Science Instructional Materials Review Rubric

Adapted from EQuIP Rubric for Science Grade K-12 — https://www.nextgenscience.org/sites/default/files/EQuIPRubricforSciencev3.pdf

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For a glossary of the navigational terms used in this rubric, please view the <u>Navigation</u> <u>Guidance section</u> at the end of this document.

I - Science Standards		
Criteria	Criteria Indicators (if applicable)	Comments
A. Presence of Three Dimensions of Science Builds understanding of the science and engineering practices (SEPs), disciplinary core ideas (DCIs), and crosscutting concepts (CCCs).	 i. Provides opportunities to develop and use specific elements of the SEP(s) ii. Provides opportunities to develop and use specific elements of the DCI(s) iii. Provides opportunities to develop and use specific elements of the CCC(s) 	As outlined in the submitted document titled "Amplify Science Correlation to the Utah SEEd Standards," Amplify Science addresses 100% of the Utah Science with Engineering Education Standards for K–12 Science, including all SEPs, DCIs, and CCCs. Additionally, Amplify Science has received all green ratings for EdReports Indicators 2D, 2E, and 2F which evaluate instructional materials' incorporation of all grade-level NGSS DCIs, SEPs, and CCCs. EdReports Indicators 2D–2F: Kindergarten 1st Grade

2nd Grade

- 3rd Grade
- 4th Grade
- 5th Grade
- Middle School

Amplify Science's real-world problems provide relevant, 21st-century contexts through which students will investigate different scientific phenomena and develop a deeper understanding of Disciplinary Core Ideas (DCIs), acquire more experience with Science and Engineering Practices (SEPs), and observe the interconnectedness of various science disciplines through the Cross-Cutting Concepts (CCCs).

The Amplify Science curriculum developers at UC Berkeley's Lawrence Hall of Science crafted each unit, chapter, and lesson with the following questions in mind: What do we want students to figure out (what DCI or part of a DCI)?; How do we want them to figure it out? (what scientific and engineering practice will they engage in to figure it out); and what crosscutting concept can scaffold students' understanding and connect it to other ideas about the natural world that they have learned? This resulted in a curriculum that incorporates a strategic, well balanced integration of the three dimensions.

In order to help teachers recognize the three dimensional structure of every unit, chapter, and lesson, each unit contains a "3-D Statement" document on the Unit Overview page. The "3-D Statement" clearly defines the 3-D integration of the unit, chapter, or lesson, and is made all the more effective by color-coding the three dimensions for easy recognition (blue = SEP, green = CCC, orange = DCI). This information is also made available to teachers at the individual lesson level, within the "Standards" section of the Lesson Brief.

Examples

Example 3-D statements can be found in **3-D Statements** section (under Teacher References) of the following Unit Overview pages:

- Kindergarten, Needs of Plants and Animals unit
- Grade 1, <u>Spinning Earth unit</u>
- Grade 2, <u>Properties of Materials unit</u>
- Grade 3, <u>Inheritance and Traits unit</u>
- Grade 4, *Energy Conversions* unit
- Grade 5, *The Earth System* unit
- Grade 6, <u>Thermal Energy unit</u>

B. Integration of Three Dimensions of Science

Materials integrate elements of the SEPs, CCC,s and DCIs for student sense-making: Three dimensions of science (SEPs, CCCs, and DCIs) are integrated (consistently utilized in conjunction with each other) to help students make sense of phenomenon and solve problems.

- Grade 7, Metabolism unit
- Grade 8, Light Waves unit

Additionally, Amplify Science has received **all green ratings** for EdReports Indicators 1A.i and 1A.ii, which state:

- 1A.i: "Materials consistently integrate the three dimensions in student learning opportunities."
- 1A.ii: "Materials consistently support meaningful student sensemaking with the three dimensions.

EdReports Indicators 1A.i and 1A.ii:

• Kindergarten: 1A.i; 1A.ii

• 1st Grade: <u>1A.i</u>; <u>1A.ii</u>

• 2nd Grade: <u>1A.i</u>; <u>1A.ii</u>

3rd Grade: <u>1A.i</u>; <u>1A.ii</u>4th Grade: <u>1A.i</u>; <u>1A.ii</u>

• 5th Grade: 1A.i; 1A.ii

Middle School: 1A.i; 1A.ii

C. Alignment to Standards

The DCI Concepts (science content) in the instructional materials align to the Utah Science with Engineering Education (SEEd) Standards

the Utah SEEd Standards," Amplify Science meets 100% of the Utah Science Standards for grades K–8.

Scientific Accuracy

Authored by the scientists and science education experts at University of California Berkeley's Lawrence Hall of Science (LHS), Amplify Science presents students with the most up-to-date scientific content, delivered in an intuitive and organized way. The materials for each unit (including a teacher-facing Science Background document aimed at supporting teachers in providing scientifically accurate information) has been reviewed and approved by LHS's incomparable network of world-class scientists.

As outlined in the submitted document titled "Amplify Science Correlation to

The material has also been reviewed by EdReports, which awarded Amplify Science green ratings for Indicator 2B, which states: "Materials present Disciplinary Core Ideas (DCIs), Science and Engineering Practices (SEPs), and Crosscutting Concepts (CCCs) in a way that is scientifically accurate."

EdReports Indicator 2B:

- <u>Kindergarten</u>
- 1st Grade

D. Scientific Accuracy

Uses scientifically accurate and grade-appropriate scientific information, phenomena, and representations to support students' three-dimensional learning.

- 2nd Grade
- 3rd Grade
- 4th Grade
- 5th Grade
- Middle School

Grade-Appropriate Information

During the development of every Amplify Science unit, the program authors at the Lawrence Hall of Science carefully attended to students' language, cognitive (as well as cognitive stamina), physical, and social development. They took what is known about typical development of children in each grade, analyzed the characteristics of typically developing children, examined best practices in primary grades, and then designed the units and lessons accordingly. In addition, content within Amplify Science has undergone extensive field tests in schools across the United States, with more than 400 teachers and 34,000 students participating.

Every unit of Amplify Science has students inhabiting the role of a scientist or engineer in order to investigate a real-world problem. These real-world problems provide relevant, developmentally appropriate contexts through which students will investigate different scientific phenomena. Contexts like playground weather conditions (Kindergarten), puppet shows (Grade 1), food science (Grade 5), and rocket launches (Grade 7) resonate with students, sparking their interest and making science applicable to their own world.

Examples

Example scientific background information can be found in the **Unit Overview** and **Science Background** sections (under Planning for the unit) of the following Unit Overview pages:

- Kindergarten, <u>Sunlight and Weather unit</u>
- Grade 1, <u>Light and Sound unit</u>
- Grade 2, <u>Changing Landforms unit</u>
- Grade 3, <u>Weather and Climate unit</u>
- Grade 4, <u>Vision and Light unit</u>
- Grade 5, Modeling Matter unit
- Grade 6, <u>Earth, Moon, and Sun unit</u>
- Grade 7, *<u>Plate Motion* unit</u>
- Grade 8, <u>Magnetic Fields unit</u>

II - Science	Pedagogy
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Criteria	Criteria Indicators (if applicable)	Comments
A. Focus on Phenomena (Science) or Problems (Engineering) Making sense of phenomena and/or designing solutions to a problem drive student learning.	i. Student questions and prior experiences related to the phenomenon or problem motivate sense-making and/or problem solving ii. The focus of the lesson is to support students in making sense of phenomena and/or designing solutions to problems iii. When engineering is a learning focus, it is integrated with developing disciplinary core ideas from physical, life, and/or earth and space sciences	In each Amplify Science unit, students are asked to inhabit the role of a scientist or engineer in order to figure out scientific phenomena through a 21st-century, real-world problem context. Over the course of the unit, students collect and make sense of evidence from multiple sources and through a variety of modalities, thus ensuring that they have a variety of vehicles through which to develop and articulate their understanding of each phenomenon. As the class progresses through lessons, students move back and forth from firsthand investigation and inquiry to secondhand analysis and synthesis, formulating an increasingly complex explanation to help them solve the problem at hand. Finally, towards the end of most K-5 units and all 6-8 units, students are presented with a brand-new problem context to explore. This gives them an opportunity to demonstrate a deep understanding of the unit's focal phenomena, as it requires taking what they've learned over the course of the unit and applying it to something new. In addition to figuring out and explaining phenomena, students also design solutions for a variety of real world problems. In grades K-5, each year has one unit that is focused on engineering design, and middle school features special units (called Engineering Internships) in which students apply science principles in order to design functional solutions, and iteratively test those solutions to determine how well they meet specific criteria. Students develop their understanding of science ideas from investigation and text, and apply them in designing a solution to an engineering problem. They then evaluate their solutions to see how well they meet a set of criteria for quality. Examples • Grade K, Pushes and Pulls unit, Unit Overview page: • Unit Overview • Printable Resources, Coherence Flowcharts • Grade 1, Animal and Plant Defenses unit, Lesson 1.1 • Grade 2, Properties of Materials unit, Lesson 1.2 • Grade 3, Balancing Forces unit, Lesson 1.1 • Grade 4, Energy Conversions Unit Overview page:

		 Printable Resources, Coherence Flowcharts Grade 5, The Earth System unit, Lesson 2.7 Grade 6, Weather Patterns unit, Lesson 1.2 Grade 7, Evolutionary History unit, Lesson 1.2 Grade 8, Earth's Changing Climate Engineering Internship unit, Unit Overview page: Unit Overview Printable Resources, Coherence Flowcharts
B. Scaffolds Identifies and builds on students' prior learning in all three dimensions.	i. Provides supports to help students engage in the practices and gradually adjusts supports over time so that students are increasingly responsible for making sense of phenomena and/or designing solutions to problems (<i>Required</i>) ii. Explicitly identifies prior student learning expected for all three dimensions. iii. Clearly explains how the prior learning will be built upon.	Supports to help students Amplify Science supports diverse learners by embedding scaffolding throughout the curriculum, including the use of the Gradual Release of Responsibility model. With the Gradual Release of Responsibility there is an emphasis on teacher modeling and direction at the beginning of the unit, but much of the scaffolds that existed earlier in the unit are thoughtfully and meaningfully removed as the unit progresses. This enables students to become more independent and confident in their own abilities over time. Examples • Grade K, Sunlight and Weather unit, Lesson 3.4, Differentiation • Grade 1, Spinning Earth unit, Lesson 2.4, Activity 2, including Teacher Support Notes linked to on activity divider slide • Grade 2, Plant and Animal Relationships unit, Lesson 2.5, Activities 2 and 3, including Teacher Support Notes linked to on activity divider slides • Grade 3, Balancing Forces unit, Lesson 2.1, Activities 2 and 3, including Teacher Support Notes linked to on activity divider slides • Grade 4, Energy Conversions unit, Lesson 3.3 • Differentiation • All activities, including Teacher Support Notes linked to on activity divider slides • Grade 5, Ecosystem Restoration unit, Lesson 1.7, Activity 1, including Teacher Support Notes linked to on activity divider slides • Grade 6, Weather Patterns unit, Lesson 1.6, Activities 2-4, including Teacher Support Notes linked to for Activity 2 • Grade 7, Metabolism unit, Lesson 2.2, Activities 2-4, including Teacher Support Notes for Activity 2

Prior learning

Each unit provides repeated opportunities to leverage and build upon students' prior knowledge as they explore guiding questions. In fact, each unit's Progress Build (i.e. learning progression, described below in metric II.C ("Teacher Supports") was designed to build off of likely prior knowledge, and frequent discourse routines give students the chance to discuss and compare their evolving questions and ideas with peers at various phases of each unit.

A Standards and Goals resource, which clearly outlines how that particular unit fits into the Amplify Science program as a whole, is also provided for every unit. This makes it easy for teachers to see how their students will have been prepared for the unit, and how they will continue to build on the understanding and experience developed in the unit after they complete it.

<u>Examples</u>

Example scientific background information can be found in the **Progress Build** section (under Planning for the Unit) and **Standards and Goals**section (under Teacher References) of the following Unit Overview pages:

- Kindergarten, Sunlight and Weather unit
- Grade 1, Spinning Earth unit
- Grade 2, Changing Landforms unit
- Grade 3, Inheritance and Traits unit
- Grade 4, <u>Vision and Light unit</u>
- Grade 5, <u>Modeling Matter unit</u>
- Grade 6, <u>Traits and Reproduction unit</u>
- Grade 7, Natural Selection unit
- Grade 8, Phase Change unit

C. Teacher SupportsSupports teachers in facilitating coherent student learning experiences over time.

- i. Provides strategies for linking student engagement across lessons (e.g., cultivating new student questions at the end of a lesson in a way that leads to future lessons)
- ii. Providing strategies for ensuring student sense-making and/or problem-solving is linked to learning in all three dimensions (e.g., Claim Evidence Reasoning-CER Framework for communicating sense-making, teacher probing questions)

Every unit of Amplify Science has a robust Teacher's Guide containing all of the unit's lesson plans, differentiation strategies, and a vast assortment of instructional supports and resources at the unit, lesson, and activity level. In addition to employing a unit-long, phenomena-based storyline to drive focused instruction, the Teacher's Guide includes a wealth of resources through which Amplify Science teachers can develop and extend their knowledge and effectively guide students through their scientific development, including:

• **Unit-level documentation**: Every unit contains a suite of documents that provides teachers support in facilitating coherent learning experiences. These documents include an overview of the unit's

iii. Provides additional resources for student learning (e.g., Models, simulations, and/or data sets for students investigation)

- guiding questions, lesson summaries, instructions on using the digital apps, an overview of the assessments in the unit, clear definitions of the learning progressions, and more.
- **Clear lesson instructions**: Every lesson has quick summaries, clear step-by-step instructions, slides, model language to use in class, answer keys with sample student responses, recommendations for classroom set up, rubrics for scoring written assessments, and a listing of standards covered.
- **Embedded teacher supports**: Each lesson comes with clear strategies to scaffold the lesson for different populations of students, including those needing additional challenge, those needing extra support, and English Learners. Additionally, individual activities often have "Teacher Support" notes, which provide classroom management tips, background information, supports for three-dimensional instruction, and more.
- <u>Program Hub:</u> This additional space offers programmatic information such as remote learning supports, pedagogical insights, and quick access to the robust <u>PD Library</u> featuring on-demand videos,
- **Help Desk**: Available live by phone, email, or online chat, the Help Desk can answer any technology questions, adjust student rosters as needed, and consult teachers on pedagogical and content queries.

Examples

- Grade K, *Pushes and Pulls* unit, <u>Lesson 3.2</u>, **Overview** and **all activities**
- Grade 1, Light and Sound unit, <u>Lesson 3.1</u>, **Activity 1**, including
 Teacher Support Notes linked to on activity divider slide
- Grade 2, Changing Landforms unit, <u>Lesson 2.1</u>, **Activity 1**
- Grade 3, Inheritance and Traits unit, <u>Lesson 2.2</u>, Activity 3, including
 Teacher Support Notes linked to on activity divider slide
- Grade 4, Energy Conversions unit, <u>Lesson 2.4</u>, Activities 1 and 4, including Teacher Support Notes linked to on activity divider slides
- Grade 5, The Earth System unit, Lesson 2.3, Activities 2 and 3, including Teacher Support Notes linked to on activity divider slides
- Grade 6, Earth, Moon, and Sun unit, <u>Lesson 2.5</u>, Activity 2, including Teacher Support Notes
- Grade 7, Force and Motion unit, <u>Lesson 2.1</u>, Activity 1
- Grade 8, Light Waves unit, Lesson 3.1, Activity 1

D. AssessmentsIncludes formative, summative, and guidance measures for interpreting student performances that assess

three-dimensional

science learning.

- i. Embeds formative assessment processes throughout conceptual development that surfaces student understanding to inform instruction
- ii. Embeds summative assessment processes following conceptual development that evaluate student learning and measure understanding
- iii. Includes aligned rubrics or scoring guidelines that provide guidance for interpreting student performance

The Amplify Science assessment system includes formal and informal opportunities for students to demonstrate understanding and for teachers to gather information throughout the unit — all while giving teachers flexibility in deciding what to score and what to simply review. Built largely around instructionally embedded performances, these opportunities encompass a range of modalities that, as a system, attend to research on effective assessment strategies and the NRC *Framework for K-12 Science Education*.

The variety of assessment options for Amplify Science include:

- **Pre-Unit Assessment** (formative): Written or oral responses (K–5) or a combination of auto-scored multiple-choice questions and rubric-scored written responses (6–8).
- **On-the-Fly Assessments** (formative): Designed to provide regular information to the teacher with minimal impact on instructional time, these embedded assessments leverage the formative opportunities in the learning experience students are already engaged in.
- End-of-Chapter Scientific Explanations (formative):
 Three-dimensional performance tasks to support students' understanding of ideas encountered in each chapter.
- Self-assessments (formative): One per chapter; brief opportunities for students to reflect on their own learning, ask questions, and reveal ongoing thoughts about unit content.
- **Critical Juncture Assessment** (formative): Occurring at the end of each chapter (K–5) or the midpoint of each unit (6–8), similar in format to the Pre-Unit and End-of-Unit assessments.
- **End-of-Unit Assessment** (summative): Written or oral responses (K–5) or a combination of auto-scored multiple-choice questions and rubric-scored written responses (6–8).
- **Investigation assessment** (summative): Opportunity to summatively assess an embedded performance in which students plan and conduct investigations.
- Portfolio assessment (summative): Through the portfolio assessment students have an opportunity to reflect on their goals and growth throughout the school year as they compile and reflect on work products from each unit.
- **Benchmark Assessments**¹: Delivered three to four times per year in Grades 3–8, benchmark assessments report on students' facility with

¹ To ensure the assessments measure progress towards Performance expectations and not the progress within the program itself, the NGSS Benchmark Assessments were developed by Amplify outside of development efforts involving the Lawrence Hall of Science and Amplify Science.

each of the grade-level appropriate DCIs, SEPs, CCCs, and performance expectations of the NGSS.

Clear guidance on interpreting student performance on these assessments is provided for teachers. For example, Assessment Guides/rubrics are included for all Pre-unit, End-of-Unit, and Investigation Assessments. Each Assessment Guide/rubric contains information on gauging the level of student performance on the respective assessment task, with suggestions for student feedback and questioning strategies to advance learning, revise performance, or elicit and clarify student thinking. The embedded formative assessments, meanwhile, include a two-part description of what evidence of understanding would look like for the task (Look for) and how instruction may be adjusted in response (Now what?).

A document called **Assessment System** (located within Teacher References on the Unit Overview page) includes a table that summarizes the range of assessment opportunities in that specific unit, noting the lesson in which each occurs, the form each takes, and the nature of guidance for reviewing and adjusting instruction in response to assessment information. Also helpful is the **3-D Assessment Objectives** document (in the Printable Resources area of the Unit Overview page), which contains a page for each of the unit's focal Performance Expectations and shows a clear breakdown of the lesson and activities in which each constituent dimension of those Performance Expectations is assessed.

Examples

- Grade K, Sunlight and Weather unit, <u>Unit Overview page</u>, 3-D
 Assessment Objectives (under Printable Resources) and Assessment System (under Teacher References)
- Grade 1, Animal and Plant Defenses unit, <u>Lesson 1.5</u>, Chapter 1:
 Clipboard Assessment Tool (under Digital Resources) and Activity
- Grade 2, Changing Landforms unit, <u>Lesson 1.1</u>, Assessment Guide: Interpreting Students' Pre-Unit Explanations About the Arch (under Digital Resources) and Activity 2
- Grade 3, *Balancing Forces* unit, <u>Lesson 2.3</u>, Activity 4 (slide 25)
- Grade 4, Patterns of Earth and Sky unit, <u>Lesson 4.3</u>, Activity 3,
 Overview, Digital Resources, and <u>Lesson Slides</u>
- Grade 5, Ecosystem Restoration unit, <u>Unit Overview page</u>, Unit

	Overview page, 3-D Assessment Objectives (under Printable Resources) and Assessment System (under Teacher References) • Grade 6, Matter and Energy in Ecosystems unit, Unit Overview page, 3-D Assessment Objectives (under Printable Resources) and Assessment System (under Teacher References) • Grade 7, Force and Motion unit, Lesson 2.1, Rubrics for Assessing Students' Investigations of Forces on Different Objects" (under Digital Resources) and Activity 2 • Grade 8, Chemical Reactions unit, Lesson 4.4, Overview and Chemical Reactions End-of-Unit Assessment Answer Key and Scoring Guide (under Digital Resources)
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III - Student Accessibility

Criteria	Criteria Indicators (if applicable)	Comments	
A. Relevant and Authentic Engages students in authentic and meaningful scenarios that reflect the practice of science and engineering as experienced in the real world.	i. Students experience phenomena or design problems as directly as possible (firsthand or through media representations) ii. Includes suggestions for how to connect instruction to the students' home, neighborhood, community and/or culture as appropriate iii. Provides opportunities for students to connect their explanation of a phenomenon and/or their design solution to a problem to questions from their own experience.	As described in metric II.A ("Focus on Phenomena (Science) or Problems (Engineering)"), students are asked to inhabit the role of a scientist or engineer in order to investigate a relevant, real-world problem Additionally, Amplify Science has received all green ratings for EdReports Indicator 1E, which states, "Phenomena and/or problems are presented to students as directly as possible." EdReports Indicator 1E • Kindergarten • 1st Grade • 2nd Grade • 3rd Grade • 3rd Grade • 4th Grade • 5th Grade • Middle School The lessons within Amplify Science include numerous opportunities to elicit and build upon students' personal experiences and family and community funds of knowledge. Each unit includes a document that provides additional strategies and tools to augment these opportunities. This document is titled Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds and is located within Printable Resources on the Unit Overview page, as well as in the Digital Resources area of many lessons.	

Every unit also includes optional "Home Investigation" (K–5)/"Family Homework Experience" (6–8) copymasters. These activities can encourage interaction and discussion between students and their families around science concepts and provide teachers with opportunities to elicit student ideas and connections that arise as well as to invite students to reflect upon how their home experiences contribute to their evolving understanding of unit phenomena.

The *Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds* **document** can be found in the Printable Resources section of every Unit Overview page. For example:

- Kindergarten, Pushes and Pulls unit
- Grade 1, Animal and Plant Defenses unit
- Grade 2, <u>Properties of Materials unit</u>
- Grade 3, <u>Environments and Survival unit</u>
- Grade 4, <u>Vision and Light unit</u>
- Grade 5, Modeling Matter unit
- Grade 6, Ocean, Atmosphere, and Climate unit
- Grade 7, <u>Plate Motion unit</u>
- Grade 8, <u>Magnetic Fields unit</u>

Examples

- Kindergarten, Sunlight and Weather unit, <u>Lesson 1.2</u>, Digital Resources,
 Optional: Chapter 1 Home Investigation: Observing Weather copymaster (under Digital Resources)
- Grade 1, Light and Sound unit, Lesson 1.1, Activity 2, including
 Teacher Support Notes linked to on activity divider slide
- Grade 2, Properties of Materials unit, <u>Lesson 1.2</u>, **Overview** and **Activities 3-5**
- Grade 3, Balancing Forces unit, <u>Lesson 1.1</u>, Digital Resources,
 Balancing Forces Family Connections Homework (under Digital Resources)
- Grade 4, Energy Conversions unit, <u>Lesson 1.4</u>, Activity 4, including
 Teacher Support Notes linked to on activity divider slide
- Grade 5, Earth's Features unit, <u>Lesson 1.1</u>, Activity 1
- Grade 6, Traits and Reproduction unit, <u>Lesson 1.2</u>, Activity 5
- Grade 7, Force and Motion Engineering Internship unit, <u>Day 10</u>,
 Activity T, "Applying Engineering Skills"
- Grade 8, Phase Change unit, <u>Lesson 1.2</u>, Activity 5

B. Teacher Supports for Diverse Learners Provides guidance for teachers to support differentiated instruction.

- i. Includes appropriate reading, writing, listening, and/or speaking alternatives (e.g., translations, picture support, graphic organizers, etc.) for students who are English language learners, have special needs, or read well below grade level.
- ii. Provides extra support (e.g., phenomena, representations, tasks) for students who are struggling to meet the targeted expectations
- ii. Provides extensions for students with high interest or who have already met the performance expectations to develop a deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts

Amplify Science units provide many varied learning opportunities as well as timely supports to ensure that diverse learners can be successful with the language and content demands of science, ultimately becoming more independent learners and thinkers.

First, Amplify Science is rooted in the research-based, multimodal approach of Do, Talk, Read, Write, Visualize. This approach provides diverse learners multiple entry points to rich science content. The Do, Talk, Read, Write approach has been extensively assessed by outside evaluators from the National Center for Research on Evaluation, Standards, and Student Testing (CRESST) at the University of California, Los Angeles (UCLA), 2005; by Mark Girod at Western Oregon University, 2005; and by David Hanauer at Indiana University of Pennsylvania, 2005. These gold standard studies showed that students who received instruction based on this multimodal learning approach instruction saw the following benefits:

- English Language Learners (ELLs) significantly outperformed other ELLs in reading comprehension, science vocabulary, and science content knowledge.
- Students significantly outperformed other students receiving their usual science instruction in Science Vocabulary, and Science Content Knowledge.

Beyond the Do, Talk, Read, Write, Visualize approach, which serves to provide repeated opportunities for students to access content, every lesson of Amplify Science includes a Differentiation section in the Lesson Overview page. The Differentiation Brief describes what is built into the lesson to support diverse learning needs; highlights potential challenges teachers should be aware of; and provides specific strategies for differentiating instruction. The Differentiation Brief contains the following sections:

- **Embedded Supports for Diverse Learners:** Every unit is designed with diverse learners in mind, with the goal of providing rigorous yet accessible science instruction. Each lesson is intentionally planned to provide multiple entry points for students, and to enable all students to be successful with all of the activities. This section of the Differentiation Brief highlights the scaffolds already embedded within the lesson so that teachers can take advantage of the power of these carefully designed activities.
- **Potential Challenges in This Lesson:** This section of the Differentiation Brief highlights aspects of the lesson that may present particular cognitive, linguistic, or social challenges for students.

- Specific differentiation strategies for English Learners (ELs): This
 section of the Differentiation Brief points out activities that could pose
 linguistic challenges for ELs or reduce their access to science content,
 and suggests supports and modifications accordingly. Suggestions
 include linguistic supports to bolster students' understanding of
 science content, supports for engaging with science texts, ideas for
 helping students participate in discussions, multiple ways students can
 express their ideas in writing, and more.
- Specific differentiation strategies for students who need more support: Every lesson includes ways for teachers to support those students who are struggling or who have special needs. These additional scaffolds are to be used entirely at the discretion of the teacher, and provide targeted suggestions tailored for the activities in that particular lesson.
- Specific differentiation strategies for students who need more challenge: Every lesson has ways for a teacher to expand upon the lesson, or go beyond the scope of what is expected in that lesson. This section of the Differentiation Brief provides suggestions that allow students to engage with content more deeply, explore the material with a new purpose, pursue more independent research on a topic, and more.

In addition to these lesson-specific differentiation strategies, language support is included throughout the program in two fundamental ways:

- 1. **Embedded instructional design**: Many scaffolds such as <u>gradual release</u>, <u>graphic organizers</u>, <u>argumentation instruction</u>, <u>language practice</u>, and <u>creating and using models</u>, are embedded within the instructional plan and are presented to teachers through the teacher materials and to all students as activities within the unit.
- Additional support: Additional activities and specific methods for supporting English learners are provided for use as needed, especially in the Teacher Support notes within the lessons. Additional supports include but are not limited to word banks, use of multiple-meaning words, leveraging students' native languages, and cognates.

Program-level examples:

• The <u>English Learners</u> section of the Amplify Science Program Guide (within Access and Equity) describes both the embedded and additional instructional supports identified above in detail.

Examples

- Grade K, *Needs of Plants and Animals* unit, <u>Lesson 1.6</u>, **Differentiation**
- Grade 1, Spinning Earth unit, <u>Lesson 2.4</u>, Activity 3, including Teacher
 Support Notes linked to on activity divider slide
- Grade 2, Changing Landforms unit, Lesson 1.4, **Differentiation**
- Grade 3, *Inheritance and Traits* unit, <u>Lesson 1.6</u>, **Activity 2**, including **Teacher Support Notes** linked to on activity divider slide
- Grade 4, Waves, Energy, and Information unit, <u>Lesson 1.3</u>, Activities 1 and 2, including Teacher Support Notes linked on Activity 1 divider slide
- Grade 5, Ecosystem Restoration unit, <u>Lesson 1.7</u>, Activity 1, including
 Teacher Support Notes linked on activity divider slide)
- Grade 6, Weather Patterns unit, Lesson 1.6, **Differentiation**
- Grade 7, *Metabolism* unit, <u>Lesson 2.2</u>, **Activities 2 and 4**, including **Teacher Support**
- Grade 8, Harnessing Human Energy unit, <u>Lesson 1.4</u>, Activities 2-4 (including Teacher Support)

Following the principles of Universal Design for Learning (UDL), Amplify Science units and lessons are designed to be universal and flexible in allowing: choices; different paths toward goals; and multiple means of engagement, representation, assessment, and action and expression, so that all students have an opportunity to learn during lessons, and to be successful with lesson and unit goals.

In addition to embedded scaffolds such as graphic organizers, gradual release, and explicit argumentation instruction, Amplify Science provides in-context differentiation suggestions in every lesson, as described in metric III.B. ("Teacher Supports for Diverse Learners"), above.

Finally, Amplify Science includes numerous technical accessibility supports. For example, the curriculum website supports screen readability, keyboard navigation, jump to main content capability, audio read-aloud of science articles (in both English and Spanish), and audio read-aloud of assessments. Accessibility considerations continue to be methodically integrated into our product development lifecycle, as we are committed to building products that address the needs of all learners, including those with disabilities.

Examples

• Grade K, Sunlight and Weather unit, <u>Lesson 3.1</u>, **Activity 2**

C. Accessible for all students

Engages students using methods, vocabulary, representations, and examples that are accessible and unbiased for all learners (e.g., Deaf and Blind, English Learners, Gifted and Talented, Special Education)

- Grade 1, *Animal and Plant Defenses* unit, <u>Lesson 1.5</u>, **Differentiation** and **Lesson Slides**
- Grade 2, Properties of Materials unit, Lesson 2.2, **Differentiation**
- Grade 3, Weather and Climate unit, Lesson 1.4, Activity 2
- Grade 4, Energy Conversions unit, <u>Lesson 2.2</u>, all activities
- Grade 5, Modeling Matter unit, Lesson 1.8, Differentiation and Evaluating Chromatography Models in More Depth (More Challenge) copymaster (under Digital Resources)
- Grade 6, Geology on Mars unit, <u>Lesson 3.1</u>, **Differentiation** and **all** activities
- Grade 7, Natural Selection unit, <u>Lesson 2.4</u>, **Differentiation**
- Grade 8, Earth's Changing Climate unit, Lesson 2.2, Activity 2, including Teacher Support

Compliance

Amplify's products are designed to comply with the American with Disabilities Act (ADA). We are committed to building products that address the needs of all learners, including those with disabilities. We do so by methodically integrating accessibility considerations into our product development lifecycle and implementing training and vendor management programs that support compliance with applicable legal standards, guidelines and best practices relating to accessibility.

Amplify works with external experts in digital accessibility to ensure that we build our products according to the WCAG 2.1 AA guidelines. This includes engaging accessibility experts to conduct assessments and committing to a remediation plan for identified deficiencies. Our teams also participate in WCAG 2.1 training programs to support the integration of accessibility concerns into the decision-making process of our product design and development teams.

Material Design

In order to highlight real-world contexts and encourage students to investigate, talk, read, write, think, and argue like real scientists and engineers, students of Amplify Science engage with hands-on materials; age-appropriate scientific texts; vibrant digital simulations; stimulating media; physical and digital models, and more.

Text, visuals, photographs, and other features of the Amplify Science curriculum usually reflect the current time period, helping to make the content relevant and interesting for students.

D. Physical Characteristics

The design of the material is ADA-compliant and can be utilized by all students. In physical terms, this material is durable, interactive, and provides high-quality audio-visual and tactile experiences for all users. The material contains modern, up-to-date and relatable visuals, including diverse groups of people.

Example:

- Grade K, Sunlight and Weather unit, Lesson 4.3, Activity 3
- Grade 1, Spinning Earth unit, Lesson 1.2, Activities 1 and 4
- Grade 2, Properties of Materials unit, Lesson 1.7, Activity 3
- Grade 3, Environments and Survival unit, Lesson 3.2, Activities 1 and 2
- Grade 4, Vision and Light unit, Lesson 4.3, Activities 1 and 2
- Grade 5, Ecosystem Restoration unit, Lesson 1.1, all activities
- Grade 6, *Traits and Reproduction* unit, <u>Lesson 1.2</u>, **all activities**
- Grade 7, Metabolism unit, Lesson 2.4, Activity 2
- Grade 8, Magnetic Fields unit, Lesson 1.2, Activity 2

Physical Characteristics

Amplify is proud to provide high-quality materials. Included in the kits are physical materials used for the hands-on activities that are carried out at strategic points throughout the unit. There are two types of hands-on manipulatives: non-consumables and consumables Non-consumables are durable and, if cared for properly, can be used over the course of several years (e.g. student books (K–5), magnets, stopwatches, graduated cylinders). All kits contain sufficient materials for two uses with a class size of 36 students in grades K–5 or five uses with a class size of 40 students in grades 6–8.

Technical Requirements

Amplify is a supporter and leader in ed-tech interoperability, as an 1EdTech (formally IMS Global) Contributing Member and signatory to the Project Unicorn interoperability pledge. Amplify products support standards including OAuth 2, SAML v2.0, IMS Learning Tools Interoperability (LTI) v1.1, IMS Global Common Cartridge v1.3, IMS OneRoster v1.1, the IMS CASE Network, and the Experience API (xAPI). Amplify certifications can be viewed at: https://site.imsglobal.org/certifications?query=amplify

Amplify has earned the Project Unicorn Interoperability Certification, at the level 4 score, indicating that the product provides optimal interoperability to its users.

As described above, Amplify works with external experts in digital accessibility to ensure that we build our products according to the WCAG 2.2 AA guidelines and best practices.

E. Technical Standards

The material goes above and beyond meating all the technical standards (ISTE Standards and VPAT Compliance), ensures student data privacy is safeguarded, and can be easily installed or accessed without technical assistance. Licensing information is clearly stated in the description.

Amplify products are delivered as web-based SaaS (Software as a Service). For more information, please review our customer requirements page located at https://amplify.com/customer-requirements

Supported platforms are:

iPad® 6+

Description: 1024 x 788 or higher, 32GB or higher

Operating system: iOS 15+

Browser: Safari 15+

PC

Description: 1.4 GHz dual core or greater, 1024 x 768 or higher, 4GB of RAM or

higher

Operating system: Windows: 10+ Browser: Chrome (latest 2 versions)

Chromebook

Description: 1.4 GHz dual core or greater, 1024 x 768 or higher, 4GB of RAM or

higher

Operating system: Chrome OS Browser: Chrome (latest 2 versions)

Mac®

Description: 1.4 GHz dual core or greater, 1024 x 768 or higher, 4GB of RAM or

higher

Operating system: OS 12.6+

Browser: Safari 13+, Chrome (latest 2 versions)

Data privacy

Amplify's products are built to comply with applicable Federal and State student data privacy laws, including supporting the district's compliance with FERPA and other applicable laws related to the collection, sharing and protection of student data. Amplify's Customer Privacy Policy, available at amplify.com/customer-privacy, describes the types of information collected and maintained on behalf of our school district customers and limitations on use and sharing of that data. Amplify was an early adopter and proud signatory of the Student Privacy Pledge, an industry-wide pledge to safeguard privacy and security of student data.

Access

Amplify's digital products are delivered as web-based SaaS (Software as a Service), so local client or workstation software installations are not required. Only a web browser is required.

Amplify will assign a dedicated implementation manager to create and support an overall Implementation Plan based on the district's timelines, goals and technical readiness. The implementation manager will provide a seamless and coordinated experience serving as the main contact person with the district. The implementation manager will be responsible for all activities, ensuring we meet our commitments to achieve the highest levels of client satisfaction.

IV - Culture of Learning and Belonging

Criteria Indicators (if applicable

Material is Free from Bias

Amplify Science has been carefully and thoughtfully designed to ensure that students encounter fair and accurate representations of scientists, engineers, and other people. The curriculum's content also empowers students to think critically and argue effectively, important skills in confronting bias in and outside of the science classroom. In addition, the program's engaging projects, interactive activities, collaborative learning experiences, and frequent student-to-student discussions provide opportunities for all voices to be included, valued, and respected in the science classroom.

A. Bias-Free

The material is free from bias and is in compliance with all relevant federal and state laws, rules, and regulations, as listed in the Adequate section for this item.

Furthermore, the material "focuses on shared identity and includes the unique characteristics & cultural differences of students in Utah." (53E-4-204.1)

The material supports civic and character education. (53G-10-204)

Examples

Comments

- Kindergarten, Sunlight and Weather unit, <u>Tornado! Predicting Severe</u>
 <u>Weather student book</u>
- Grade 1, Spinning Earth unit, Nighttime Investigation student book
- Grade 2, Properties of Materials unit, Jelly Bean Engineer student book
- Grade 3, Weather and Climate unit, World Weather Handbook student book
- Grade 4, *Energy Conversions* unit, <u>Lesson 3.6</u>, **Activities 3 and 4**, including **Teacher Support Notes** linked to on activity divider slides
- Grade 5, Ecosystem Restoration unit, Lesson 1.2, Activity 1
- Grade 6, Traits and Reproduction unit, <u>Lesson 1.2</u>, Activity 1
- Grade 7, Natural Selection unit, <u>Lesson 3.2</u>, Activity 5, screen 2, including Teacher Support
- Grade 8, Earth's Changing Climate unit, Lesson 1.2, Activity T,

"Introduction to Climatologist Role"

Material focuses on shared identity and includes the unique characteristics & cultural differences of students in Utah.

As described in metric III.A. ("Focus on Phenomena (Science) or Problems (Engineering)"), Amplify Science embeds opportunities to elicit and build upon students' personal experiences and family and community funds of knowledge throughout every unit. The activities that students engage with through these experiences supports them in focusing on their unique characteristics and the cultural similarities and differences present in their classroom.

The *Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds document* can be found in the Printable Resources section of every Unit Overview page. For example:

- Kindergarten, <u>Pushes and Pulls unit</u>
- Grade 1, Animal and Plant Defenses unit
- Grade 2, <u>Properties of Materials unit</u>
- Grade 3, Environments and Survival unit
- Grade 4, Vision and Light unit
- Grade 5, Modeling Matter unit
- Grade 6, Ocean, Atmosphere, and Climate unit
- Grade 7, Plate Motion unit
- Grade 8, <u>Magnetic Fields unit</u>

The material supports civic and character education.

In Amplify Science, students take on roles as scientists and engineers as they explore real-world contexts to figure out phenomena and solve problems. By supporting students' scientific habits of mind in these contexts, Amplify Science develops young citizens who are curious, skeptical, evidence-based thinkers capable of making decisions that improve their own lives and the lives of those in their communities.

Examples

- Kindergarten, *Plants and Animals* unit, <u>Unit Overview</u>
- Grade 1, Animal and Plant Defenses unit, Unit Overview
- Grade 2, Changing Landforms unit, <u>Unit Overview</u>
- Grade 3, Weather and Climate unit, <u>Unit Overview</u>
- Grade 4, Energy Conversions unit, <u>Unit Overview</u>
- Grade 5, Ecosystem Restoration unit, Unit Overview
- Grade 6, Populations and Resources unit, <u>Unit Overview</u>

- Grade 7, Microbiome unit, Unit Overview
- Grade 8, Earth's Changing Climate Engineering Internship, Unit Overview

Throughout the Amplify Science program, students encounter ethnically diverse people in Amplify Science's books, media, and other learning materials, and are inspired by scientists and engineers from a variety of ethnic and cultural backgrounds who represent diversity with respect to gender and disability. The variety of cultural perspectives and experiences presented gives students multiple frames of reference for developing their understanding of the science ideas with which they are engaging.

B. Cultural Awareness

The material promotes respect for distinct socio-cultural identities by representing various cultural and social aspects of society. The material provides many opportunities to recognize and incorporate the diverse ethnic histories, cultures, contributions, and perspectives of people from Utah, the United States, and the world. The material accurately reflects the culture(s), languages, traditions, beliefs, values, and customs of people from diverse backgrounds, including various forms of cultural philosophy and epistemology.

Examples:

- Grade K, Sunlight and Weather unit, Lesson 2.2, Activity 2, including
 Teacher Support Notes linked to on activity divider slide
- Grade 1, Spinning Earth unit, Lesson 3.4, Activity 2
- Grade 2, *Plant and Animal Relationships* unit, <u>Lesson 2.3</u>, **Differentiation**
- Grade 3, Environments and Survival unit, Lesson 4.3, Activity 2
- Grade 4, Energy Conversions unit, <u>Energy Past and Present student</u> book
- Grade 5, Earth's Features unit, Lesson 1.2, Differentiation
- Grade 6, Weather Patterns unit, Lesson 1.4, Activity 2 and "Printable article: "What Are Clouds?" (under Digital Resources)
- Grade 7, Natural Selection unit, Lesson 1.2, Differentiation
- Grade 8, Magnetic Fields unit, <u>Lesson 1.2</u>, Activities 2 and 6, and "Printable article: Meet a Scientist Who Studied Magnets" (under Digital Resources)

C. Inclusive Components

The material uses a range of texts, examples, scenarios, applications, and imagery to promote diverse representation, inclusion, and belonging. The material provides cultural backgrounds, contemporary real-life experiences, and contexts that are relevant to local students. It includes diverse characters representing people of color, people with disabilities, various body types, complexions, ages, personalities, and societal roles.

As described above, Amplify Science students are inspired by scientists and engineers from a variety of multicultural backgrounds. By showing that science and engineering are undertaken by humans—some of whom look like and have lived experiences like those of the students themselves—students are better able to see themselves choosing a path to become professional scientists and engineers in the future. Wherever fictional characters have been represented, care has also been taken to ensure that these characters are represented in a culturally and socially authentic way. Additional guidance is provided to teachers for making learning relevant to their students through activities described in metric III.A ("Relevant and Authentic").

Examples:

- Kindergarten, Sunlight and Weather unit, <u>Handbook of Models</u> student book
- Grade 1, Animal and Plant Defenses unit, Frog Models student book
- Grade 2, *Properties of Materials* unit, <u>Jelly Bean Engineer</u> student book
- Grade 3, Environments and Survival unit, Environment News, student book
- Grade 4, Waves, Energy, and Information unit, <u>The Scientist Who</u>
 Cracked the Dolphin Code student book
- Grade 5, Ecosystem Restoration unit, Walk in the Woods student book
- Grade 6, Thermal Energy unit, Lesson 1.2, Activities 1, 2, and 4
- Grade 7, Plate Motion unit, <u>Lesson 1.2</u>, Activity T, "Why Geologists Value Fossils"
- Grade 8, Earth's Changing Climate Engineering Internship, Day 2,
 Printable Resources, Meet an Engineering Who Designs City Streets

D. Shared Values and Character Traits

The material focuses on the shared values of diverse people and communities, including the common elements that unite Utahns and the world. -Diverse histories, family units, geographies, cultures, socioeconomic environments, livelihoods, etc.

Additionally, figures in the material may be described by their behaviors, beliefs, and values regardless of education, income, or occupational descriptors.

The material fosters the development of character traits in students, such as courage, leadership, intelligence, integrity, honesty, respect, morality, civility, duty, honor, and service, along with principles contained in the Constitution (53G-10-204, Utah's Portrait of a Graduate)

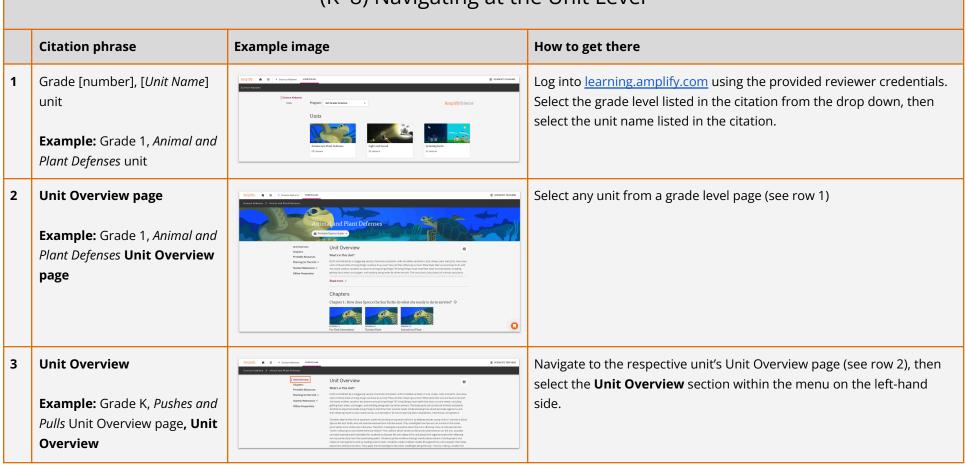
As described in metrics III.A ("Relevant and Authentic") and IV.A. ("Bias-Free"), throughout Amplify Science, students engage with diverse people and communities that are presented in a bias-free way through books, videos, and images. They also have the opportunity to build a shared classroom community through opportunities to elicit and build upon their and their peers' personal experiences. Additionally, students develop as citizens who are curious, skeptical, and capable of making decisions that improve their own lives and communities.

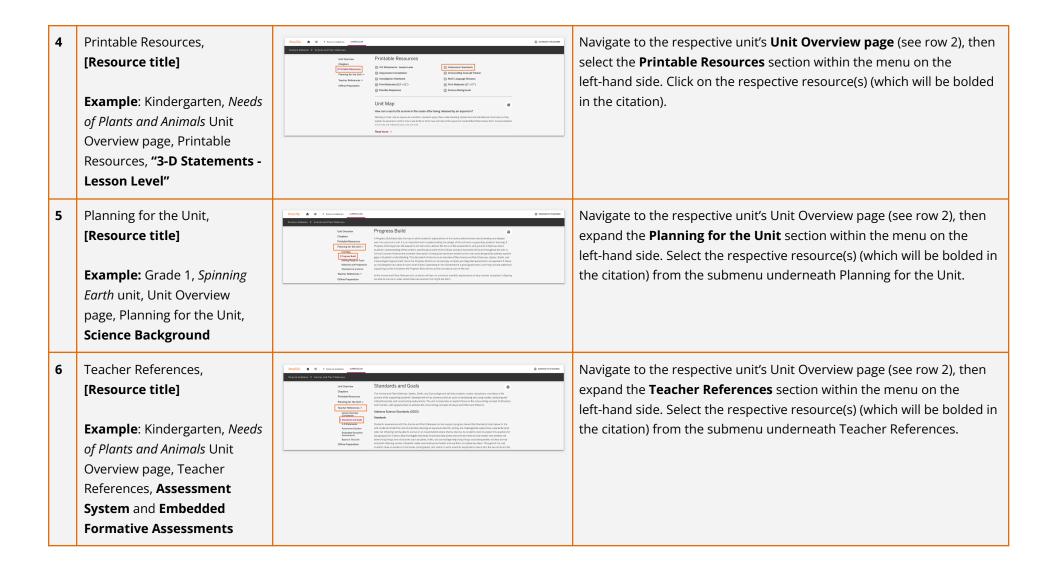
Navigation Guidance

The following table outlines the meaning and provides examples of the common terms that are used in this HQIM.

- (K-8) Navigating at the Unit Level
- (K-5) Navigating at the Lesson and Activity Level
- (6–8) Navigating at the Lesson and Activity Level
- (K-8) Navigating the Program & Apps Menu

(K-8) Navigating at the Unit Level





(K–5) Navigating at the Lesson and Activity Level

Citation phrase Example image How to get there
--

7 Lesson [number]

Example: Grade 1, *Animal and Plant Defenses* unit, **Lesson 1.3**



Navigate to the respective unit's Unit Overview page (see row 2), then select the **Chapters** section from the left-hand menu. Scroll within the Chapters section to find the lesson listed in the citation, then select it to open the lesson.

8 Overview

Vocabulary

Lesson at a Glance
Materials & Preparation
Differentiation
Standards
and/or

Example: Grade K, *Pushes and*

Pulls unit, Lesson 2.3, **Differentiation**

Angular

Convert

Course

Co

Navigate to the **lesson** (see row 7), then select the specified section of lesson information from the **left-hand menu**.

Note: if the lesson is listed by itself, all of the lesson information should be reviewed, as well as the lesson slides (see row 10).

9 Digital Resources, "Resource title"

Example: Grade 3, Balancing Forces unit, Lesson 1.1, Digital Resources, "Balancing Forces Family Connections
Homework"



Navigate to the **lesson** (see row 7), then select the specified resource from the **Digital Resources** area on the right-hand side.

10 Activity [number]

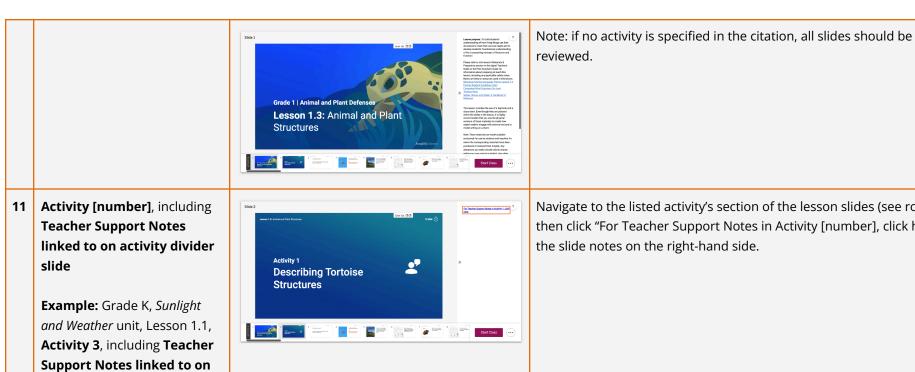
Or

All Activities

Example: Grade K, *Pushes and Pulls* unit, Lesson 1.2, **all activities**



Navigate to the **lesson** (see row 7), then select the **"Teach" button** on the right side of the screen. In the Teacher Guide tab that opens, navigate to the specified activity using the slide tray along the bottom and use the right arrow on your keyboard to navigate through subsequent slides. The first slide of each activity has a gradient background, rather than white, for ease of location.



Navigate to the listed activity's section of the lesson slides (see row 10), then click "For Teacher Support Notes in Activity [number], click here" in

Activity [number], slide [number], [assessment name] instructional note

activity divider slide

Example: Grade 1, Animal and Plant Defenses unit, Lesson 4.2, Activity 2, slide 20,

On-the-Fly Assessment 14 instructional note

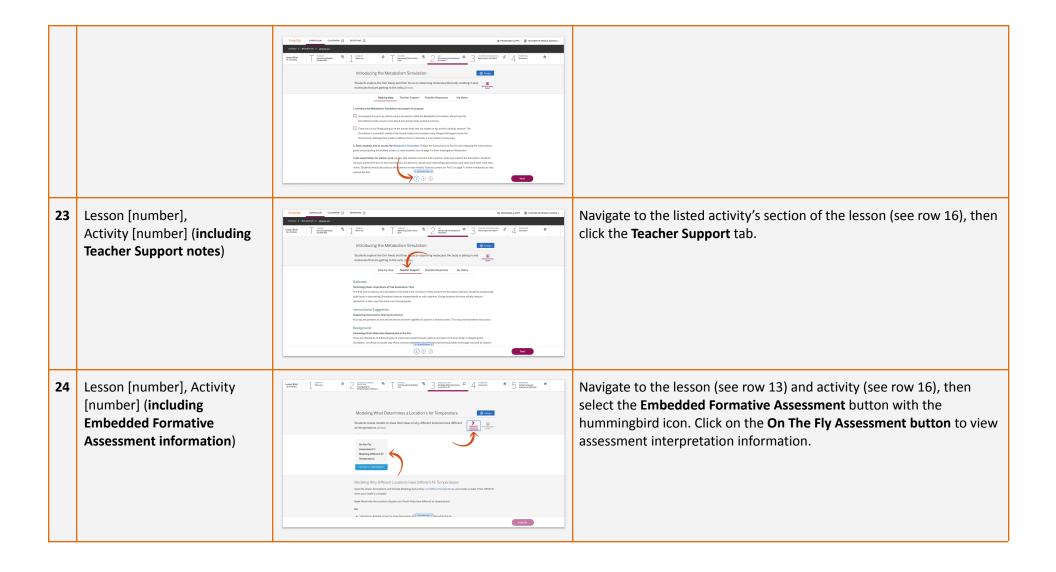


Navigate to the listed activity's section of the lesson slides (see row 10), use the slide tray along the bottom to navigate to the referenced slide, then view the instructional notes referenced.

(6–8) Navigating at the Lesson and Activity Level

Citation phrase Example image How to get there

13	Lesson [number]	August General Control of Control	Navigate to the respective unit's Unit Overview page (see row 2), then scroll to our select Chapters from the left-hand menu. Scroll within the Chapters section to find the lesson listed in the citation, then select it to open the lesson.
14	Lesson [number], Overview Materials & Preparation Differentiation Standards	Angelly sensor continued (Navigate to the lesson (see row 13), then select the specified section of lesson information from the left-hand menu . Note: if the lesson is listed by itself, all of the lesson information should be reviewed, including all activities (see row 16).
15	Resource title (under Digital Resources)	Lesson 1, 2; Welcome to Medical School Thomas Toward Common Com	Navigate to the lesson (see row 13), then select the specified resource from the Digital Resources area on the right-hand side.
16	Lesson [number], Activity [number]	Angelly command Comman	Navigate to the lesson (see row 13), then select the activity in the Activity Ribbon under the lesson image. Scroll past the Instructional Guide to see what students will experience on the student platform. When an activity has multiple steps, click through each of them using the numbered buttons at the bottom of the page. Note: if no activity is specified in the citation, all activities should be reviewed.



(K-8) Navigating the Program & Apps menu

