



Science and Engineering Practices

Common Core Reading Anchors

Grades 6-12 Literacy in Science and Technical Subjects

SCIENCE AND ENGINEERING PRACTICE: ANALYZING AND INTERPRETING DATA

Once collected, data must be presented in a form that can reveal any patterns and relationships and that allows results to be communicated to others. Because raw data as such have little meaning, a major practice of scientists is to organize and interpret data through tabulating, graphing, or statistical analysis. Such analysis can bring out the meaning of data—and their relevance—so that they may be used as evidence.

Engineers, too, make decisions based on evidence that a given design will work; they rarely rely on trial and error. Engineers often analyze a design by creating a model or prototype and collecting extensive data on how it performs, including under extreme conditions. Analysis of this kind of data not only informs design decisions and enables the prediction or assessment of performance but also helps define or clarify problems, determine economic feasibility, evaluate alternatives, and investigate failures. (NRC *Framework*, 2012, p. 61-62)



Science and Engineering Practices Literacy in Science and Technical Subjects

ANALYZING AND INTERPRETING DATA – 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 Reading Anchor #7: Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words RST.6-8.1: “...support analysis of science and technical texts.”</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>Scientists and engineers present data in a myriad of visual formats in order to reveal meaningful patterns and trends. Reading Standard 7 speaks directly to the importance of understanding and presenting information that has been gathered in various formats to reveal patterns and relationships and allow for deeper explanations and analyses.</p>	<p>Addressing Eco-Schools pathways require students to ask questions, explore possibilities, and search for reasonable solutions to problems through the interpretation and analyses of data sets, text and technical information.</p>



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<p>CCR Reading Anchor #9: Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.</p> <ul style="list-style-type: none"> • RST.6-8.9: “Compare and contrast the information gained from experiments, simulations, video or multimedia sources with that gained from reading a text on the same topic.” • RST.9-10.9: “Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.” • RST.11-12.9: “Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.” 	<p>Scientists and engineers use technology to allow them to draw on multiple sources of information in order to create data sets. Reading Standard 9 identifies the importance of analyzing multiple sources in order to inform design decisions and create a coherent understanding of a process or concept.</p>	<p>The lens of sustainability provides students an excellent opportunity to compare literary styles and approaches and allows them to debate the information within and substantiate or refute their claims and evidence or the claims and evidence of others.</p>



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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>Scientists and engineers present data in a myriad of visual formats in order to reveal meaningful patterns and trends. Reading Standard 7 speaks directly to the importance of understanding and presenting information that has been gathered in various formats to reveal patterns and relationships and allow for deeper explanations and analyses.</p>	<p>Addressing Eco-Schools pathways require students to ask questions, explore possibilities, and search for reasonable solutions to problems through the interpretation and analyses of data sets, text and technical information.</p>



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<p>CCR Reading Anchor #9: Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.</p> <ul style="list-style-type: none"> • RST.6-8.9: “Compare and contrast the information gained from experiments, simulations, video or multimedia sources with that gained from reading a text on the same topic.” • RST.9-10.9: “Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.” • RST.11-12.9: “Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.” 	<p>Scientists and engineers use technology to allow them to draw on multiple sources of information in order to create data sets. Reading Standard 9 identifies the importance of analyzing multiple sources in order to inform design decisions and create a coherent understanding of a process or concept.</p>	<p>The lens of sustainability provides students an excellent opportunity to compare literary styles and approaches and allows them to debate the information within and substantiate or refute their claims and evidence or the claims and evidence of others.</p>
<p>CCR Speaking and Listening #2: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.</p> <ul style="list-style-type: none"> • SL.8.2: “Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, and orally)...” • SL.9-10.2: “Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.” • SL.11-12.2: “...evaluating the credibility and accuracy of each source and noting any discrepancies among the data.” 	<p>Central to the practice of scientists and engineers is integrating data drawn from multiple sources in order to create a cohesive vision of what the data means. Speaking and Listening Standard 2 addresses the importance of such synthesizing activities to building knowledge and defining and clarifying problems. This includes evaluating the credibility and accuracy of data and identifying possible sources of error.</p>	<p>Validating evidence and claims throughout the Seven Step Framework leads to student drawn conclusions that ultimately benefit the school and larger community.</p>



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<p>CCR Speaking and Listening #5: Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.</p> <ul style="list-style-type: none"> • SL.8.5: “Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence...” • SL.9-12.5: “Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence...” 	<p>Presenting data for the purposes of cross-comparison is essential for identifying the best design solution or scientific explanation. Speaking and Listening Standard 5 stresses the importance of visual displays of data within presentations in order to enhance understanding of the relevance of the evidence. That way others can make critical decisions regarding what is being claimed based on the data.</p>	<p>All Eco-Schools USA pathways can be used in the dissemination of information using digital technology in a way that is appealing and easily understood and geared toward its intended audience.</p>