Sample Agenda For 2.5–Day Project 2061 Workshop

Exploring the Use of Project 2061 Tools to Design Instruction

Workshop Summary

The participants in this 2 1/2 day workshop are K-12 mathematics, science, and technology teachers from a school district curriculum study committee. This committee is charged with the task of revising the district's curriculum to reflect more closely the national discipline standards and to demonstrate substantive integration of the separate disciplines. The committee has reviewed published national documents and has requested a series of Project 2061 professional development sessions. These sessions are to include an overview of the Project's principles and curriculum design tools and a demonstration of how these are useful to curriculum reform efforts. The committee describes itself as interested in the potential value of the Project's products to their work but in need of the opportunity for a directed examination of those products. The estimated time shown for each option is the minimum required.

WORKSHOP AGENDA
Opening

DAY 1

INTRODUCTION — OPTION B: QUESTIONS TO ASK ABOUT GOALS

Estimated Time: 5 minutes.

Overview: Participants consider key questions related to the reform of science, mathematics, and technology education. The questions focus attention on the centrality of learning goals to the design of curriculum and instruction. This option can be used to set the stage for a workshops that focus on exploring the use of Project 2061 tools to analyze curriculum materials, analyze instruction, or improve lesson design.

WHAT PARTICIPANTS KNOW — OPTION B: PARTICIPANTS DESCRIBE PROJECT 2061

Estimated Time: 5 minutes.

Overview: Participants list important characteristics of Project 2061. Their descriptions give the presenter a sense of how familiar participants are with the Project and provide an opportunity to remind them of important characteristics they may have omitted from the following list: goal oriented; less is better; commitment to all; science literacy defined as including science, mathematics, and technology, and their interconnections; K-12; long-term nature.

Need for Change — Option F: Participants List Needed Changes

Estimated Time: 20 minutes

Overview: Participants list changes they consider necessary for the reform of science, mathematics, and technology education. They decide which of these changes they can make themselves and which changes have to involve other people. A transparency shows parts of the education system that the Project 2061 reform plans to affect. This option is appropriate for participants who think that change is needed and are ready to get started.

Available Tools — Option A: Overview of Project 2061 Tools

Estimated Time: 5 minutes.

Overview: Using a graphic representation, the presenter describes available and forthcoming Project 2061 tools. This option is appropriate for a group already familiar with *SFAA* and *Benchmarks* and can be combined with Option G to give more detailed information about the latest tool, *Resources for Science Literacy: Professional Development.*

Workshop Goals — Option C: Workshop on Integrating Curriculum

Estimated Time: 5 minutes.

Overview: The presenter shares with the group the workshop goals, which are appropriate for educators who want to design a curriculum that shows connections among science, mathematics, and technology. Goals include making the case that Project 2061 is promoting science literacy through education reform in natural science, social science, mathematics, and technology; using science literacy and learning goals promotes effective teaching; studying *SFAA* and *Benchmarks* can increase science literacy among educators; and *Benchmarks* complements national science and mathematics standards and is useful in planning curriculum to help students appreciate connections among ideas.

Exploring the Use of Project 2061 Tools, 3: To Design Instruction
Option F: 9-12 Lesson: Control Mechanisms (Steps 1-3)

Estimated Time: 5-6 hours.

Overview: Participants engage in an activity designed around Benchmark 11A(9-12)#3:

> The successful operation of a designed system usually involves feedback. The feedback of output from some parts of a system to input of other parts can be used to encourage what is going on in a system, discourage it, or reduce its discrepancy from some desired value. The stability of a system can be greater when it includes appropriate feedback mechanisms.

They then analyze how well the lesson's content and pedagogy would contribute to students' understanding the benchmark. Finally, they attempt to extend the lesson to address related benchmarks. Throughout, they study and discuss relevant parts of *SFAA* and *Benchmarks*.

Step 1: Lesson Demonstration: Control Mechanisms (2 hours). The presenter teaches a lesson developed to conform to the principles of Project 2061 and its reform tools, *SFAA* and *Benchmarks*. This is a laboratory lesson for grades 10-11 in which students model a mechanical feedback/control mechanism.

Step 2: Analysis of the Lesson: Control Mechanisms (2.5 hours). The central benchmark addressed by this lesson is shown to participants, who then analyze the lesson plan and their experience with the activity for evidence that the lesson addresses this central benchmark. Next participants work in groups to study components of *SFAA* and *Benchmarks* in order to enhance their understanding of the central benchmark. Then, using a handout listing defining principles of Project 2061 that are drawn from *SFAA* Chapter 13, participants offer examples of activities within the lesson that illustrate Project 2061 principles.

Step 3: Choosing Benchmarks for Lesson Design. As an overnight assignment, participants review a list of benchmarks that might relate to the lesson and select one or two around which they will design a new lesson. This new lesson should help students appreciate connections among science, mathematics, and technology. They also read "About Strands."

DAY 2

The next day, participants indicate which benchmarks they chose and why they think a lesson designed around it will help students appreciate connections among science, mathematics, and technology. Before proceeding with the design of a lesson, participants identify conceptual connections among benchmarks.

AVAILABLE TOOLS — OPTION E:
IDENTIFYING BENCHMARKS STRANDS

Estimated Time: 1 hour.

Overview: This activity shows how benchmarks related to a topic can be identified and linked to show the K-12 development of understanding of the topic. The activity is a worthwhile investment of time for groups who will be working extensively with *Science for All Americans* and *Benchmarks for Science Literacy*. Starting with the K-12 list of benchmarks from a particular section, participants highlight benchmarks and parts of benchmarks that relate to a selected topic. They repeat this procedure for other benchmarks sections until they have assembled a collection of conceptually related benchmarks. Finally, they draw arrows to show how benchmarks in the collection are related.

EXPLORING THE USE OF PROJECT 2061 TOOLS, 3: TO DESIGN INSTRUCTION
OPTION F: 9-12 LESSON: CONTROL MECHANISMS (Steps 4-6)

Estimated Time: 7-8 hours.

Step 4: Identifying Conceptual Connections Among Benchmarks (1-2 hours). Using the handout: How to Design a K-12 Benchmark Strand, participants prepare a strand map that includes benchmark 11A(9-12)#3, the benchmark selected for their extension lesson and other relevant benchmarks.

Step 5: Presentation of Lesson Design Procedure (0.5 hour). The presenter describes a procedure for designing lessons using Project 2061 tools.

Step 6: Design of Lesson Plans/Preparation for Poster Session (4.5 hours). Using the benchmarks they have selected and the procedure for lesson design, participants design lessons that address the selected benchmarks and demonstrate connections among science, mathematics, and technology. Then they prepare a poster presentation to show their lesson design to other participants.

DAY 3

EXPLORING THE USE OF PROJECT 2061 TOOLS, 3: TO DESIGN INSTRUCTION

OPTION F: 9-12 LESSON: CONTROL MECHANISMS (Step 7)

Estimated Time: 1.5 hours.

Step 7: Poster Session (Evaluation— Option F: Poster Presentation) (1.5 hours). Participants present their own posters and review those of others. This serves as an evaluation of participant understanding of how *SFAA* and *Benchmarks* can inform the design of lessons for science literacy. Include map(s) in poster presentation.

AVAILABLE TOOLS — OPTION I:

COMPARISON OF *BENCHMARKS* AND *STANDARDS FOR SCHOOL MATHEMATICS*

Estimated Time: 30 minutes.

Overview: Using examples from the detailed comparison that appears on the *Resources for Science Literacy: Professional Development* disk, this option shows the extent of agreement and identifies differences between *Benchmarks* and the *Curriculum and Evaluation Standards for School Mathematics*. It is particularly appropriate for groups of educators with an interest in mathematics or in designing K-12 curricula that teaches connections between mathematics and science.

SUMMARY — OPTION E: REVISITING QUESTIONS

Estimated Time: 30 minutes.

Overview: Participants revisit key questions related to the reform of science, mathematics, and technology education and consider implications of workshop activities for their ongoing work.

EVALUATION — OPTION E: USING MISCONCEPTIONS

Estimated Time: 30 minutes.

Overview: The presenter displays some common misconceptions about the Project 2061 reform effort and asks participants to comment on how they might attempt to correct them.