Core Actions for K-12 Science

Text taken/adapted from the Student Achievement Partners, CCSS Instructional Practice Guide for ELA

CORE ACTION 1: Develop disciplinary literacy in science by employing the science and engineering *practices* from the MA STE Curriculum Framework during each lesson to develop understanding of *disciplinary core ideas*.

(Teacher Rubric Strands: I-A-1. Subject Matter Knowledge; I-A-4. Well-Structured Lesson; I-B-2. Adjustments to Practice; II-A-1, Quality of Effort and Work; II-A-2. Student Engagement; II-A-3. Meeting Diverse Needs)

Science and Engineering Practices

(adapted from the Next Generation Science Standards)

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

The teacher:

A. creates the conditions for learning science and provides all students regular opportunities to engage in each of the science and engineering practices during every unit.
B. plans lessons that use a variety of instructional strategies to promote student engagement and perseverance.
C. differentiates instruction and strategically acts on knowledge of individual students to promote progress toward independence in attaining grade level expectations for science and engineering practices and content.
D. uses curriculum embedded performance tasks to inform and assess instruction (e.g., CWAs, PBTs, etc.).
E. provides opportunities every day for students to "make sense" of their experiences (developing understanding by going beyond the activity) in class through oral discourse and writing.
F. expects that students document and reflect upon learning experiences in science notebooks each day.
G. provides frequent, critical feedback to students that helps them understand what to do to improve their performance. Feedback may include questions, ideas, suggestions, and strategies and should address both the practices and how to deepen their understanding of the disciplinary core ideas.
H. creates a sense of urgency to accomplish tasks in the classroom.

Scaffolds and Supports for English Language Learners and Students with Disabilities

Adapted from Universal Design for Learning (UDL) and World Class Instructional Design and Assessment (WIDA)

Provide opportunities for students to process and produce language at the discourse, sentence, and word/phrase level.	Include sensory, graphic and/or interactive instructional supports (e.g., digital media, graphic organizers, word walls, and anchor charts).	Explicitly link prior learning and new concepts (e.g., through complex text, critical reading discussion, digital media, etc.).
Use WIDA standards and integrate language domains (e.g., reading, writing, speaking, and listening) to develop language targets and objectives that are appropriate for students' language proficiency and instructional levels.	Enable rigorous evidence-based discussions and engagement by providing language structures (e.g., sentence stems) and using protocols (e.g., turn-and-talks, retelling, summarizing and synthesizing the main points, and collaborative learning structures).	Explicitly teach relevant Tier 2 vocabulary words to build the academic language necessary for students to read, write, and/or discuss texts and tasks. Tier 3 vocabulary should be embedded within the context of the lesson rather than at the start of the lesson.
Model annotation (e.g., through shared and interactive reading and writing) of high-quality grade level text at the word, phrase, or sentence level.	Create authentic and meaningful assessments in conjunction with timely and targeted feedback on a consistent basis.	Select an essential complex aspect of the text in which to delve deeper (e.g., close read) with questioning and academic language instruction.

Core Actions for K-12 Science

Text taken/adapted from: 1) Student Achievement Partners, CCSS Instructional Practice Guide for ELA and 2) Pearson, Moje, and Greenleaf (2010).

CORE ACTION 2: Develop disciplinary literacy in science by employing lessons focused on high quality texts, as well as questions, tasks, and dialogues that are evidence-based.

(Teacher Rubric Strands: I-A-1. Subject Matter Knowledge; I-A-4. Well-Structured Lessons; II-A-1. Quality of Effort and Work; II-A-2. Student Engagement)

The teacher:

A. scaffolds student learning with discipline specific strategies and makes their use explicit to students.
B. provides opportunities for students to conduct research, drawing appropriate and sufficient evidence from informational texts, observational studies, investigations, and design solutions, to justify arguments and develop explanations.
C. creates the conditions for conversations where students listen carefully to construct, understand and critique ideas.
D. uses explicit strategies to support students' acquisition and transferability of academic and domain specific vocabulary.
E. provides regular opportunities for and feedback on students' writing, including their use of Standard English grammar and science domain conventions.
F. uses science notebooks each day as a learning resource to record and reflect upon science lessons.
G. uses curriculum embedded performance tasks to inform and assess instruction (e.g., CWAs, PBTs, etc.).
H. uses non-fiction science texts(s) that are: at or above the complexity level expected for the grade and time in the school year; content-rich and designed to build knowledge and enable rigorous evidence based discussions and engagement.
I. embeds *close reading* questions that are sequenced to guide students to delve deeper into the text to identify key ideas and details.
J. conceptualizes reading in science as a form of scientific inquiry by setting purposes, asking questions, clarifying ambiguities, drawing inferences from incomplete evidence, and making evidence-based arguments.

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Use WIDA standards and integrate language domains (e.g., reading, writing, speaking, and listening) to develop language targets and objectives that are appropriate for students' language proficiency and instructional levels.	Enable rigorous evidence-based discussions and engagement by providing language structures (e.g., sentence stems) and using protocols (e.g., turn-and-talks, retelling, summarizing and synthesizing the main points, and collaborative learning structures).	Explicitly teach relevant Tier 2 vocabulary words to build the academic language necessary for students to read, write, and/or discuss texts and tasks. Tier 3 vocabulary should be embedded within the context of the lesson rather than at the start of the lesson.
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