EQuIP Rubric for Lessons & Units: Science

Introduction

The Educators Evaluating the Quality of Instructional Products (EQuIP) Rubric for science provides criteria by which to measure the alignment and overall quality of lessons and units with respect to the Next Generation Science Standards (NGSS). The purposes of the rubric and review process are to: (1) review existing lessons and units to determine what revisions are needed; (2) provide constructive criterion-based feedback and suggestions for improvement to developers; (3) identify exemplars/models for teachers' use within and across states; and (4) to inform the development of new lessons and units.

To effectively apply this rubric, an understanding of the National Research Council's *A Framework for K–12 Science Education and the Next Generation Science Standards*, including the NGSS shifts (appendix A of the NGSS), is needed. Unlike the EQuIP Rubrics for mathematics and ELA, there is not a category in the science rubric for shifts. Over the course of the rubric development, writers and reviewers noted that the shifts fit naturally into the other three categories. For example, the blending of the three-dimensions, or three-dimensional learning, is addressed in each of the three categories; coherence is addressed in the first two categories; connections to the Common Core State Standards is addressed in the first category; etc. Each category includes criteria by which to evaluate the integration of engineering, when included in a lesson or unit, through practices or disciplinary core ideas. Another difference between the EQuIP Rubrics from mathematics and ELA is in the name of the categories; the rubric for science refers to them simply as *categories*, whereas the math and ELA rubrics refer to the categories as dimensions. This distinction was made because the Next Generation Science Standards already uses the term *dimensions* to refer to practices, disciplinary core ideas, and crosscutting concepts.

The architecture of the NGSS is significantly different from other sets of standards. The three dimensions, crafted into performance expectations, describe what is to be assessed following instruction and therefore are the measure of proficiency. A lesson or unit may provide opportunities for students to demonstrate performance of practices connected with their understanding of core ideas and crosscutting concepts as foundational pieces. This three-dimensional learning leads toward eventual mastery of performance expectations. In this scenario, quality materials should clearly describe or show how the lesson or unit works coherently with previous and following lessons or units to help build toward eventual mastery of performance expectations. The term *element* is used in the rubric to represent the relevant, bulleted practices, disciplinary core ideas, and crosscutting concepts that are articulated in the foundation boxes of the standards as well as the in the NGSS appendices on each dimension. Given the understanding that a lesson or unit may include the blending of practices, disciplinary core ideas, and crosscutting concepts that are not identical to the combination of practices, disciplinary core ideas, and crosscutting concepts in a performance expectation, the new term *elements* was needed to describe these smaller units of the three dimensions. Although it is unlikely that a single lesson would provide adequate opportunities for a student to demonstrate proficiency on every dimension of a performance expectation, high-quality units are more likely to provide these opportunities to demonstrate proficiency on one or more performances expectations.

There is a recognition among educators that curriculum and instruction will need to shift with the adoption of the NGSS, but there is currently a lack of NGSS-aligned materials. The power of the rubric is in the feedback and suggestions for improvement it provides curriculum developers and the productive conversations educators have while evaluating materials (i.e., the review process). For curriculum developers, the rubric and review process provide evidence on the quality and alignment of a lesson or unit to the NGSS. Additionally, the rubric and review process generate suggestions for improvement on how materials can be further improved and more closely aligned to the NGSS. As more NGSS lessons and units are developed, this rubric may change to meet the evolving needs of supporting both educators in evaluating materials and developers in the modification and creation of materials. Additionally, support materials will be developed to complement the use of this rubric, such as a professional development guide, a criterion discussion guide, and publishers' criteria that will be more focused on textbooks and comprehensive curriculums.

Version 2 – published September 2014

Directions

The first step in the review process is to become familiar with the rubric, the lesson or unit, and the practices, disciplinary core ideas, and crosscutting concepts targeted in the lesson or unit. The three categories in the rubric correspond to: alignment to the NGSS, instructional supports, and monitoring student progress. Specific criteria within each category should be considered separately as part of the complete review process and are used to provide sufficient information for determination of overall quality of the lesson or unit. For the purposes of using the rubric, a lesson is defined as: a coherent set of instructional activities and assessments aligned to the NGSS that may extend over a few to several class periods or days and a unit is defined as: coherent set of lessons aligned to the NGSS that extend over a longer period of time.

Also important to the review process is feedback and suggestions for improvement to the developer of the resource. For this purpose a set of response forms is included so that the reviewer can effectively provide criterion-based feedback and suggestions for improvement for each category. The response forms correspond to the criteria of the rubric. Evidence for each criterion must be identified and documented and criterion-based feedback and suggestions for improvement should be given to help improve the lesson or unit.

While it is possible for the rubric to be applied by an individual, the quality review process works best with a team of reviewers, as a collaborative process, with the individuals recording their thoughts and then discussing with other team members before finalizing their feedback and suggestions for improvement. Discussions should focus on understanding all reviewers' interpretations of the criteria and the evidence they have found. The goal of the process is to eventually calibrate responses across reviewers and to move toward agreement about quality with respect to the NGSS. Commentary needs to be constructive, with all lessons or units considered "works in progress." Reviewers must be respectful of team members and the resource contributor. Contributors should see the review process as an opportunity to gather feedback and suggestions for improvement rather than to advocate for their work. All feedback and suggestions for improvement should be criterion-based and have supporting evidence from the lesson or unit cited.

Note: This rubric will eventually have scoring guidelines for each category, as well as for an overall rating. However, given the current lack of NGSS-aligned materials, rather than focusing on ratings at this point in time, the focus should be on becoming familiar with the rubric and using it to provide criterion-based feedback and suggestions for improvement to developers and make revisions to existing materials.

Step 1 – Review Materials

The first step in the review process is to become familiar with the rubric, the lesson or unit, and the practices, disciplinary core ideas, and crosscutting concepts targeted in the lesson or unit.

- Review the rubric and record the grade and title of the lesson or unit on the response form.
- Scan to see what the lesson or unit contains, what practices, disciplinary core ideas, and crosscutting concepts are targeted, and how it is organized.
- Read key materials related to instruction, assessment, and teacher guidance.

Step 2 – Apply Criteria in Category I: Alignment to the NGSS

The second step is to evaluate the lesson or unit using the criteria in the first category, first individually and then as a team.

- Closely examine the lesson or unit through the "lens" of each criterion in the first category of the response form.
- Individually check each criterion on the response form for which clear and substantial evidence is found and record the evidence and reasoning.
- As a team, discuss criteria for which clear and substantial evidence is found, as well as criterion-based suggestions for specific improvements that might be needed to meet criteria.

If the lesson or unit is not closely aligned to the Next Generation Science Standards, it may not be appropriate to move on to the second and third categories. Professional judgment should be used when weighing the individual criterion. For example, a lesson without crosscutting concepts explicitly called out may be easier to revise than one without appropriate disciplinary core ideas; such a difference may determine whether reviewers believe the lesson merits continued evaluation or not.

Step 3 – Apply Criteria in Categories II and III: Instructional Supports and Monitoring Student Progress

The third step is to evaluate the lesson or unit using the criteria in the second and third categories, first individually and then as a group.

- Closely examine the lesson or unit through the "lens" of each criterion in the second and third categories of the response form.

- Individually check each criterion on the response form for which clear and substantial evidence is found and record the evidence and reasoning.
- As a team, discuss criteria for which clear and substantial evidence is found, as well as criterion-based suggestions for specific improvements that might be needed to meet criteria.

When working in a group, teams may choose to compare ratings after each category or delay conversation until each person has rated and recorded input for the two remaining categories. Complete consensus among team members is not required but discussion is a key component of the review process.

EQuIP Rubric for Lessons & Units: Science

I. Alignment to the NGSS	II. Instructional Supports	III. Monitoring Student Progress
The lesson or unit aligns with the conceptual shifts of the NGSS: A. Grade-appropriate elements of the science and engineering practice(s), disciplinary core idea(s), and crosscutting concept(s), work together to support students in three-dimensional learning to make sense of phenomena and/or to design solutions to problems. i. Provides opportunities to develop and use specific elements of the practice(s) to make sense of phenomena and/or to design solutions to problems. ii. Provides opportunities to develop and use specific elements of the disciplinary core idea(s) to make sense of phenomena and/or to design solutions to problems. iii. Provides opportunities to develop and use specific elements of the crosscutting concept(s) to make sense of phenomena and/or to design solutions to problems. iv. The three dimensions work together to support students to make sense of phenomena and/or to design solutions to problems. A unit or longer lesson will also: B. Lessons fit together coherently targeting a set of performance expectations. i. Each lesson links to previous lessons and provides a need to engage in the current lesson. ii. The lessons help students develop proficiency on a targeted set of performance expectations. C. Where appropriate, disciplinary core ideas from different disciplines are used together to explain phenomena. D. Where appropriate, crosscutting concepts are used in the explanation of phenomena from a variety of disciplines. E. Provides grade-appropriate connection(s) to the Common Core State Standards in Mathematics and/or English Language Arts & Literacy in History/Social Studies, Science and Technical Subjects.	The lesson or unit supports instruction and learning for all students: A. Engages students in authentic and meaningful scenarios that reflect the practice of science and engineering as experienced in the real world and that provide students with a purpose (e.g., making sense of phenomena and/or designing solutions to problems). i. The context, including phenomena, questions, or problems, motivates students to engage in three-dimensional learning. ii. Provides students with relevant phenomena (either firsthand experiences or through representations) to make sense of and/or relevant problems to solve. iii. Engages students in multiple practices that work together with disciplinary core ideas and crosscutting concepts to support students in making sense of phenomena and/or designing solutions to problems. iv. Provides opportunities for students to connect their explanation of a phenomenon and/or their design solution to a problem to their own experience. v. When engineering performance expectations are included, they are used along with disciplinary core ideas from physical, life, or earth and space sciences. B. Develops deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts by identifying and building on students' prior knowledge. C. Uses scientifically accurate and grade-appropriate scientific information, phenomena, and representations to support students' three-dimensional learning. D. Provides opportunities for students to express, clarify, justify, interpret, and represent their ideas and respond to peer and teacher feedback orally and/or in written form as appropriate to support student's three-dimensional learning. E. Provides guidance for teachers to support differentiated instruction in the classroom so that every student's needs are addressed by including: i. Suggestions for how to connect instruction to the students' home, neighborhood, community and/or culture as appropriate. ii. Appropriate reading, writing, listening, and/or speaking alternatives (e.g., translations, picture support, graphic organizers) for students who are English language learners, have special needs, or read well below the grade level. iii. Suggested extra support (e.g., phenomena, representations, tasks) for students who are struggling to meet the performance expectations. iv. Extensions for students with high interest or who have already met the performance expectations to develop deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts. A unit or longer lesson will also: F. Provides guidance for teachers throughout the unit for how lessons build on each other to support students developing deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts over the course of the unit. G. Provides supports to help students engage in the practices as needed and gradually adjusts supports over time so that students are increasingly responsible for making sense of phenomena and/or designing solutions to problems.	The lesson or unit supports monitoring student progress: A. Elicits direct, observable evidence of three-dimensional learning by students using practices with core ideas and crosscutting concepts to make sense of phenomena and/or to design solutions. B. Formative assessments of three-dimensional learning are embedded throughout the instruction. C. Includes aligned rubrics and scoring guidelines that provide guidance for interpreting student performance along the three dimensions to support teachers in (a) planning instruction and (b) providing ongoing feedback to students. D. Assessing student proficiency using methods, vocabulary, representations, and examples that are accessible and unbiased for all students. A unit or longer lesson will also: E. Includes pre-, formative, summative, and self-assessment measures that assess three-dimensional learning. F. Provides multiple opportunities for students to demonstrate performance of practices connected with their understanding of disciplinary core ideas and crosscutting concepts and receive feedback.

EQuIP Rubric for Lessons & Units: Science

Reviewer Name or ID: **Oralia Gil, LAB-AIDS** **Grade: High School Earth Science**

Science Lesson/Unit Title: **EDC Earth Science, LAB-AIDS © 2014**

I. Alignment to the NGSS

The lesson or unit aligns with the conceptual shifts of the NGSS: *This is ONE lesson sample from a 27 lesson unit.*

Criteria	Specific evidence from materials and reviewers' reasoning	Suggestions for improvement
☐ A. Grade-appropriate elements of the science and engineering practice(s), disciplinary core idea(s), and crosscutting concept(s), work together to support students in three-dimensional learning to make sense of phenomena and/or to design solutions to problems. i. Provides opportunities to develop and use specific elements of the practice(s) to make sense of phenomena and/or to design solutions to problems. ii. Provides opportunities to develop and use specific elements of the disciplinary core idea(s) to make sense of phenomena and/or to design solutions to problems. iii. Provides opportunities to develop and use specific elements of the crosscutting concept(s) to make sense of phenomena and/or to design solutions to problems. iv. The three dimensions work together to support students to make sense of phenomena and/or to design solutions to problems.	EDC Earth Science: Unit 2 Atmosphere and Climate Chapter 5 Activity 3 Moving Carbon Around Students investigate in experiments and with molecular models how carbon atoms are transferred between rocks and the atmosphere. Citations: Practices Developing & Using Models Cross cutting concepts: Energy & Matter DCI: ESS2.D PE: HS-ESS2-6 [EDC Unit 2 Ch 5 Activity 3 SB p. 124-126] [EDC Unit 2 Ch 5 Activity 3 TE p. 169-171]	

A unit or longer lesson will also: *This is a 27 lesson unit that takes approximately 6-8 weeks of instruction.*

Criteria	Specific evidence from materials and reviewers' reasoning	Suggestions for improvement
☐ B. Lessons fit together coherently targeting a set of performance expectations. i. Each lesson links to previous lessons and provides a need to engage in the current lesson. ii. The lessons help students develop proficiency on a targeted set of performance expectations.	EDC Earth Science: Unit 2 Atmosphere and Climate In this 6-8 week unit, students start their exploration of climate close to home, learning about the climate in their local area and comparing it to a chosen travel destination. They read about a community in Alaska that is threatened by global warming and research the factors that influence global climate and can cause it to change. They explore two time periods in Earth's past when climate was very different from	

	today—the warm Cretaceous and a glacial interval of the Pleistocene. They look at evidence that Earth's climate is changing now and how human activity and natural factors contribute to this change. Citations: [EDC Scope and Sequence, p. xiii] [EDC Learning Goals and Student Assessment Outcomes, Ch 4, p. 109-110] [EDC Learning Goals and Student Assessment Outcomes, Ch 5, p. 150-151] [EDC Learning Goals and Student Assessment Outcomes, Ch 6, p. 190-191]	
☐ C. Where appropriate, disciplinary core ideas from different disciplines are used together to explain phenomena.	This unit targets different disciplines to explain phenomena addressed during the study of regional and global climates and climate change in Earth's history. Citations: [EDC Scope and Sequence, p. xiii] [EDC Alignment to NGSF DCI, pp. xxvi – xxviii] [EDC Goals for Understanding, Ch 4, pp. 109, and table of activities, assessment outcomes, and assessments, p. 111] [EDC Goals for Understanding, Ch 5, pp. 150, and table of activities, assessment outcomes, and assessments, p. 153] [EDC Goals for Understanding, Ch 6, pp. 190, and table of activities, assessment outcomes, and assessments, p. 192] Sample activities: [EDC Unit 2 Ch 4 Activity 1 SB p. 85-91] [EDC Unit 2 Ch 4 Activity 3 SB p. 94-96] [EDC Unit 2 Ch 4 Activity 4 SB p. 99-102] [EDC Unit 2 Ch 5 Activity 1 SB p. 116-120] [EDC Unit 2 Ch 5 Activity 4 SB p. 127-132] [EDC Unit 2 Ch 6 Activity 2 SB p. 152-154]	
☐ D. Where appropriate, crosscutting concepts are used in the explanation of phenomena from a variety of disciplines.	This unit explores cross cutting concepts such as patterns, stability and change, cause and effect, systems and system models, energy and matter, and engaging in argument from evidence.	

	Citations: [EDC Scope and Sequence, p. xiii] [EDC Alignment to NGSF DCI, pp. xxvi – xxviii] [EDC Goals for Understanding, Ch 4, pp. 109, and table of activities, assessment outcomes, and assessments, p. 111] [EDC Goals for Understanding, Ch 5, pp. 150, and table of activities, assessment outcomes, and assessments, p. 153] [EDC Goals for Understanding, Ch 6, pp. 190, and table of activities, assessment outcomes, and assessments, p. 192] Sample activities: [EDC Unit 2 Ch 4 Activity 1 SB p. 85-91] [EDC Unit 2 Ch 4 Activity 3 SB p. 94-96] [EDC Unit 2 Ch 4 Activity 4 SB p. 99-102] [EDC Unit 2 Ch 5 Activity 1 SB p. 116-120] [EDC Unit 2 Ch 5 Activity 4 SB p. 127-132] [EDC Unit 2 Ch 6 Activity 2 SB p. 152-154]	
☐ E. Provides grade-appropriate connection(s) to the Common Core State Standards in Mathematics and/or English Language Arts & Literacy in History/Social Studies, Science and Technical Subjects.	*CC ELA: EDC Earth Science* has embedded support for literacy throughout the course for reading, with more than 40 reading supports, including strategies such as Science Fact Triangle, Three-Level Reading Guide, and Anticipation Guide. Support for writing comes in the form of authentic writing tasks, throughout the chapters, such as written support for a mock court case involving sea ice reduction in a northern Alaska village (chapter 5) and exhibit copy for a GCC museum (chapter 6). Course examples of support for the 9-10 ELA standards are shown below. Citations: [RST.9-10.1] [RST.9-10.2] [RST 9.10-3] [RST.9-10.4] [RST.9-10.5] [RST 9.10-6] [RST.9-10.7] [RST.9-10.8] [RST 9.10-9] *CC MATH: EDC Earth Science* supports the following CC Mathematics Content: High School Number and Quantity (real numbers, quantities), Modeling, Measurement and Data, Ratios and Proportional Relationships. CCSS.Math.Content.HSN.Q.A.1;	

	CCSS.Math.Content.HSN.Q.A.2; CCSS.Math.Content.HSN.Q.A.3; CCSS.Math.Content.HSA.REI.A.1 CCSS.Math.Content.HSF.LE.A.1 CCSS.Math.Content.HSF.LE.B.5	

If the lesson or unit is not closely aligned to the Next Generation Science Standards, it may not be appropriate to move on to the second and third categories. Professional judgment should be used when weighing the individual criterion. For example, a lesson without crosscutting concepts explicitly called out may be easier to revise than one without appropriate disciplinary core ideas; such a difference may determine whether reviewers believe the lesson merits continued evaluation or not.

II. Instructional Supports

The lesson or unit supports instruction and learning for all students: *This is a 27 lesson unit that takes approximately 6-8 weeks of instruction.*

Criteria	Specific evidence from materials and reviewers' reasoning	Suggestions for improvement
☐ A. Engages students in authentic and meaningful scenarios that reflect the practice of science and engineering as experienced in the real world and that provide students with a purpose (e.g., making sense of phenomena and/or designing solutions to problems). i. The context, including phenomena, questions, or problems, motivates students to engage in three-dimensional learning. ii. Provides students with relevant phenomena (either firsthand experiences or through representations) to make sense of and/or relevant problems to solve. iii. Engages students in multiple practices that work together with disciplinary core ideas and crosscutting concepts to support students in making sense of phenomena and/or designing solutions to problems. iv. Provides opportunities for students to connect their explanation of a phenomenon and/or their design solution to a problem to their own experience. v. When engineering performance expectations are included, they are used along with disciplinary core ideas from physical, life, or earth and space sciences.	EDC Earth Science: Unit 2 Atmosphere and Climate select lesson sample: Ch. 5 Activity 4 Calling All Carbons Students explore the carbon cycle by analyzing information about processes by which carbon is transferred from one reservoir to another. This activity follows readings and activities on path of light energy, greenhouse effect, albedo effect, modeling carbon combustion and formations to explore factors that influence global climate and that can affect communities. The reading that follows discusses how Earth's systems can interact to either stabilize the climate or accelerate climate change. Citations: Practices: Constructing Explanations; Engaging in Argument from Evidence Cross cutting concepts: Energy & Matter; Stability & Change DCI: ESS2.D PE: HS-ESS2-6 [EDC Unit 2 Ch 5 Activity 4 SB p. 127-132] [EDC Unit 2 Ch 5 Activity 4 TE p. 172-177]	
☐ B. Develops deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts by identifying and building on students' prior knowledge.	EDC Earth Science: Unit 2 Atmosphere and Climate select lesson sample: Ch. 4 Local Connections: Regional Climate Introduce chapter and discuss Brainstorming questions and Ch. 4 Activity 1 Looking at Climate Data In this chapter, students will start their exploration of climate by comparing their local area to another part of the world and investigating the factors that make each region's climate unique. By studying local connections, students are able to build on the knowledge gained in order to develop the basic understandings necessary to assess what is being	

	said about climate change and understand what this might mean to them. Citations: Practices: Obtaining, Evaluating, & Communicating Information; Using Mathematics & Computational Thinking Cross cutting concepts: Patterns; Stability & Change DCI: ESS2.D; ESS2.E PE: [EDC Unit 2 Ch 4 Brainstorming SB p. 81-85] [EDC Unit 2 Ch 4 Brainstorming TE p. 116-117] [EDC Unit 2 Ch 4 Activity 1 SB p. 85-91] [EDC Unit 2 Ch 4 Activity 1 TE p. 121-127]	
☐ C. Uses scientifically accurate and grade-appropriate scientific information, phenomena, and representations to support students' three-dimensional learning.	EDC Earth Science: Unit 2 Atmosphere and Climate select lesson sample: Ch. 6 The Longest Experiment: Climate Change in Earth's History: In this chapter, students explore climate change that has happened in Earth's past and think about its relevance to climate change happening now. They study data about changes currently happening related to Earth's climate and examine the forecasts of climate models about Earth's future. In addition to building on their foundation of knowledge about Earth's atmosphere and hydrosphere from previous chapters, this study connects them to many of the concepts covered later in the course, relating to plate tectonics and the rock cycle. Citations : Practices: Constructing Explanations; Engaging in Argument from Evidence; Using Mathematics & Computational Thinking; Developing & Using Models Cross cutting concepts: Patterns; Cause & Effect; Systems &System Models; Scale, Proportion, & Quantity; Energy & Matter; Stability & Change DCI: ESS2.D PE: HS-ESS2-2; HS-ESS2-4; HS-ESS3-5	

	[EDC Unit 2 Ch 6 SB p. 141-185] [EDC Unit 2 Ch 6 TE p. 189-242]	
☐ D. Provides opportunities for students to express, clarify, justify, interpret, and represent their ideas and respond to peer and teacher feedback orally and/or in written form as appropriate to support student's three-dimensional learning.	Formative Strategies These are typically used during the consider–investigate–process phases of the EDC Earth Science learning cycle. Examples include: • Literacy strategies, such as the Anticipation Guide, Science Fact Triangles, and Three-Level Reading Guides, which provide feedback that can be used on a formative basis. • About the Reading questions to see what students learn from the short content readings in the course. • Analysis questions for formatively assessing students' learning from activities. • Students' science notebooks that can provide formative feedback for teachers and students. • Discuss questions in the process sections that provide useful feedback on whether the broad chapter learning goals have been met. Citations: [EDC Assessment TE, p. xxxix – xlii] [EDC Unit 2 Ch 4 Brainstorming SB p. 81-85] [EDC Unit 2 Ch 5 Reading & Activity 1 SB p. 114-120] [EDC Unit 2 Ch 6 Activity 4 SB p. 165-175]	
☐ E. Provides guidance for teachers to support differentiated instruction in the classroom so that every student's needs are addressed by including: i. Suggestions for how to connect instruction to the students' home, neighborhood, community and/or culture as appropriate. ii. Appropriate reading, writing, listening, and/or speaking alternatives (e.g., translations, picture support, graphic organizers) for students who are English language learners, have special needs, or read well below the grade level. iii. Suggested extra support (e.g., phenomena, representations, tasks) for students who are struggling to meet the performance expectations. iv. Extensions for students with high interest or who have already met the performance expectations to develop deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts.	EDC Earth Science stresses the following goals: • Developing students' reading, writing, data analysis, and communication skills to produce science-literate citizens. • Motivating students to acquire the knowledge for solving a problem, by offering them historical, newsworthy, and fictionalized stories that draw them into the earth science content. • Teaching students to tackle problems and challenges in science by using accurate information, critical thinking, and problem solving to reach decisions grounded in evidence and logic. • Offering varied learning strategies and activities that help students construct meaning from their experiences and that serve as bridges between	

	concrete and abstract thinking. EDC Earth Science consists of instructional support for the teacher in the Teacher's Edition. A full suite of ancillary teaching resources is provided on the Teacher Resource CD and via the EDC Earth Science page on the LAB-AIDS website. These include links to real-time data, animations and supplemental information, slide presentations to go with each chapter, supplemental readings, student notebook sheets, literacy supplements such as anticipation guides to go with each reading. Citation: [EDC Assessment TE, p. xxxix – xlii] [EDC Full Picture TE, p. xxv – xliii] [EDC Overview TE, p. xi – xv]	

A unit or longer lesson will also: *This is a 27 lesson unit that takes approximately 6-8 weeks of instruction.*

Criteria	Specific evidence from materials and reviewers' reasoning	Suggestions for improvement
☐ F. Provides guidance for teachers throughout the unit for how lessons build on each other to support students developing deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts over the course of the unit.	Each of the 17 chapters in this course addresses a specific set of concepts. Chapters build on prior knowledge, progressing from the simple to the more complex, and from the concrete to the abstract. This scaffolding of learning permits the exploration of earth science concepts at increasingly greater depth in a gradual, step-by-step fashion. While the course was written as a full-year sequence, it is also available as individual units. Citation: [EDC Overview TE, p. xi – xv] [EDC Unit 2 Ch. 4 Overview/Scope & Sequence TE p.108-112] [EDC Unit 2 Ch. 5 Overview/Scope & Sequence TE p.149-154] [EDC Unit 2 Ch. 6 Overview/Scope & Sequence TE p.189-193]	
☐ G. Provides supports to help students engage in the practices as needed and gradually adjusts supports over time so that students are increasingly responsible for making sense of phenomena and/or designing solutions to problems.	Summative Strategies These typically come into play only after the process phase of the EDC Earth Science learning cycle. They include: • Multiple-choice items, found at the end of each chapter (Assessment), as well as in electronic form in the ExamView® test-generation software. • Free- or constructed-response items, to be scored with rubrics or scoring guides, also found in the end-of-chapter Assessment questions and ExamView® test item banks online. • Process or Address the Challenge tasks requiring students' responses. Citations: [EDC Assessment TE, p. xxxix – xlii] [EDC Unit 2 Ch. 4 Process/Assessment TE p.143-147] [EDC Unit 2 Ch. 5 Process/Assessment TE p.182-188] [EDC Unit 2 Ch. 6 Process/Assessment TE p.236-242]	

III. Monitoring Student Progress

The lesson or unit supports monitoring student progress: *This is a 27 lesson unit that takes approximately 6-8 weeks of instruction.*

Criteria	Specific evidence from materials and reviewers' reasoning	Suggestions for improvement
☐ A. Elicits direct, observable evidence of three-dimensional learning by students using practices with core ideas and crosscutting concepts to make sense of phenomena and/or to design solutions.	Numerous activities and assessments engage students in authentic tasks and collect evidence of what they know and are able to do. For each of the chapters, you will find a rich source of materials for summative assessment that will allow you to evaluate students' mastery of scientific concepts and practices. At the end of each chapter, students synthesize what they have learned in Address the Challenge. They demonstrate their learning through written essays, position papers, newspaper articles, posters, museum exhibits, construction of 3-D models, and debates. In addition, Assessment questions at the end of each chapter (and in ExamView) provide an ample source of selected-response and open-ended items to gauge students' learning. Citation: [EDC Assessment TE, p. xxxix – xlii] CHAPTER 7 Mid-Year Challenge: Broadcast from the Future - In this mid-year challenge, students synthesize the many concepts they have learned about the functioning of Earth's systems and use their knowledge to make predictions about the future. [EDC Mid-Year Challenge Ch 7 SB p. 188-192] [EDC Mid-Year Challenge Ch 7 TE p. 244-250]	
☐ B. Formative assessments of three-dimensional learning are embedded throughout the instruction.	As students move through the activities and readings within a chapter, they regularly connect back to the Challenge question, which gives them the chance to monitor their progress as they gather knowledge to meet the challenge. Pre-activity discussions, often included, give students an explicit opportunity to reflect on their current knowledge and focus them on the learning goal of the activity. Think About It questions, which appear within activities and readings, give students a chance to stop and think about what they are learning and how it relates to their learning goals. The About the Reading and Analysis questions at the end of each reading and activity, respectively, ask students to synthesize what they have learned and think about what it means. Possible student responses to each About the Reading and Analysis question	

	are provided. Citations: [EDC Assessment TE, p. xxxix – xlii] [EDC Unit 2 Ch 4 Brainstorming SB p. 81-85] [EDC Unit 2 Ch 5 Reading & Activity 1 SB p. 114-120] [EDC Unit 2 Ch 6 Activity 4 SB p. 165-175]	
☐ C. Includes aligned rubrics and scoring guidelines that provide guidance for interpreting student performance along the three dimensions to support teachers in (a) planning instruction and (b) providing ongoing feedback to students.	There are several formative and summative assessment strategies and tools in EDC Earth Science. These are linked to the learning goals and learning outcomes identified in the book chapters, and ultimately to the science practices, crosscutting concepts, and core-content elements of the Next Generation Science Framework (NRC, 2012). Citations: [EDC Assessment TE, p. xxxix – xlii] [EDC Unit 2 Ch. 4 Process/Assessment TE p.143-147] [EDC Unit 2 Ch. 5 Process/Assessment TE p.182-188] [EDC Unit 2 Ch. 6 Process/Assessment TE p.236-242]	
☐ D. Assessing student proficiency using methods, vocabulary, representations, and examples that are accessible and unbiased for all students.	EDC Earth Science provides a rich set of opportunities for students to develop and apply their literacy skills. Students • gather information by engaging with readings in a variety of forms; analyzing data and information displayed in maps, graphs, charts, and photographs; researching topics on the Internet; and carefully observing phenomena. • build conceptual understanding by organizing observations in tables and other data displays, documenting their thinking in writing, and discussing ideas with their peers. • communicate learning through written projects (five-paragraph essays, business plans, and brochures) and orally (formal slide presentations, scientific poster sessions, and structured debates). Students are encouraged to incorporate a variety of new media as they gather, analyze, and communicate scientific information to meet the challenges within each chapter. Citation: [EDC Literacy TE, p. xxxiii– xxxix] [EDC Assessment TE, p. xxxix – xlii] [EDC Overview TE, p. xi – xv]	

A unit or longer lesson will also: *This is a 27 lesson unit that takes approximately 6-8 weeks of instruction.*

Criteria	Specific evidence from materials and reviewers' reasoning	Suggestions for improvement

☐ E. Includes pre-, formative, summative, and self-assessment measures that assess three-dimensional learning.	Learning goals are a particularly critical anchor point in extended learning experiences, such as those embodied in the chapters of EDC Earth Science. They bring a coherent purpose to the learning activities, and provide a framework against which progress can be measured. To be useful measures of learning and effective motivators of students' achievement, formative and summative assessments should always clearly relate to these learning goals. [EDC Assessment TE, p. xxxix – xlii] [EDC Unit 2 Ch. 4 Process/Assessment TE p.143-147] [EDC Unit 2 Ch. 5 Process/Assessment TE p.182-188] [EDC Unit 2 Ch. 6 Process/Assessment TE p.236-242] ExamView® for EDC Earth Science makes it easier for educators to use your content to assess, track, and analyze student performance. Comprised of the Test Generator, Test Manager, and Test Player, ExamView® is the industry standard for paper, Internet, and LAN-based question and test development.	
☐ F. Provides multiple opportunities for students to demonstrate performance of practices connected with their understanding of disciplinary core ideas and crosscutting concepts and receive feedback.	Each chapter of the student book begins by introducing students to the learning goals and why they are important, and asks students to reflect on what they already know about the ideas that will be covered. Opportunities for formative assessment are provided throughout each chapter. These formative assessments reveal the state of students' understanding, and represent a chance for you to give students feedback and encourage them to follow certain strategies to improve their work. For each of the chapters, you will find a rich source of materials for summative assessment that will allow you to evaluate students' mastery of scientific concepts and practices. At the end of each chapter, students synthesize what they have learned in Address the Challenge. Citation: [EDC Assessment TE, p. xxxix – xlii] [EDC Unit 2 Ch 4 Activity 1 SB p. 85-91] [EDC Unit 2 Ch 4 Activity 1 TE p. 121-127] [EDC Unit 2 Ch. 4 Process/Assessment TE p.143-147] [EDC Unit 2 Ch. 5 Process/Assessment TE p.182-188] [EDC Unit 2 Ch 6 Activity 4 SB p. 165-175] [EDC Unit 2 Ch. 6 Process/Assessment TE p.236-242]	

Overall Summary Comments: