Next Generation Science Standards

Lesson Checklist

Purpose of this tool-

The checklist can be used to determine whether lessons* meet criteria that describe key instructional shifts from past standards to the Next Generation Science Standards (NGSS) and criteria that signify a high-quality lesson design. (*Figure 1*) *A lesson is defined as a coherent set of instructional activities and assessments that could extend over several class period or days. One day or class period would not include all criteria or indicators listed below.

How to use this tool-

This checklist is meant to help develop, design, or identify the presence of criteria for high-quality NGSS-aligned lessons. Upon reviewing lessons, criterion-based feedback can be completed by selecting which indicators within each criterion is represented in the lesson. This type of feedback can then be used to make improvements or enhancements to the lesson. Note: Unlike lessons, units and science course curriculum should include as many components from each criterion as described in *Figure 1* below.

Who can use this tool-

Teachers participating in the Improvement Science partnership with *WhatMatterNow* may use this tool to create and review their own lessons, observe peers, and support professional learning community (PLC) discussions.

NGSS Shifts

A. **Explaining Phenomena or Designing Solutions**: The lesson focuses on supporting students to make sense of a phenomenon or design solutions to a problem.

B. **Three Dimensions**: The lesson helps students develop and use multiple grade-appropriate elements of the science and engineering practices (SEPs), disciplinary core ideas (DCIs), and crosscutting concepts (CCCs), which are deliberately selected to aid student sense-making of phenomena or designing of solutions.

C. **Integrating the Three Dimensions for Instruction and Assessment:** The lesson requires student performances that integrate elements of the SEPs, CCCs, and DCIs to make sense of phenomena or design solutions to problems, and the lesson elicits student artifacts that show direct, observable evidence of three-dimensional learning.

Features of Quality Design

D. **Relevance and Authenticity:** The lesson motivates student sense-making or problem-solving by taking advantage of student questions and prior experiences in the context of the students' home, neighborhood, and community as appropriate.

E. **Student Ideas:** The lesson provides opportunities for students to express, clarify, justify, interpret, and represent their ideas (i.e., making thinking visible) and to respond to peer and teacher feedback.

F. **Building on Students' Prior Knowledge**: The lesson identifies and builds on students' prior learning in all three dimensions in a way that is explicit to both the teacher and the students.

Figure 1. Criteria used to review lessons for NGSS-alignment and high-quality

Adapted from "NGSS Lesson Screener," December 2016. Next Generation Science Standards.

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For each criterion, review the indicators describing what an NGSS-aligned, high-quality lesson looks like. Indicate that you have addressed the appropriate and relevant indicators by checking the box next to each criterion.

☐ **Criterion A. Explaining Phenomena or Designing Solutions**

- ✓ The purpose and focus of the lesson are to support students in making sense of phenomena and/or designing solutions to problems. The entire lesson drives toward this goal.
- ✓ Student sense-making of phenomena or designing of solutions is used as a window into student understanding of all three dimensions of the NGSS.
- ✓ Lessons work together in a coherent storyline to help students make sense of phenomena.
- ✓ Students get direct (preferably firsthand, or through media representations) experience with a phenomenon or problem that is relevant to them and is developmentally appropriate.
- ✓ The development of science ideas is anchored in explaining phenomena or designing solutions to problems.

Notes:

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☐ **Criterion B. Three Dimensions**

✓ The lesson helps students use multiple (e.g., 2–4) elements as appropriate in their learning.

✓ Engineering lessons require students to acquire and use elements of DCIs from physical, life, or Earth and space sciences together with elements of DCIs from engineering design (ETS) to solve design problems.

✓ Students explicitly use grade appropriate SEP and CCC elements to make sense of the phenomenon or to solve a problem (*see below*).

Note: NGSS-aligned lessons must include at least 2-4 SEPs and 2-4 CCCs.

Science and Engineering Practices (SEPs)

- ☐ Asking questions and defining problems
- ☐ Developing and using models
- ☐ Planning and carrying out investigations
- ☐ Analyzing and interpreting data
- ☐ Using mathematics and computational thinking
- ☐ Constructing explanations and designing solutions
- ☐ Engaging in argument from evidence
- ☐ Obtaining, evaluating, and communicating information

Crosscutting Concepts (CCCs)

- ☐ Patterns
- ☐ Cause and effect
- ☐ Scale, proportion, and quantity
- ☐ Systems and system models
- ☐ Energy and matter
- ☐ Structure and function
- ☐ Stability and change

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☐ **Criterion C. Integrating the Three Dimensions for Instruction and Assessment**

- ✓ The lesson is designed to build student proficiency in at least one grade-appropriate element from each of the three dimensions.
- ✓ The three dimensions intentionally work together to help students explain a phenomenon or design solutions to a problem.
- ✓ All three dimensions are necessary for sense-making and problem-solving.
- ✓ Teachers deliberately seek out student artifacts that show direct, observable evidence of learning, building toward all three dimensions of the NGSS at a grade-appropriate level.
- ✓ Teachers use tasks that ask students to explain phenomena or design solutions to problems, and that reveal the level of student proficiency in all three dimensions.

Notes:

☐ **Criterion D. Relevance and Authenticity**

- ✓ The lesson motivates student sense-making or problem-solving.
- ✓ The lesson provides support to teachers for making connections to the lives of every student in the class.
- ✓ Student questions, prior experiences, and diverse backgrounds related to the phenomenon or problem are used to drive the lesson and the sense-making or problem-solving.
- ✓ The lesson provides support to teachers or students for connecting students' own questions to the targeted materials.

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☐ **Criterion E. Student Ideas**

- ✓ Classroom discourse focuses on explicitly expressing and clarifying student reasoning.
- ✓ Students have opportunities to share ideas and feedback with each other directly.
- ✓ Student artifacts include elaborations (which may be written, oral, pictorial, and kinesthetic) of reasoning behind their answers, and show how students' thinking has changed over time.
- ✓ The lesson provides supports to teachers for eliciting student ideas.

Notes:

☐ **Criterion F. Building on Students' Prior Knowledge**

- ✓ The lesson content builds on students' prior learning in all three dimensions.
- ✓ The lesson provides explicit support to teachers for identifying students' prior learning and accommodating different entry points and describes how the lesson will build on the prior learning.
- ✓ The lesson explicitly works together with students' foundational knowledge and practice from prior grade levels.

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