Issues and Science, Published by Lab-Aids
Grade 7

- Land, Water, and Human Interactions
- Body Systems
- From Cells to Organisms
- Ecology
- Energy
- Weather and Climate

Reference: https://www.edreports.org/reports/detail/sepuplab-aids-issues-and-science-2019/sixth-to-eighth

SECTION I: NON-NEGOTIABLE CRITERIA OF SUPERIOR QUALITY
Materials must meet Non-negotiable Criteria 1 and 2 for the review to continue to Non-negotiable Criteria 3 and 4. Materials must meet all of the Non-negotiable Criteria 1-4 in order for the review to continue to Section II.

Non-negotiable	**Required**
1.THREE-DIMENSIONAL LEARNING: Students have multiple opportunities throughout each unit to develop an understanding and demonstrate application of the three dimensions.	**1a)** Materials are designed so that students develop scientific content knowledge and scientific skills through **interacting with the three dimensions** of the science standards. The majority of the materials teach the science and engineering practices (SEP), crosscutting concepts (CCC), and disciplinary core ideas (DCI) in an integrated manner to support deeper learning.

Justification with examples:

Issues and Science is based on an instructional model that integrates three-dimensional learning with a thematic approach to applying science and engineering in the context of issues—compelling personal, local, societal, and global topics or problems for students to debate, discuss, or explore to develop a decision or solution. These capture students' interest, focus their investigation into scientific concepts and processes, and enhance students' understanding. Students are then able to apply scientific principles and evidence to make informed decisions. The relevance of science and engineering practices and concepts becomes obvious, eliminating the question, "Why are we learning this?"

Issues and Science is designed to integrate the Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs) into student learning opportunities. Additionally, the Phenomena, Driving Questions, and Storyline section of the Teacher Edition outlines which activities in each unit are bundled together into a learning sequence centered around a driving question.

Across the series, each learning sequence consists of one or more learning opportunities (activities). Each learning sequence includes three dimensions and integrates SEPs, CCCs, and

DCIs in at least one activity within the learning sequence. The materials are designed for SEPs and CCCs to support sensemaking with the other dimensions in nearly all learning sequences. The Teacher Edition provides support to help teachers introduce the CCCs to the students and provide opportunities for students to use the CCCs to make sense of the DCIs. Occasionally, a CCC is found only in an assessment question at the end of an activity or is not explicitly addressed in the student resource but is present through teacher facilitation. However, within the bundled activities within a learning sequence, students use one or more CCC to make sense of the concept or phenomenon.

Each unit provides three-dimensional learning objectives in the form of performance expectations (PEs). The number of targeted objectives (PEs) varies by unit. Each unit is organized into Activities (lessons); near the end of each activity is an Analysis section that serves as an assessment for the Activity. The PEs for the unit are assessed through specific questions within the Analysis sections and are embedded throughout the unit. The Analysis questions, identified as summative PE assessments, are color coded with three dots (orange, blue, and green). The Teacher Edition also provides a sample response. Not every analysis question assesses all three dimensions; some questions assess only one or two dimensions but across the unit, all three dimensions are assessed. The Teacher Edition for each unit contains an Assessment Blueprint indicating the activity and Analysis question that assesses each targeted PE.

- All units include overview documents that show how the 3 dimensions are used throughout the activities. To see a summary of the NGSS correlations for the 6th grade units, please visit the links below. They can also be found in the *Teacher's Edition* and *Teacher Resources* along with more in-depth NGSS correlations for each unit that also include activity descriptions, etc.
    - Land, Water, and Human Interactions https://www.lab-aids.com/sites/default/files/2020-07/IMP%20NGSS%20and%20Common%20Core%20Correlations%20v3.1.pdf
    - Body Systems https://www.lab-aids.com/sites/default/files/2020-07/Body%20Systems%203e%20NGSS%20and%20Common%20Core%20Correlations%20v3.1.pdf
    - From Cells to Organisms https://www.lab-aids.com/sites/default/files/2020-07/From%20Cells%20to%20Organisms%203e%20NGSS%20%26%20Common%20Core%20Correlations%20v3.1.pdf
    - Ecology https://www.lab-aids.com/sites/default/files/2020-07/Ecology%20NGSS%20%26%20Common%20Core%20Correlations%20v3.1.pdf
    - Energy https://www.lab-aids.com/sites/default/files/2020-07/Energy%20NGSS%20and%20Common%20Core%20Correlations%20v3.1.pdf
    - Weather and Climate https://www.lab-aids.com/sites/default/files/2020-07/Weather%20and%20Climate%203e%20NGSS%20and%20Common%20Core%20Correlations%20v3.1.pdf

- In Unit: Ecology, Activity 3: Data Transects, students determine why certain species are more common than others, and why some species become more common over time. Students use models of transects from two locations in a restored prairie ecosystem to determine patterns and relationships that exist between organisms. They collect and analyze data (SEP-DATA-M4) using transect cards on four environmental components within the two locations to detect patterns in populations (CCC-PAT-M3). Students then discuss the results of the restoration efforts and answer questions to identify factors or relationships (DCI-LS2.C-M1) that caused the patterns and changes in the locations.

- In Unit: Ecology, Activity 9: Population Growth, students determine how different species in the same ecosystem interact with each other and the physical environment. Students conduct a laboratory investigation (SEP-INV-M2) using Paramecium caudatum to explore how the availability of food affects the growth of a population (CCC-EM-M4). Students use a microscope to observe wet mount slides of organisms. Students predict how populations of paramecium will differ with varying amounts of food (DCI-LS2.A-M3), they observe two different populations of Paramecium, and record their observations. Analysis questions relate to the transfer of energy in the ecosystem, the effects of the availability of food as observed during the lab (SEP-DATA-M4), and predictions of how the population will change with the provided amounts of food over time.

- In Unit: Body Systems, Activity 3: What's Happening Inside?, the three dimensional learning objective is found in the Teacher Edition in the NGSS Connections and NGSS Correlations section; in the Student Book it is presented as the guiding question, "How do organs in the human body interact to perform a specific function?" Students group organs and structures into systems based on their functions, then compare their initial ideas to information about human body systems and learn about the function of systems in the body. After reading Body System cards, revisions are made to initial groups. Students read Organ Function Cards and record information on the assigned student sheet. Students work in groups to classify Organ Cards or Structure Cards into systems. They record their classifications and discuss and record the function of each system in their notebooks. As groupings are discussed, students pay attention to similarities and differences between other groups in the class. After receiving Body System Cards students compare the actual placement of organs with their groupings and make revisions, if necessary, recording changes in notebooks. Students receive Function Cards and match the cards with the organ being described (SEP-CEDS-M3). The three sets of cards are used to complete a sheet assessing student knowledge of body organs and organ systems. Analysis questions also assess student understanding of structure/function of organ systems and the interrelationships between systems (CCC-SF-M1, DCI-LS1.A-M3). Student understanding of the objectives is assessed through group discussions, individual answers to the analysis questions, and by revisiting the guiding question at the end of the lesson.

- In Unit: Body Systems, Activity 10: Gas Exchange, students understand how the respiratory system is used to regulate gases in the blood. Students conduct an investigation (SEP-INV-M2) providing evidence of carbon dioxide in exhaled breath to develop understanding that specialized body systems function (DCI-LS1.A-M3, CCC-SF-M1) with the respiratory system (DCI-PS3.D-M2) during gas exchange.

- In Unit: Energy, Activity 1: Home Energy Use, students determine relative energy efficiency of different devices and how to increase energy efficiency in a home. Students evaluate relative energy efficiency of home features and provide evidence by comparing data (SEP-DATA-M4) from the energy features for two homes in different locations. Then students suggest which home consumes less energy as they build knowledge about how energy can be measured and tracked through a designed system (CCC-EM-M4). Students work toward understanding that a system of objects may also contain stored energy (DCI-PS3.A-M2) when they are asked to consider how the climate and weather influence the energy use in the two homes.

- In Unit: Energy, Activity 4: Shake the Shot, the three dimensional learning objective is found in the Teacher Edition in the NGSS Connections and NGSS Correlations section; in the Student Book it is presented as the guiding question, "How can kinetic energy of motion be transformed into another kind of kinetic energy: thermal energy?" Students explore energy transformation and transfer through an investigation. Students measure the temperature of metal pellets as evidence of energy transformation from kinetic to thermal. The teacher is prompted to facilitate a discussion about experimental design and controlling variables. Of the four questions in the Analysis section, questions 3 and 4 assess all three dimensions. In question 3, students analyze and interpret their experimental data (SEP-DATA-M4) to explain the causal pattern (CCC-PAT-M3, CCC-CE-M2) in their data regarding energy transformation and energy transfer (DCI-PS3.B-M1, DCI-PS3.B-M2). Student understanding of the objectives is assessed through group discussions, individual answers to the analysis questions, and by revisiting the guiding question at the end of the lesson.

- In Unit: Energy, Activity 10: Energy Transfer Challenge, students determine relative energy efficiency of different devices and how to increase energy efficiency in a home. Students build knowledge regarding the concept of heat flow (DCI-PS3.B-M3) when they engage in a design cycle to melt the most ice in a given amount of time and to prevent it from melting in a given amount of time. As they track energy flow through different insulation materials (CCC-EM-M4), they design a control to provide evidence that their design is effective (DCI-ETS1.B-M1). Students consider and redesign to take into account the insulation properties of the materials and energy transfers within their design (DCI-PS3.A-M3). Students communicate how the effectiveness of design materials makes a difference in energy efficiency (SEP-CEDS-M7).

Non-negotiable **2.PHENOMENON-BASEDINSTRUCTION:** Explaining phenomenon and designing solutions drive student learning.	**Required** **2a) Observing and explaining phenomena** and designing solutions provide the purpose and opportunity for students to engage in a coherent sequence of learning a majority of the time. Phenomena provide students with authentic opportunities to ask questions and define problems, as well as purpose to incrementally build understanding through the lessons that follow.

Justification with examples:

In *Issues and Science*, current and relevant issues are the unit storylines that capture students' interest that can range from personal to global in its implications. Students are eventually asked to make a decision about that issue – which means learning about the associated science. Issues give thematic continuity to the scientific investigations in every SEUP unit. These issues create personal connections for students and provide a source of motivation throughout the learning cycle. Most importantly, they enhance students' understanding of the role of scientific principles and evidence in making informed personal and societal decisions. Issues are revisited throughout the unit as students make connections and gather evidence toward making a decision.

Each unit begins with an introduction to the real-world relevant problem that will be explored throughout. Students read a brief scenario that frames the issue and asks for their initial thoughts and questions. Prior background knowledge or experience is not expected. As the unit progresses, the Teacher's Edition and Student Book continuously refer back to the real-world problem and has students apply their understanding. Students explore phenomena, collect and analyze data, develop knowledge, and apply what they've learned in order to make informed decisions on the issues surrounding each unit.

Each unit issue is not just an anchor for students to apply their learning, but also serves as a starting point for content engagement. The problems presented are not easily solved and require application of the three dimensions to propose solutions based on evidence. Relevant, timely real-world problems are selected to not only engage students, but to challenge their thinking and have them examine multiple sides of the highlighted problem before making a decision. Students engage in the work of actual scientists and engineers to further their scientific knowledge and solve problems.

The activities and investigations in *Issues and Science* require students to apply scientific evidence to and analyze the trade-offs involved in personal and societal decisions or designed solutions to problems. It’s important to note that SEPUP curriculum materials do not advocate specific positions on issues, and the units do not promote teachers’ or students’ acceptance of any position. Instead, the materials aim to provide opportunities for students to build the knowledge, skills, and understanding to help them make their own informed decisions.

Each unit is centered on an anchoring phenomenon that relates to the issue being addressed across the unit. Because the anchoring phenomena are broad and the related issues are complex, each unit is divided into instructional sequences that typically comprise two to five activities. In each instructional sequence, students explore an investigative phenomenon, guided by a driving question. The SEPUP storyline, a coherent conceptual storyline for each unit that aligns to the NGSS, describes the unit’s logical progression and connects the instructional sequences.

SEPUP storylines are built around the concepts and practices needed to explain phenomena and solve problems related to the issue under investigation. By answering the driving question for each investigative phenomena, students move through the storyline and deepen their understanding of how various science and engineering concepts and ideas are woven together across the entire unit. Each unit comprises several instructional sequences. The investigative phenomena that guide each sequence involve something that is puzzling or that instigates student questioning, launched by a driving question. The structure of activities has students usually “doing” first so they begin to develop their own understandings of phenomena and then read about it to make connections and expand their understanding.

A section in the Teacher’s Edition called “Investigative Phenomena and Sensemaking” identifies phenomena students explore in the activity and the primary sensemaking opportunities, potential knowledge gaps that will be addressed, and how students’ sensemaking will proceed as they move forward in the unit. The *Phenomena, Driving Questions, and Storyline* section of the Teacher Edition show how the different activities are organized around Driving Questions and the unit storyline. Multiple activities typically link to a Driving Question in the storyline and the associated content learning to address the associated performance expectation (PE); this typically ranges from two to six activities in the activity sequence, and these may be consecutive activities or distributed across the unit.

Issues and Science utilizes a Driving Questions Board (DQB) throughout each unit to support student sensemaking and the application of prior knowledge. In the first few activities of each unit, students use a Driving Questions Board to express their initial ideas and questions about the anchoring phenomenon or issue they are investigating. Throughout this discussion, students are encouraged to make connections to their own experiences and communities and to share any background knowledge they have that relates to the phenomena under investigation. Students’ prior and alternate ideas surface during this initial sharing, providing the foundation on which they will build new knowledge. As the unit progresses, students confront their initial ideas with evidence as they revisit and revise their understanding. This routine promotes student ownership of the learning and allows for students to express their personal curiosities around a topic, making the subsequent investigations more meaningful for learners.

Phenomena and problems are found across the materials in life science, physical science, and earth and space science units. The materials frequently connect both phenomena and problems to grade-band appropriate DCIs both at the unit level and at the activity level. Within the materials, unit-level phenomena and/or problems are generally presented in activities near a unit's opening, while lesson-level phenomena and problems are presented in activities at punctuated points throughout each unit. Most phenomena and problems are presented to students through some combination of teacher demonstration, hands-on experience, image, video, maps, data, and/or discussion. These modes provide students with entry points or experiences to engage with the phenomenon or problem.

- All the units in *Issues and Science* have accompanying Storyline and Phenomena documents that help teachers understand the anchoring phenomenon for each unit, the progression of investigative phenomena within a unit, and how the activities are used to help students make sense of them. An example from the Land, Water, and Human Interactions unit can be found here: https://www.lab-aids.com/sites/default/files/2020-07/IMP%20Storyline%20and%20Phenom%20v3.1.pdf

- In Unit: Ecology, Activity 1: The Miracle Fish?, the phenomenon is that the Nile perch introduced by the government has impacted Lake Victoria. Students research different cases of introduced species to evaluate human activities involved and the effects on these ecosystems. Students evaluate data of a population in its native ecosystem (DCI-LS2.C-M1) to determine how the population size changes over time.

- In Unit: Ecology, Activity 6: Ups and Downs, the phenomenon that the zebra mussel population varies over time is presented to students through a data table showing population densities in two different time periods. Students graph the data, and then compare the graphs to identify the phenomenon. Students look at additional data as they work to figure out what accounted for the change in the population between the two time periods.

- In Unit: Ecology, Activity 14: Effects of an Introduced Species, the phenomenon is that introduced zebra mussels affect populations of other organisms in the Hudson River ecosystem. The phenomenon is presented through two videos and a reading passage on how data was collected in the ecosystem. Students investigate different biotic and abiotic factors to determine whether that factor remained stable or changed as a result of the introduced zebra mussels.

- In Unit: Land, Water and Human Interactions, the unit-level challenge is to decide where to build a new school in the fictional city of Boomtown to minimize the impact on the surrounding environment. Students engage in a series of lessons allowing them to observe how humans can negatively impact the environment, including land and water. Students develop multiple models to show the results of humans changing the land as they evaluate human impacts associated with constructing buildings in different environments. Then students look at sites that are being considered for the new school and discuss possible human impacts and tradeoffs. Throughout the unit, students relate their activities to the unit problem of where to build the school in Boomtown. Students develop and test an erosion-mitigation structure and present their structure to the class. Students evaluate other structures based on the design criteria and constraints.

- In Unit: Land, Water, and Human Interactions, Activity 6: Gulf of Mexico Dead Zone, the problem is a dead zone is present in the Gulf of Mexico. Students use an anticipation to assess what they know about dead zones before and after the reading. They gather information about the causes and effects of dead zones as well as a look at what can be done about them. This builds towards understanding of how human activities can damage natural habitats and negatively impact the biosphere (DCI-ESS3.C-M1).

- In Unit: Land, Water, and Human Interactions, Activity 7: Cutting Canyons and Building Deltas, the problem is moving water can cause erosion. Students are challenged to design a structure to reduce river erosion. Students investigate how water on a stream table can move sediment and can change the land. Students apply what they learned from their stream table model to develop prototypes to mitigate erosion.

- In Unit: Weather and Climate, Activity 17: People, Weather and Climate, students are presented with the phenomenon that increasing the size of the human population in Sunbeam City impacts the city's weather, climate, and water supply. Each group of students serves as a team of scientists, where each student in the group role plays as an atmospheric scientist, hydrologist, meteorologist or climatologist. Students analyze provided data sets related to their respective fields to determine the impacts of population growth on the city's weather, climate, or water supply (DCI-ESS3.D-M1).

- In Unit: From Cells to Organisms, Activity 15: Disease Detectives, the problem is to identify which infectious agent caused the disease outbreak in a series of patients. Students analyze data from five different patients looking at symptoms, incubation time, presence at Duck Lake, and other information. Students are also provided with images of two different pathogens and compare to the pathogen isolated from the patients.

They use this information to determine which disease has caused the symptoms in the patients. Students relate the location to the source of the disease outbreak and everyone who came in contact with the water at the location became ill with specific symptoms. The pathogens students consider as the cause of disease are a virus, bacteria, and protist, and a reflection question asks students, “How does understanding cells help scientists study and treat infectious diseases?”

<table>
<tr><td>Non-negotiable (only reviewed if Criteria 1 and 2 are met)
3.ALIGNMENT & ACCURACY:
Materials adequately address the Louisiana Student Standards for Science.</td><td>Required
3a) The majority of the Louisiana Student Standards for Science are incorporated, to the full depth of the standards.</td></tr>
<tr><td colspan="2">Required
3b) Science content is accurate, reflecting the most current and widely accepted explanations.</td></tr>
</table>

Please see the correlations document included for with this submission.

<table>
<tr><td>Non-negotiable (only reviewed if Criteria 1 and 2 are met)
4.DISCIPLINARY LITERACY:
Materials have students engage with authentic sources and incorporate speaking, reading, and writing to develop scientific literacy.</td><td>Required *Indicator for grades 4-12 only
4a) Students regularly engage with authentic sources that represent the language and style that is used and produced by scientists; e.g., journal excerpts, authentic data, photographs, sections of lab reports, and media releases of current science research. Frequency of engagement with authentic sources should increase in higher grade levels and courses.</td></tr>
<tr><td colspan="2">Required
4b) Students regularly engage in speaking and writing about scientific phenomena and engineering solutions using authentic science sources; e.g., authentic data, models, lab investigations, or journal excerpts. Materials address the necessity of using scientific evidence to support scientific ideas.</td></tr>
<tr><td colspan="2">Required
4c) There is variability in the tasks that students are required to execute. For example, students are asked to produce solutions to problems, models of phenomena, explanations of theory development, and conclusions from investigations.</td></tr>
<tr><td colspan="2">4d) Materials provide a coherent sequence of authentic science sources that build scientific vocabulary and knowledge over the course of study. Vocabulary is addressed as needed in the materials, but not taught in isolation of deeper scientific learning.</td></tr>
</table>

Justification with examples:

Lab-Aids' philosophy is that students need to do science to learn science, and this is reflected in each of our programs. Students continually engage in labs and investigations that require them to collect empirical evidence to make sense of core ideas. This evidence is often required when answering an analysis question to help support or refute a claim. There are 11 different types of activities that students will engage in throughout *Issues and Science:* Talking it Over, Investigations, Laboratories, Readings, Role Plays, Modeling, Projects, View and Reflects, Computer Simulations, Problem Solving, and Field Studies. As students engage in each of these types of activities they engage in the Science and Engineering Practices through the context of Disciplinary Core Ideas and bring out the bigger ideas of Crosscutting Concepts.

Wherever possible, students explore a concept by gathering data firsthand or through direct experience. Students frequently manipulate scientific tools to investigate a specific problem or design a solution. For example, they might gather data from an experiment that tests the solubility and malleability of various elements or use a microscope to make observations about a sample of nematodes. Some lab activities encourage students to plan and conduct their own Investigations.

A key component of *Issues and Science* is the multimodal nature of the program, where students are writing, illustrating, and engaging in discourse daily. Part of this is facilitated through daily use of a science notebook. Here, students often are asked to record their prior knowledge, evidence collected from activities, notes from readings, and reflect upon their learning with writing and illustrations. The notebook becomes a record of how students' thinking progresses over time and changes with new experiences and evidence. It a powerful resource and tool for students to construct explanations in a variety of formats.

Various forms of group interaction have students interacting on a regular basis in whole group, groups of four, pairs, and individually. Sentence starters are provided to help facilitate student discussions. Additionally, there are Writing Frames that guide students in constructing explanations with evidence if needed and a Writing Review allowing for peers to review and provide constructive feedback in a structured manner.

Students frequently encounter text they have trouble understanding. A number of strategies that help students improve reading comprehension can be implemented before, during, and after the reading. Support for literacy has been developed using nationally known strategies – Talking Drawings, Anticipation Guides, Three-Level Reading Guides, Writing Frames, Intra-Act, Discussion Webs, and more-- to support student reading comprehension, student writing, and student oral presentation. The Literacy Support section of the *Issues and Science Teacher Resource Guide* describes this process and walks teachers through various strategies embedded within activities throughout each unit. This section explains each strategy and then accompanying tables identify where each activity is located. This support is not just a template, rather a fully developed, ready-to-go strategy available for immediate use. Many activities additionally list extensions that can be completed by students who want to explore a topic on a deeper level.

Throughout each unit, multiple instructional strategies are suggested to support teachers in anticipating student misconceptions and background knowledge. These strategies support student literacy with reading, writing, and group discussion. Some of the strategies include:

- *Anticipation guides*: Pre Reading exercises help students activate their background knowledge about a topic and generate curiosity about the material they will learn. An Anticipation Guide has students answer a set of prompts before reading, and after reading, students discuss how their predictions compared to the information in the reading. The value of an Anticipation Guide is in the discussion that occurs before and after the reading. Before reading, students discuss their predictions and reasons for them. During this discussion, the teacher gleans information about the depth of students' existing knowledge of and misconceptions about a topic.

- *Stop to think questions*: "Stopping to Think" questions are embedded in readings to focus students' attention on important ideas in the section of text they have just read. The questions may require students to identify the main idea of a previous paragraph or synthesize ideas presented in two or more preceding paragraphs. Because some questions require interpretation and application of knowledge, students will not always find answers by skimming and searching the text. "Stopping to Think" questions give students "think time" to summarize, interpret, or apply what they have just read. The suggested stopping points in the reading where the questions appear break the text into manageable chunks of information to summarize. Students may also use the questions to predict what might come next in the reading.

- *Talking drawings*: Talking Drawings appear in when students are asked to construct diagrams to visually communicate their ideas about a concept. After completing an activity or activities, they adjust the picture to represent their new understanding. The strategy asks students to explain how their diagram, and thus their understanding, has changed. When constructing a Talking Drawing both before and after an activity, students experience the reflective process by which skilled science learners incorporate new conceptual understanding with previously held ideas. Scientists create diagrams to describe concepts and hypotheses, and they go back and refine those models as necessary. This draw-and explain strategy is also helpful to visual learners.

The approach to vocabulary in *Issues and Science* is that it needs to be used in context for it to be meaningful. In the Teacher's Edition, the beginning page of every activity lists relevant vocabulary that will either be introduced in that activity and/or used by students as they engage in the activity. There is also a section in each Teacher Resource book that walks the teacher through how to help develop academic vocabulary with students as well as two graphic organizers. In the student book, vocabulary is often introduced in the introduction, within a reading section, or comes out after a lab to help make meaning of what students discovered.

To read about all the literacy strategies embedded within *Issues and Science* units, look at the Teacher Resources binder and Teacher's Editions.

Throughout these learning experiences, students work collaboratively with their peers and engage one another in discourse about the science and issues that underlie the activity. This coupling of concrete experiences and peer-led discussion provides students with structured opportunities to share their thinking and to practice using scientific language. Throughout the program, students are communicating their ideas in a variety of ways, including posters, presentations, proposals, and reports. These assessments ask students to target their responses to a wide range of audiences, such as community planners, scientists, city council members, and other community stakeholders.

- In Unit: Land, Water, and Human Interactions, Activity 1: Where Should We Build?, students view aerial photographs taken before and after construction of buildings has occurred. Students ask questions to clarify evidence. The evidence obtained from the observations is used to make a claim about the human impact of building.

- In the second instructional sequence in Land, Water, and Human Interactions, students begin with an activity where they use physical materials to collect data about substances that can or cannot dissolve in water. In the next two activities, they analyze and interpret given data about water quality in the fictional community of Boomtown. They conduct another investigation to determine the effect of fertilizers on the environment, and they begin to consider how substances that enter the water in an environment might have a harmful effect. Finally, they read a real-world case study about Earth's largest dead zone in the Gulf of Mexico. They use data from the reading and other sources, including their own investigations earlier in the instructional sequence, to build an argument about limitations on fertilizer use.

- In the final activity in Land, Water, and Human Interactions, students develop a plan for building a new school on an appropriate site, and identify the many ways that humans can engineer solutions to mitigate their negative impact on land and water when building new construction.

- In Unit: Ecology, Activity 14: Effects of an Introduced Species, students develop a testable question and use an online database and graphing tool to investigate it. Students ask questions about biotic and abiotic factors and use collected data to determine relationships. The materials direct the teacher to support students in ensuring their questions ask how an independent variable affects a dependent variable.

- In Unit: Ecology, Activity 4: Taking a Look Outside, students conduct a field study of a local environment using the transect method. While planning the study, students discuss questions they have about the environment, and how they would test those questions. During evidence collection, students are able to answer their questions.

- Example vocabulary guidance from Weather and Climate *Teacher's Edition*

d. Support students' understanding of key scientific vocabulary.

When words are formally defined in an activity, they appear in bold type in the Key Vocabulary list, which can be found in the Activity Resources that follow the Teaching Steps. Encourage students to use these words when talking or writing about science. During discussions, listen for these words to see if students are using them correctly. Decide how you will support students' understanding of the vocabulary—perhaps by setting up a word wall in the classroom.

Activity 1 Climate Change

• English learners: Introduce a class word wall for the *Issues and Earth Science*, Weather and Climate unit to provide a visual reminder of the new key scientific terms and to make words easily accessible. Begin it for this activity with the word *evidence*, and continue to add terms throughout the unit. Have

students enter the words and their definitions in the glossary in their science notebooks or in their personal vocabulary logs. Consider adding an explanatory picture or diagram for some (or all) of the terms.

5.LEARNING PROGRESSIONS:	**Required**
The materials adequately address Appendix A: Learning Progressions. They are coherent and provide natural connections to other performance expectations including science and engineering practices, crosscutting concepts, and disciplinary core ideas; the content complements the Louisiana Student Standards for Math.	**5a)** The overall organization of the materials and the development of disciplinary core ideas, science and engineering practices, and crosscutting concepts are coherent within and across units. The **progression of learning** is coordinated over time, clear, and organized to prevent student misunderstanding and supports student mastery of the performance expectations.

<u>Justification with examples:</u>

The learning activities within *Issues and Science* combine the exploration of Disciplinary Core Ideas with authentic Science and Engineering Practices to make the knowledge more meaningful and students better equipped to meet the many challenges facing today's society. During the process of unit development, SEPUP has created Learning Pathway models to map the integration of the 3 dimensions within the unit. Each instructional unit bundles several Performance Expectations (PEs); therefore, an activity may be part of several intertwined Learning Pathways. By the time that students reach the activity that incorporates the assessment related to the Performance Expectation, they will have interacted with the core ideas, practices, and crosscutting concepts multiple times in their learning journey. To view an example of a Learning Pathway, visit http://sepuplhs.org/pathways.html .

Engineering standards and performance expectations are integrated throughout units where called for by the NGSS. Many units integrate scientific principles and engineering practices into specific activities; in other units, the issue focuses on designing a solution to a problem, and the engineering standards are prevalent throughout. All four engineering performance expectations are addressed in all content areas and within grade levels for the suggested integrated sequence.

Each unit comprises several instructional sequences. The investigative phenomena that guide each sequence involve something that is puzzling or that instigates student questioning, launched by a driving question. The storyline is built around the science and engineering concepts needed to explain phenomena and solve problems related to the issue under investigation. By answering the driving question for each investigative phenomenon, students move through the storyline and deepen their understanding of how various science and engineering concepts and ideas are woven together across the entire unit. By the last activity in an instructional sequence, students are prepared to answer the driving question and explain the corresponding investigative phenomenon. Instructional sequences often correspond to an NGSS performance expectation. Students will complete a summative assessment for that performance expectation, either immediately upon completion of the sequence or later in the unit. After completing all the instructional sequences in a unit, students can explain the anchoring phenomenon for the entire unit and apply their conceptual understanding to offer solutions to the unit issue.

Issues and Science uses real data sets when possible, making connections to math practices and providing opportunities for students to engage with the necessary skills to work with large data sets and numbers. *Issues and* Science units also integrate the CCSS in ELA and Mathematics, as specified in the NGSS. The CCSS are embedded in numerous activities and often include strategies designed to support diverse learners.

- For a Learning Pathways specific to the energy unit, please visit
  https://sepuplhs.org/images/MS-PS3-3_new.jpg
  https://sepuplhs.org/images/MS-PS3-4.jpg
  https://sepuplhs.org/images/MS-PS3-5.jpg

- DATA-M2. In Unit: Land, Water, and Human Interactions, Activity 11: Boomtown's Topography, students analyze data from topographic maps that display temporal and spatial information about a particular area. They construct explanations based on evidence for how geoscience processes have changed Earth's surface over time.

- DATA-M3. In Unit: Land, Water, and Human Interactions, Activity 3: Water Quality, students analyze 100 years of water-quality data from Boomtown River to determine if the increase of Boomtown's population affects its water quality. During the activity, students review the definitions of correlation and causation, and then respond to the question, "Is there enough evidence in the graphs to determine that the population increase in Boomtown caused a decline in the water quality? Explain." The expected student response includes demonstrating an understanding of correlation and causation.

- DATA-M5. In Unit: Weather and Climate, Activity 2: Investigating Local Weather, students collect weather data for their location including temperature, pressure, precipitation, and wind. After collecting data for five days, students then determine the mean, median, and mode for different measurements such as temperature, air pressure, and top wind speed and compare their recorded data with provided monthly weather averages to better understand and predict seasonal variations in weather.

- MATH-M1. In Unit: Ecology, Activity 14: Effects of an Introduced Species, students use a Web-based graphing tool to graph and analyze a large data set regarding biotic and abiotic factors that the zebra mussel might affect.

- MATH-M2. In Unit: Weather and Climate, Activity 17: People, Weather, Climate (Is the growth of Sunbeam City affecting its weather, atmosphere, and water availability?), students engage in a jigsaw role play. They summarize strategies and analyze data to make conclusions about the relationship between population growth and changes in the environment. Students brainstorm recommendations to reduce the human impact on weather, atmosphere, and water availability, discussing the advantages and disadvantages of each, using their prior knowledge of the human impact on the weather, the atmosphere, and water.

<table>
<tr><td>6.SCAFFOLDING AND SUPPORT:
Materials provide teachers with guidance to build their own knowledge and to give all students extensive opportunities and support to explore key concepts using multiple, varied experiences to build scientific thinking.</td><td>Required
6a) There are separate teacher support materials including: scientific background knowledge, support in three-dimensional learning, learning progressions, common student misconceptions and suggestions to address them, guidance targeting speaking and writing in the science classroom (e.g. conversation guides, sample scripts, rubrics, exemplar student responses).</td></tr>
<tr><td colspan="2">6b) Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson level (e.g., alternative teaching approaches, pacing, instructional delivery options, suggestions for addressing common student difficulties to meet standards, etc.).</td></tr>
</table>

<u>Justification with examples:</u>

The instructional materials in *Issues and Science and Science* incorporate flexible approaches and features for differentiated instruction, with the overarching goal of addressing students' varying learning needs and providing the support students need as they move toward more self-directed learning.

In *Issues and Science,* classroom supports for differentiated instruction are embedded in each activity and identified in Strategies for Teaching Diverse Learners in the *Teacher's Edition*. These modifications take different forms, depending on the goals of the activity. For example:

- For students with lower literacy levels, teachers can use optional Student Sheets with pre-constructed data tables, graphic organizers, and/or Science Skills Student Sheets.
- For students who are not yet prepared to design their own scientific investigation, the *Teacher's Edition* may provide a sample lab procedure.
- For students who are ready to be more independent, the *Teacher's Edition* incorporates suggestions to reduce teacher guidance.

Additional differentiation support can be found in Section 4 of the *Teacher Resources* titled "Comprehensive Teacher Support".

The *Teacher's Edition* for each unit contain a variety of sections outlining other program features. Each activity has a section called Investigative Phenomena and Sensemaking that outlines where students are in the learning progression for the content and which phenomena are being used to drive that learning at that point. Another section called Background Information provides scientific background knowledge for teachers relevant to the activity beyond what is covered in the lesson.

Potential student misconceptions are addressed in the Teaching Steps for an activity as well as in the use of several instructional strategies found throughout the units. For example, one embedded literacy strategy is the use of Anticipation Guides. From page 52 of the *Teacher*

Resources: “The value of an Anticipation Guide is in the discussion that occurs before and after the reading. Before reading, students discuss their predictions and the reasons for them. During this discussion, the teacher gleans information about the depth of students’ existing knowledge and their misconceptions about a topic. The post-reading discussion on how students’ answers have changed allows teachers to formatively assess what students gained from the reading.” Additional support about addressing student misconceptions can be found in the *Teacher Resources* starting on page 69 under the section “Eliciting Students’ Prior Knowledge”.

Scoring guide rubrics are provided throughout the program to help teaches assess how students are progressing in the Science and Engineering Practices. The rubrics can be applied to assess student work as part of an activity procedure or analysis. Blueprints are provided in each *Teacher’s Edition* for where the rubrics can be used, and sample student work for a level 4 response is proved. The *Teacher Resources* includes sample work at all levels from one question for each of the practices. Sample student responses are also provided for all analysis questions at the end of each activity. For more information about the Scoring Guides please see the section on assessment.

The *Teacher’s Edition* also features a section within each lesson plan called Materials and Advanced Preparation. This section outlines exactly what is needed from the materials kits and any additional prep like the mixing of chemicals or ordering of live specimens that needs to be done to complete the activity.

- For an example of the Background Information Section in the *Teacher’s Edition*, please visit pages 33-34 in the digital *Teacher’s Edition* for Weather and Climate (Activity 1 Climate Change) or pages 169-170 in the digital *Teacher’s Edition* for From Cells to Organisms (Activity 8 Modeling Cell Structure and Function).
- Please see Appendix E (Literacy Strategies) in the back of any student book for sample literacy supports including oral presentation guidelines, written report guidelines, and conversation starters for developing communication skills.
- Please see the Literacy Strategies section starting on page 45 of the *Teacher Resources* for additional teacher supports:
    - Reading supports begin on page 45
    - Writing supports begin on page 52
    - Oral supports begin on page 55
- The “Strategies for Diverse Learners” section can be found after the “Build Understanding” section of each lesson plan for every activity within all *Teacher’s Editions*.

7. USABILITY: Materials are easily accessible, promote safety in the science classroom, and are viable for implementation given the length of a school year.	**Required** **7a)** Text sets (when applicable), laboratory, and other scientific materials are **readily accessible** through vendor packaging.
Required **7b)** Materials help students build an understanding of standard operating procedures in a science laboratory and include **safety** guidelines, procedures, and equipment. Science classroom and laboratory safety guidelines are embedded in the curriculum.	

<u>Justification with examples:</u>

Student books are available in print as well as digital formats. Each unit has a hardcover printed *Student Book*. *Teacher's Editions* and the *Teacher Resources* are printed and assembled into tabbed 3-ring binders. The *Teacher's Edition* and *Teacher Resources* are also available as digital assets as well.

All materials kits come with SDS sheets that are also included in the digital portal. Refill sheets for the materials packages for each unit are available on the Lab-Aids portal as well as on the website. For an example, please visit https://www.lab-aids.com/3eRefills. The *Teacher's Edition* and *Student Books* include safety notes as part of the procedure for an activity as needed.

Unit overviews provide estimated lengths for each activity based on 50-minute class periods. The length of instructional time was a result of the field testing that occurred during unit development. Using these outlines and the correlations for Louisiana, we estimate that Issues and Science will take 30 instructional weeks for 6th grade, 35 weeks for 7th grade, and 32 weeks for 8th grade.

- Please see Appendix B "Science Safety Guidelines" in the back of any Student book for more information and the safety contract. The safety contract is also available as part of the *Teacher Resources*.
- From the unit From Cells to Organisms, Activity 7 Investigating the Cell Membrane, Safety note in Student Book (digital page 54)

SAFETY

Wear chemical splash goggles, protective gloves, and a lab apron when using Lugol's solution. Do not touch the solution or bring it into contact with your nose or mouth. Be careful not to get Lugol's solution on your skin or clothing as it may leave a stain. Wash your hands after completing the laboratory activity.

- From Body Systems, Activity 10 Gas Exchange, Safety note in *Teacher's Edition* (digital page 161)

SAFETY NOTE

Students will blow through a straw into chemicals. Make sure that they do not inhale through the straw! They should breathe in through their nose and exhale through their mouth. If they accidentally swallow liquid, make sure that they rinse out their mouth thoroughly and drink plenty of water.

Make sure that students wear chemical splash goggles while working with chemicals. Students should not touch the chemicals or bring them into contact with their nose or mouth. Have them thoroughly wash their hands after completing the activity.

<table>
<tr><td>8. ASSESSMENT:
Materials offer assessment opportunities that genuinely measure progress and elicit direct, observable evidence of the degree to which students can independently demonstrate the assessed standards.</td><td>Required
8a) Multiple types of formative and summative assessments (performance-based tasks, questions, research, investigations, and projects) are embedded into content materials and assess the learning targets.</td></tr>
<tr><td colspan="2">Required
8b) Assessment items and tasks are structured on integration of the three dimensions and include opportunities to engage students in applying understanding to new contexts.</td></tr>
</table>

Justification with examples:

Issues and Science includes a research-based assessment system based on a system first developed by SEPUP and the Berkeley Evaluation and Assessment Research Group (BEAR) at the University of California Graduate School of Education. Studies show that students in classrooms where the SEPUP Assessment System was used as part of a yearlong SEPUP course scored better on post-assessments than did students in classrooms where this assessment system was not used (Wilson & Sloane, 2000). In Classroom Assessment and the National Science Education Standards (National Research Council, 2001), the SEPUP assessment system is presented as a strong example of a system that can be used for both formative and summative assessment.

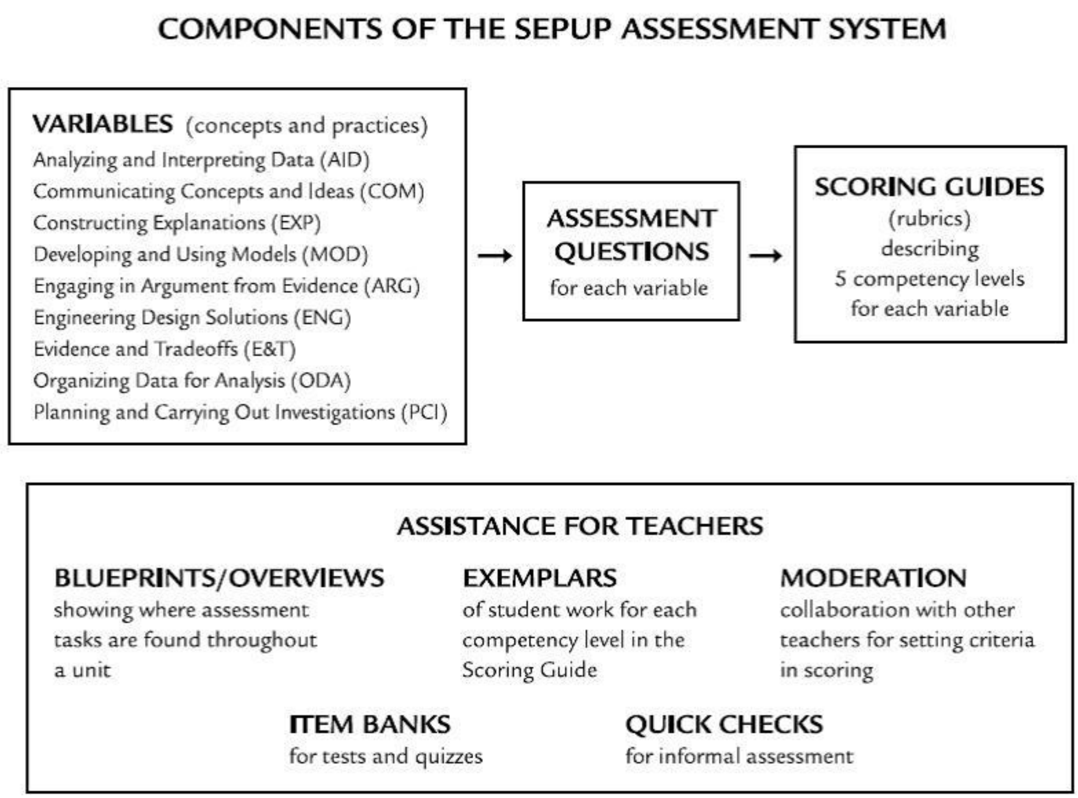
The SEPUP Assessment System incorporates both formative and summative assessments. Assessment tasks are embedded in Issues and Science and are an integral part of the learning activities:

- Formative assessments typically occur during the learning process, as students are acquiring new knowledge. They are especially useful in ensuring that students are learning specific concepts and practices. Teachers can use these assessments to inform and adjust their instruction, with the aim of helping to enhance student learning.

• Summative assessments occur at the end of a learning period, such as at the end of a learning sequence, unit, or grade band. They can provide evidence of students' integrated learning of the DCIs and CCCs and can also be used as evidence of their use of the SEPs and CCCs across multiple units. In this way, summative assessments can be used to inform future instruction.

Quick Checks are embedded tasks that can be used as checkpoints of students' learning along one, two, or three dimensions. When Quick Checks appear in an activity, they are integrated into the Teaching Steps.

The following diagram shows the different elements of the SEPUP assessment system.



The nine assessment variables, listed in the first box, define the Science and Engineering Practices that students are expected to learn. Each of these variables is complemented by a Scoring Guide with which to measure students' achievements according to five competency levels.

The SEPUP Scoring Guides are formatted as holistic scoring rubrics. However, they are easily converted to analytic scoring guides by adding criteria specific to each embedded assessment question. The nine Scoring Guides are used from unit to unit of Issues and Science for teachers to closely monitor students' growth and encourage their progression from novice to expert on each variable. When a scoring guide is suggested in the *Teacher's Edition*, student exemplars are also included. Scoring guides can be seen in the Assessment section of the *Teacher Resources* as well as in the *Teacher's Edition* when one is suggested.

These performance rubrics help teachers and students track their skill development with the Science and Engineering Practices. They provide a foundation for schools to translate the results into standards-based grading with evidence of student proficiency. Professional development around the implementation of the SEPUP assessment system models the practice of moderation, where teachers are tasked to evaluate the same work and compare results. This process develops a sense of how the rubrics are to be used as an evaluation tool and can be modeled with students for self-assessment as well.

Issues and Science includes analysis questions at the end of each lesson that have been identified as summative assessment opportunities include suggested student answers. Analysis questions are scaffolded with later questions requiring more thought and effort. Throughout the *Teacher's Editions*, specific analysis questions are highlighted with dot icons that emphasize which dimension or dimensions (DCIs, SEPs, and CCCs) are being assessed. Sample answers are provided for all analysis items.

Additionally, *Issues and Science* comes with an accompanying item bank of analysis items. The item banks provided for each unit contain questions in a format similar to the state or district tests that many students take. Some teachers use the item banks for pre- and post-assessments for each unit or chapter to measure students' growth. The questions also provide supplementary assessment opportunities. The item banks focus on key content and process skills in the unit and include multiple-choice questions, short-answer questions, and questions requiring an extended response. Our portal has the ability for teachers to design additional questions in a variety of online formats, including drag and drop, audio recorded, and multiple select. Each item bank has an accompanying page in the *Teacher's Edition* that correlates the questions to the three dimensions. Answers to all item bank items are provided.

- From the Body Systems unit Activity 2 Parts of a Whole example Quick Check in the *Teacher's Edition*

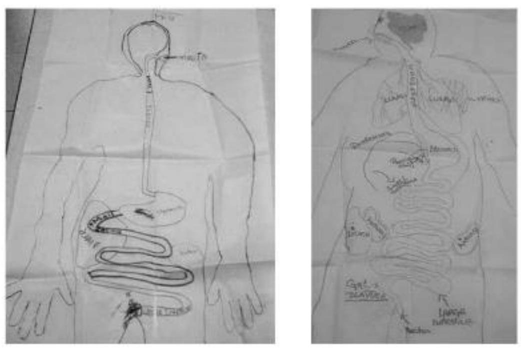
b. (QUICK CHECK) Have student groups draw a life-size model of organs inside the human torso outline, label the structures, and identify their functions based on prior knowledge.

Quick Checks

Since students are mostly focusing on the internal organs, it is important that they have enough space to draw and write. Encourage them to draw a life-size head, neck, and torso. They should not be concerned with arms and legs. You may want to show a torso model as a miniature template for the outline of the torso. Other options are to have a student lie on the paper while the teacher or another student trace their outline, use a cardboard stencil, or draw human body outlines ahead of time. (Samples of student drawings are shown in the figure below.)

Each student in a group of four chooses three organs to draw. They should each draw different organs and should not duplicate one another. Besides drawing 12 different internal organs, each group should write on the chart paper (near the organ) the function of each organ they have drawn. For groups having difficulty, ask students to think of experiences they have had that might provide clues to the placement and function of organs.

Encourage students to move around the room to look at one another's work. Display or save the drawings so students can see how much they have learned by the end of the activity and the end of the unit.



Samples of students' drawings

QUICK CHECK indicates an opportunity for formative assessment of key concepts. Use Procedure Steps 2 and 4 to gauge students' understanding of how the body is a system of interacting subsystems composed of groups of cells. This is building toward Performance Assessment MS-LS1-3.

- Sample student response from Body Systems Activity 3 What's Happening Inside Quick Check:

3. (QUICK CHECK) Just as all the organs in a system work together, the various body systems work together in a healthy person. Can you think of an example of how two systems work together? Explain your ideas.

   The circulatory and respiratory systems work together to help you breathe. The heart pumps blood around the body, and the lungs take in the oxygen that is carried around in the blood.

- Example item bank correlation from *Teacher's Edition* of Weather and Climate

ITEM BANK NGSS CORRELATIONS

WEATHER AND CLIMATE

Item number	Supports activity	NGSS
1	2	ESS2.C
2	4	ESS2.C
3	8, 9	ESS2.C
4	14	ESS2.D
5	14	ESS2.D
6	10, 14	ESS2.D
7	5	ESS2.D
8	16	ESS3.D
9	10	ESS2.D
10	5	ESS2.D
11	12	Connections to Engineering, Technology, and Applications of Science
12	16	Connections to the Nature of Science
13	5	
14	9, 10	ESS2.C, ESS2.D, Constructing Explanations, Systems and System Models, Energy and Matter
15	4	Analyzing and Interpreting Data
16	4	Analyzing and Interpreting Data
17	4	ESS2.D, Analyzing and Interpreting Data, Constructing Explanations
18	2	ESS2.C, ESS2.D
19	9, 10	ESS2.C, ESS2.D, Constructing Explanations
20	15, 16	ESS3.D, Constructing Explanations, Systems and System Models, Energy and Matter
21	13	ESS2.D
22	16	Patterns, Cause and Effect
23	6	ESS2.C, Constructing Explanations, Patterns, Cause and Effect
24	8, 9, 10, 14, 16	ESS2.D, ESS3.D, Constructing Explanations, Cause and Effect, Systems and System Models, Energy and Matter
25	12	ESS2.D

WEATHER AND CLIMATE T-47

- From Ecology unit Activity 4 Taking a Look Outside example of procedure that uses Planning and Carrying Out Investigations Scoring Guide as described in the *Teacher's Edition* with Sample Student Response

d. (PCI ASSESSMENT) Approve students' investigation designs.

Before distributing equipment, remind students to record data for the transect number, sampling point, biotic components, and abiotic components in their science notebooks. While most of the design will have been discussed as a class, this step ensures that each group is prepared to conduct the investigation productively.

SAMPLE LEVEL 4 RESPONSE

We will conduct a transect on the Yeats School ground on September 14, 2020. Our transect will be 100 m long. We will mark a string with flagging tape at 10-m intervals. We will sample at 0 m and every 10 m until we reach the end of the transect. We will make sure that the transect is completely straight. We will use the 1-m^2 quadrat device to mark our sampling areas. We will place the middle of one edge of the quadrat device at the flagging tape. We will keep track of everything we find within each quadrat. We will keep track of whether the items we find are biotic or abiotic. We will also take the temperature of the soil and the air in the center of the quadrat.

- Sample scoring guide (Planning and Carrying Out Investigations):

PLANNING AND CARRYING OUT INVESTIGATIONS (PCI)

When to use this Scoring Guide:

This Scoring Guide is used when students plan and/or carry out scientific investigations.

What to look for:

- Response describes the data to be collected.
- Response describes appropriate tools and methods for collecting the data.
- Response includes appropriate variables and controls related to the crosscutting concepts and disciplinary core ideas being investigated.

Level	Description
Level 4 Complete and correct	The student's plan/investigation is appropriate and includes all essential elements*, with no errors or omissions.
Level 3 Almost there	The student's plan/investigation is appropriate and includes most essential elements*, BUT has one or more minor to moderate omissions and/or errors.
Level 2 On the way	The student's plan/investigation has a basic plan, with two or more elements* appropriate to the goal of the investigation, BUT has one or more significant omissions and/or errors.
Level 1 Getting started	The student's plan/investigation has at least one element* relevant to the goal of the investigations, BUT is generally incorrect or missing multiple components essential to the goal of the investigation.
Level 0	The student's design or procedure is missing, illegible, or irrelevant to the goal of the investigation.
x	The student had no opportunity to respond.

* Based on the prompt, essential elements may include

a) the phenomenon under investigation.
b) goal of the investigation.
c) descriptions of the data to be collected.
d) how the data relate to the investigation.
e) the methods and tools used to indicate, collect, or measure data.
f) identification of tested (independent and dependent) and controlled variables.
g) indication of whether the investigation will be conducted individually or collaboratively.
h) systematic collecting and recording of data.
i) evaluation of the investigation.
j) revision of the investigation

ASSESSMENT TOOLS **395**

- In Unit: Ecology, the objectives include the following PEs: MS-LS2-1, MS-LS2-2, MS-LS2-3, MS-LS2-4, and MS-LS2-5. All five PEs are assessed through the analysis questions or activities identified in the Assessment Blueprint. For example, in Activity 14, analysis questions 1 and 2 assess PE-MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. Analysis questions 1-2 check for student understanding that disruptions to part of an ecosystem can lead to shifts in populations (DCI-LS2.C-M1), and how various factors contribute to the stability or change in an ecosystem and impact other parts of the ecosystem (CCC-SC-M2). Students use evidence from the lesson and a provided data table to support a claim about the ecosystem (SEP-ARG-M3).

- In Unit: Land, Water, and Human Interactions, the objectives include the following PEs: MS-ESS2-2, MS-ESS2-4, MS-ESS3-3, MS-ETS1-1, and MS-ETS1-2. All five PEs are assessed through the analysis questions and activities identified in the Assessment Blueprint. For example, in Activity 14, analysis question 5 assesses PE-MS-ESS2-2: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. Students use the real-world example of the Mississippi River to create an explanation (SEP-CEDS-M3) how geological processes have changed land surface features (DCI-ESS2.A-M2, DCI-ESS.C-M5) over long and short periods of time, how they have occurred in the past and will continue in the future, and can be observed in a model. Students use evidence in their explanation for past, present, and future to incorporate time scales (CCC-SPQ-M1) and to demonstrate gradual changes versus sudden changes (CCC-SC-M3).

- In Unit: From Cells to Organisms, the objectives include the following PEs: MS-LS1-1, MS-LS1-2, MS-LS1-6, and MS-LS1-7. All four PEs are assessed through the analysis questions and activities identified in the Assessment Blueprint. For example, in Activity 11, analysis question 4 assesses PE-MS-LS1-7: Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. Students draw a diagram or model to show what happens to food that they eat (SEP-MOD-M6), including what happens to the protein and carbohydrate when each enters the digestive system (CCC-EM-M4). Students model what happens to a hamburger and the bun as it moves through the digestive system into cells in order to show the movement of matter and the releasing of energy stored in food (DCI-LS1.C-M2).

- In Unit: Weather and Climate, the objectives include the following PEs: MS-ESS2-5, MS-ESS2-6, MS-ESS3-5, MS-ETS1-3, and MS-ETS1-4. All five PEs are assessed through the analysis questions and activities identified in the Assessment Blueprint. For example, in Activity 13, the procedure assesses PE-MS-ESS2-5: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. Students familiarize themselves with weather symbols before working in pairs to analyze and interpret weather maps and prepare weather reports summarizing the information from the weather maps (SEP-INV-M4, CCC-CE-M2). Groups prepare a weather report to present to the class. This is followed by summarizing eight days of weather information from weather maps for Cleveland, Ohio and forecasting the weather to come (DCI-ESS2.C-M2, DCI-ESS2.D-M2). Students explain how they used the information from the weather maps to create their forecast and how confident they are about the accuracy of their forecast (SEP-ARG-M3).