ALIGNING ASSESSMENT, INSTRUCTIONAL ACTIVITIES, AND STANDARDS

This activity begins with an assessment based on an example of content from the NRC *Framework* and *Next Generation Science Standards.* After completing the performance-based assessment, you will be challenged to design an instructional sequence that provides students opportunities to learn the science content and practices described in standards and assessed in the initial activity.

QUESTION 2:

Some individuals think that there is a connection between energy and sound. Can you provide evidence for the connection?

Describe your investigation that energy can be transferred into sound. What is the evidence that energy was transferred?

The evidence I investigated is:

_____

_____

_____

My evidence of the interaction is:

_____

_____

_____

QUESTION 3:

Use the materials to answer a question—about light and the transfer of energy. Based on an investigation, answer the question below.

How is lighting a bulb evidence that energy can be transferred?

_____

_____

_____

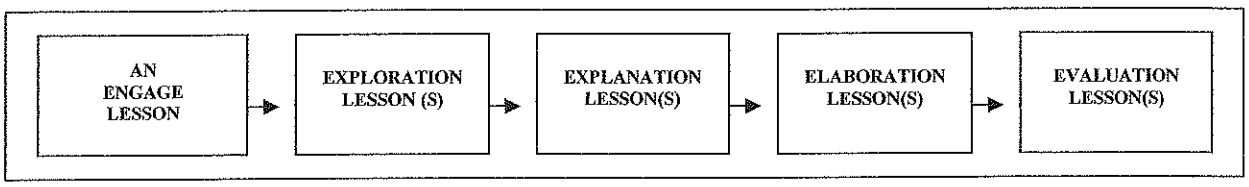
PART II

DESIGNING AN INTEGRATED INSTRUCTIONAL SEQUENCE

Based on the assessment, you should have a clear idea of what students who demonstrate understandings of the performance expectation can, and cannot, do. Next, the challenge is to use those outcomes to design an instructional sequence that provides students opportunities to learn the valued outcomes.

This activity uses the 5E instructional model. That model is summarized here with more elaborate descriptions prior to your proposed activities.

Figure 1. The 5E Instructional Model and an Integrated Instructional Sequence



Using the following descriptions of phases for the 5E model, propose lessons for the instructional sequence.

BSCS 5E Instructional Model and An Integrated Instructional Sequence: Exploring the Concepts and Practices

EXPLORATION General Description	Detailed Description of Instruction
Students investigate initial ideas and solutions in meaningful contexts.	This phase provides students with a common base of experiences within which they identify and begin developing concepts, practices, abilities, and skills. Students actively explore the contextual situation through investigations, reading, web searches, and discourse with peers.

An Exploration lesson(s)

BSCS 5E Instructional Model and An Integrated Instructional Sequence: Elaborating the Concepts and Practices

ELABORATION General Description	Detailed Description of Instruction
Students have opportunities to expand and apply their understanding of the concepts within new contexts and situations.	These lessons extend students' conceptual understanding through opportunities for students to apply knowledge, skills, and abilities. Through new experiences, the learners transfer what they have learned and develop broader and deeper understanding of concepts about the contextual situation and refine their skills and abilities.

An Elaboration lesson(s)

Evaluating the Instructional Sequence

First, complete the summary of the instructional sequence (See Figure 1). Then, answer the following questions.

Did students have adequate and appropriate time and opportunity to develop an understanding of:

- Science and Engineering Practice(s)?
- Disciplinary Core Idea(s)?
- Crosscutting Concept(s)?

Was instruction aligned with the assessment?

Did you make any connections to Common Core State Standards for English language arts or mathematics?

Evaluating the Experience

The purpose here is not to evaluate the lesson(s). Think about the experience of designing a lesson based on the translation of a single performance expectation. Think about and answer the questions:

- What was the easiest part of the exercise?

- What was the most difficult issue you encountered?

- If you had to do this exercise again, what would you do differently?

Wiggins, G. & McTighe, J. (2005). *Understanding by Design*. Alexandria, VA: Association for Supervision and Curriculum Development (ASCD).