



Science and Engineering Practices

Common Core Reading Anchors

Grades 6-12 Literacy in Science and Technical Subjects

SCIENCE AND ENGINEERING PRACTICE: ASKING QUESTIONS AND DEFINING PROBLEMS

Students at any grade level should be able to ask questions of each other about the texts they read, the features of the phenomena they observe, and the conclusions they draw from their models or scientific investigations. For engineering, they should ask questions to define the problem to be solved and to elicit ideas that lead to the constraints and specifications for its solution. (NRC Framework 2012, p.56)

Supporting CCSS Literacy Anchor Standards and Relevant Portions of the Corresponding Stands for Science and Technical Subjects	Connection to Science and Engineering Practice	Connection to Eco-Schools USA Pathways
<p>CCR Reading Anchor #1: Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</p> <ul style="list-style-type: none"> • RST.6-8.1: "...support analysis of science and technical texts." • RST.9-10.1: "...support analysis of science and technical texts, attending to the precise details of explanations or descriptions." • RST.11-12.1: "...support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account." 	<p>Evidence plays a critical role in the kinds of questions asked, information gathered, and findings reported in science and technical texts. The notion of close reading in Reading Standard 1 emphasizes the use of asking and refining questions in order to answer them with evidence that is either explicitly stated or implied.</p>	<p>When addressing sustainability students must be able to read for understanding and site factual data and text as supporting evidence for their claims.</p>



Pathways to Sustainability Alignment to NGSS (HS-ESS2)

ASKING QUESTIONS AND DEFINING PROBLEMS – CONTINUED

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<p>CCR Reading Anchor #7: Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.</p> <ul style="list-style-type: none"> • RST.6-8.7: “Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).” • RST.9-10.7: “Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. • RST.11-12.7: “...evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.” 	<p>Challenging or clarifying scientific hypotheses, arguments, experiments or conclusions—and the evidence and premises that support them—are key to this practice. Reading Standard 8 emphasizes evaluating the validity of arguments and whether the evidence offered backs up the claims logically.</p>	<p>Students use a variety of methods to collect and disseminate data and transform various texts and technical information into formats that can be understood by a large audience. Students use both qualitative and quantitative methods to provide evidence to support their claims.</p>



ASKING QUESTIONS AND DEFINING PROBLEMS – CONTINUED

Supporting CCSS Literacy Anchor Standards and Relevant Portions of the Corresponding Stands for Science and Technical Subjects	Connection to Science and Engineering Practice	Connection to Eco-Schools USA Pathways
<p>CCR Writing Anchor #7: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.</p> <ul style="list-style-type: none"> • RST.6-8.7: “...answer a question (including a self-generated question)...generating additional related, focused questions that allow for multiple avenues of exploration.” • RST.9-12.7: “...narrow or broaden inquiry when appropriate...” 	<p>Generating focused questions and well-honed scientific inquiries are key to conducting investigations and defining problems. The research practices reflected in Writing Standard 7 reflect the skills needed for successful completion of such research-based inquiries.</p>	<p>Addressing Eco-Schools pathways require students to ask questions, explore possibilities, and search for reasonable solutions to problems.</p>
<p>CCR Speaking & Listening Anchor #1: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others’ ideas and expressing their own clearly and persuasively.</p> <ul style="list-style-type: none"> • SL.8.1: “...Pose...specific questions by making comments that contribute to the discussion...” • SL.9-10.1: “... posing and responding to questions that relate the current discussion to broader themes or larger ideas...” • SL.11-12.1: “...posing and responding to questions that probe reasoning and evidence...” 	<p>The ability to pose relevant questions, clarify or elaborate on the ideas of others or request information from others are crucial to learning and conducting investigations in science class. Speaking and Listening Standard 1 speaks directly to the importance of asking and refining questions to clarify ideas that generate solutions and explanations.</p>	<p>Eco-Action teams work with a wide range of people including, peers, teachers, facilities staff, and community partners, thus having the opportunity to build skills through meaningful, authentic learning experiences.</p>



Pathways to Sustainability

Alignment to NGSS (HS-ESS2)

ASKING QUESTIONS AND DEFINING PROBLEMS

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<p>CCR Speaking & Listening Anchor #3: Evaluate a speaker’s point of view, reasoning, and use of evidence and rhetoric.</p> <ul style="list-style-type: none"> • SL.8.3: “...evaluating the soundness of the reasoning and sufficiency of the evidence, and identifying when irrelevant evidence is introduced.” • SL.9-10.3: “...identifying fallacious reasoning or exaggerated or distorted evidence.” • SL.11-12.3: “...assessing the stance, premises, and links among ideas, word choice, and points of emphasis.” 	<p>Evaluating the soundness of a speaker’s reasoning and evidence concerning scientific theories and concepts through a series of inquiries teaches students to be discriminating thinkers. Speaking and Listening Standard 3 directly asserts that students must be able to critique a point of view from the perspective of the evidence provided and reasoning advanced.</p>	<p>Discerning points or view, fact versus opinion, and distortions of the truth play a critical role in addressing sustainability. Separating fact based evidence over bias is crucial in solving issues on campus.</p>
<p>CCR Writing Anchor #7: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.</p>	<p>Planning and carrying out investigations to test hypotheses or designs is central to scientific and engineering activity. The research practices reflected in Writing Standard 7 reflect the skills needed for successful completion of such research-based inquiries.</p>	<p>Addressing Eco-Schools pathways require students to ask questions, explore possibilities, and search for reasonable solutions to problems.</p>