MODULE 1.
Learning, Reflections, and Science

Overview

Module 1 introduces participants to the design and theoretical foundations of the *Reflecting on Practice*™ program. They learn that the program is an opportunity for practitioners with all levels of experience to learn from one another, develop shared language on educational practice, deepen their knowledge on the science of learning, and exchange ideas on how they teach.

Session 1 introduces the program and commitments, and presents **foundational ideas on learning** that will be explored throughout the program. It introduces tasks and routines integral to the program, including **research discussions** to relate their experiences and thinking to research; and **hands-on activities** designed to be engaging and challenging experiences for adults to think about learning and teaching.

Session 2 engages participants in **discussions about professional learning and reflective practice**. It introduces them to the **professional learning community** framework and the reflective tasks that are part of the program, with a special focus on observing and analyzing videos of one another's practice in **Video Reflections**. Participants practice using the **tools and processes** in their first Whole-Community Video Reflection.

In Session 3, participants gain insight into the **nature and practices of science** in the best way possible: by *doing* and *reflecting* on science. They explore, "What is science?" and "How does science work?" The conversation deepens with ideas on common misinterpretations of science, how science is one way of knowing, and young people's science aspirations and identities.

Overview

Module 2 delves into the Five Foundational Ideas on Learning introduced in Module 1. Participants consider the implications of these ideas on how they teach and design learning experiences.

Session 1 opens with a hands-on activity that places participants in the role of the learner, and then invites reflection on the experience to think more deeply about **how people experience learning**. Expanding on their reflections, they're given more information to consider, focused on three topics: cognitive system and prior knowledge, social cognitive system and conversations, and motivation and engagement in learning. Participants are then introduced to the research-based learning design framework and pedagogical practices used in the hands-on activity they just experienced.

Session 2 continues the discussion on learning with an emphasis on conceptual change and the **critical role of prior knowledge**. Another hands-on activity is used as a shared experience to explore the varying conditions of prior knowledge and how that affects learning. Participants are given a framework for thinking about learners' prior knowledge, and then self-interrogate their own experience in the hands-on activity to generate ways to transfer the framework into their practice.

Session 3 is the second whole-community **Video Reflection,** this time focusing on retrieving and connecting to prior knowledge. Participants revisit a previous Research Discussion on reflective practice and professional learning and are introduced to additional Tools for Reflective Practice to use in the video reflection. Participants are provided tools to prepare for their own Video Reflections in small groups.

MODULE 3.
Learning Conversations

Overview

In this module, participants probe more deeply into the significance of *talk* in learning, and consider how to best facilitate conversations in their interactions, depending on their **teaching purpose**. One teaching purpose, Activate Prior Connections, was the focus of Module 2. In this Module, four more—**Give Information**, **Check for Understanding**, **Express Your Thoughts**, and **Transfer Understanding**—are examined in depth. The educators critically examine how they currently converse with learners in their practice, and explore methods for facilitating conversations that specifically support learning.

In Session 1, participants brainstorm **characteristics of quality learning conversations**. They take part in three scripted role-plays in which they analyze facilitated conversations, and discuss both the limitations and potentials inherent in these conversations for supporting specific **teaching purposes**. They read and discuss research on **the role of talk in learning**, including how we process information into long-term storage and how this relates to the importance of talk for supporting learning. After having seen it implicitly modeled since the program began, participants are now formally introduced to the **Discussion Map** for developing skills to facilitate conversations.

In Session 2, participants take part in a hands-on activity that offers a shared experience to probe more deeply into teaching purposes when facilitating conversations. They read and discuss different facilitation approaches, and learn how to use the **Facilitation Approaches Framework** to orchestrate ideas and voices in learning conversations.

In Session 3, participants do a close rereading of the Research Discussions on learning and talk from Modules 2 and 3. Following this priming, they do a **whole-community Video Reflection** on facilitating learning conversations strategically designed to achieve specific teaching purposes, including how to allow for the sharing of multiple ideas as learners are guided towards the scientific view.

Following Session 3, and on their own timetable, participants meet in their **critical-colleague groups to do their own Video Reflections** on the module's focus, the importance of talk to the learning process.

Overview

In informal science learning environments, in which a team of educators may teach the same set of programs and activities, consistency across educators' teaching practice may be inextricably tied to **how these experiences are designed**. In Module 4, participants integrate insights and ideas from previous modules to consider how their understanding of how people learn is applied in their existing designs. Participants apply these insights and information to revise the learning experiences they teach and design.

Session 1 assesses the use of **objects** in participants' programs and activities. It begins with recognizing that objects are used in many learning experiences in informal learning environments, and offers a set of categories for organizing and talking about these objects. Empirical studies are used to provide participants with deeper insights into **how learners interact with objects** at informal learning environments, and to consider the **limitations and possibilities** for learning from the different types of objects. The hands-on activity encourages and challenges participants to use insights gained from the Research Discussion to rough design a learning experience using one of four types of objects to embody what they know about how people learn and to spark new thinking about possibilities and limitations of different objects to support learning.

Session 2 brings together the research and tools for supporting learning discussed throughout the program, including **Thinking Moves** and **Thinking Routines**, with the specific goal of incorporating these ideas into the design of learning experiences. Participants reflect on the learning research that underlie each of the tools and pedagogy. Calling on their experiences in *Reflecting on Practice* as concrete examples, participants work in small groups to reflect on the design of a learning experience at their institution, **share ideas for revisions**, and **receive input** from colleagues using the design tool, **Reflection Exercise Worksheet for Rapid Design Feedback**.

Session 3 offers two ways for participants to further reflect on their practice. The opening **whole-community Video Reflection** focuses on using objects to support learning. Following that, participants use the **Reflection Exercise Worksheet for Critiquing Objects in Learning Experiences** to critique how they currently foster conversation and engagement with objects in learning experiences they offer. They are then challenged to think of ways to leverage these objects to more effectively support learning.

Once again, participants meet in their **critical-colleague groups to do their own Video Reflections** on the module's focus, the use of objects to support learning.