outcomes	• ILO1: Understand factors affecting the rate of photosynthesis • ILO2: Understand the mechanism of of photosynthesis • ILO3: Apply the process of scientific investigation to construct scientific knowledge
Workflow Step of Disciplinary Practice	Scientific Investigation—Formulate an inquiry question
Pedagogical Focus	Self-directed Learning - Goal-setting
Learning Tasks	* Each task type has a representative color.  **Observe plant growth conditions and interview others about environmental factors affecting plant growth** **Share outcomes and discovery after observations and interviews** **Compare findings with peers and consolidate new insights** **Watch a video about photosynthesis** **Synthesize the information collected to propose factors affecting rate of photosynthesis and formulate an inquiry question for further investigation**

The tasks in a CC:

- A task can be both a learning task and an assessment.
- A well-formulated task sequence helps build knowledge and skills step-by-step while enabling ongoing assessment of student understanding.
- The introduction of the task types will be covered in **Chapter 2.6 - Task Taxonomy**.

> The link to the **learning design** of this sample course.

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