Local Assessment Support Workshop
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Workshop Objectives

Participants will:

- Study and use the Illinois State Board of Education (ISBE) *Guiding Principles for Classroom Assessment* standards.
- Identify and demonstrate the classroom assessment development process.
- Become familiar with the Assessment Development Template and related tools.
- Use the Assessment Development Template to develop draft assessments using the provided tools.

**Day 1—Session I**

Session I of the workshop will introduce the new Illinois Learning Standards for Science, the *Guiding Principles for Classroom Assessment*, and the first two steps in the five-step assessment development process. Participants will begin developing draft classroom assessments using the Assessment Development Template.

**Day 2—Session II**

Session II of the workshop will focus on steps three, four, and five of the five-step assessment development process. Participants will continue developing their classroom assessments and have the opportunity to provide feedback to their colleagues on the draft assessments.
## Day 1: Agenda

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<td>Build draft assessments: Steps 1 and 2—population, purpose, and learning expectations</td>
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Introduction to ISBE’s Guiding Principles for Classroom Assessment

ISBE is committed to building educators’ confidence and their capacity to develop, select, and modify assessments that measure student learning in order to inform both curriculum and instruction and educator evaluation. In particular, this project focuses on supporting teachers in commonly non-tested grades and subjects develop high-quality, authentic classroom assessments. Educators are encouraged to draw on their existing assessment and content area knowledge to systematically develop classroom assessments that will help to inform instruction and improve students’ learning.

Several tools have been developed to guide participants through the assessment development process. These tools include a series of online Assessment Literacy Modules, this workbook and the workshop with which it aligns, an Assessment Development Template, and an Assessment Review Tool. All these tools have been developed as companions to ISBE’s Guiding Principles for Classroom Assessment.¹

The Guiding Principles for Classroom Assessment and the related tools are organized into three broad domains, as summarized below.

**Foundations**
The six foundation standards encompass the basis for developing and implementing sound and fair classroom assessment practices that are focused on the students who are assessed.

**Use**
The four use standards align with the assessment process and follow a logical progression from selecting and developing classroom assessments to communicating the assessment results.

**Quality**
The six quality standards address assessment practices to ensure that accurate and dependable information about students’ learning is collected.

As noted above, each of these domains includes a series of standards associated with the broad domain. For example, within the Foundations domain, the standards include topics such as assessment purpose and assessment design. The Use domain includes topics such as analysis of student performance and effective feedback, while the Quality domain includes topics such as cultural and linguistic diversity, validity, and reliability. The graphic below displays the three

¹ The Guiding Principles for Classroom Assessment has adapted the Field Trial Draft of the Classroom Assessment Standards: Sound Assessment Practices for PK-12, copyrighted to the Joint Committee on Standards for Educational Evaluation (JCSEE) Classroom Assessment Standards Development Task Force www.jcsee.org.
domains with all their respective standards. In addition, the full document is available on the ISBE website at [www.isbe.state.il.us/assessment/htmls/balanced-asmt.htm](http://www.isbe.state.il.us/assessment/htmls/balanced-asmt.htm).

**Guiding Principles Activity: Examining the Foundations and Quality Standards**

**Requirements:**
- *Guiding Principles for Classroom Assessment*
- Pencil
- Partner(s)

**Directions:**
1. Review the text for the particular standard assigned to your table.
2. Annotate the text for that standard in the following ways:
   - ✓ - Affirmed your prior understanding
   - ! - Surprised you
   - ? - Raised a question for you
3. Discuss your annotations at your table. Answer the following question: What is the key-takeaway for the standard as it relates to your content area? Be prepared to share your group’s answer with the room.
Five Steps of Assessment Development

Assessment is broadly defined in the *Guiding Principles for Classroom Assessment* as the process of collecting and interpreting information that can be used to inform teachers, students, and, when applicable, parents/guardians or other users of assessment information about students’ progress in attaining the knowledge, skills, attitudes, and behaviors to be learned or acquired in school. Assessment practices range in frequency and scope from formative daily checks of understanding to summative end-of-term assignments.

To facilitate the development of assessments, this workshop outlines a five-step process. These steps map onto the domains and standards outlined in ISBE’s *Guiding Principles for Classroom Assessment* noted above. These steps are:

- **Step 1**: Identify population and purpose (F1)
- **Step 2**: Identify learning expectations (F2, Q4)
- **Step 3**: Develop assessment design and prepare the assessment (F3, F4, F5)
- **Step 4**: Plan for analysis and use (U1-U4)
- **Step 5**: Evaluate assessments for quality (Q1-Q6)

Although the development of an assessment is not a perfectly linear process, the steps involved are presented in the workshop as if they unfold in a linear way. The five steps are designed to help illustrate a systematic way of approaching assessment development and provide an anchor for educators as they build their own assessments.

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2 This definition of assessment is drawn from the ISBE *Guiding Principles for Classroom Assessment*. 
Introducing the Case Study

As a way to work through the five-step assessment development process, we will follow the progress of Sue, a middle school science teacher, as she works to develop an assessment in her content area. This example will be used throughout the workshop. Let’s learn more about Sue before we begin.

Case Study: Sue, Middle School Science Teacher

Sue is a middle school science teacher at ABC Middle School, teaching sixth-grade students. She has been teaching science for 15 years, and this will be her tenth year at ABC. The school is a stand-alone middle school in a small city in Illinois that serves about 250 students who are mostly low-income minority students, over 40% of whom are eligible for free or reduced-price lunch. Sue’s students take science four times per week for 50 minutes per period throughout the school year.

Sue has been exposed to the new Illinois Learning Standards for Science and is working on incorporating these new standards into her curriculum. She has been using the same summative assessments, which she has drawn from a middle school Earth science textbook, for the past five years. She knows these will need to be changed with the implementation of the new standards. In addition, she also employs formative and interim assessments that she has developed herself and would like to continue using. Sue would also like to find more authentic assessments that will truly measure what her students are learning about science content and practices.

Sue would like to develop an engaging Earth science assessment that will align with the new Illinois Learning Standards for Science and with the corresponding Performance Expectations for middle school Earth science. She wants to develop a multi-step assessment that focuses on the interaction of Earth’s major systems and assesses students’ ability to construct an explanation for how geoscience processes have changed Earth’s surface at varying times and spatial scales (MS-ESS2-2) by looking at how mountains are formed and what causes them to look different. She would like this classroom assessment to be interactive as well as flexible in order to accommodate her special education students and English learners.

3 MS-ESS2-2 refers to a Performance Expectation for middle school Earth space science related to Earth’s systems from the new Illinois Learning Standards for Science.
In small groups, review the background information on Sue. Take some time to think about her goals and what she wants to do with the assessment she has planned. Based on what you know about assessment development, what types of challenges do you think Sue might face in developing her classroom assessment? Write your brainstormed list here.

In the same small groups, discuss the following question: How does Sue’s story relate to you and your own assessment challenges?
Step 1: Identify Population and Purpose

Step 1 of assessment development addresses the following questions:

- Who is being assessed?
- What is being assessed?
- Why do I need to assess students at this time?

The answers to these questions can be found in an assessment’s target population and purpose.

Step 1 focuses on the following standard:

**F1 Assessment Purpose**
Classroom assessment practices should have a clear purpose that supports teaching and learning.

**Identifying the Population**

As a part of identifying an assessment’s purpose, it is important to define the population that the assessment is designed to evaluate. *Population*, in the context of this work, refers to the intended grade levels or targeted student groups that will be assessed. The population identified should align with the specified content standards and learning expectations, in this case the new Illinois Learning Standards for Science. The assessment strategies should be age-appropriate for the population, which can include a single grade level or a span of grades if the assessment is relevant for multiple grades. For example, populations to be assessed could be:

- Grade 1
- Grades 9-12
- Students in an AP biology course

**Identifying the Purpose**

There are a variety of reasons why a teacher may need an assessment. For example, teachers may need a way to assess student understanding at the mid-point of a unit, or they may need to assess learning across the entire span of a course. By first establishing the assessment’s *purpose*, or the intended objective for the particular assessment, subsequent assessment design decisions can be made to maximize the assessment’s effectiveness. If a teacher does not clearly
define the purpose of an assessment before designing it, the resulting assessment may not serve the purpose originally imagined. It is also possible that if the assessment’s purpose is not clearly articulated, a more appropriate assessment approach may be overlooked.

**Topic of the Assessment**

In Step 1, we identify the general topic to be assessed. At this step in assessment development, the topic may be defined fairly broadly, such as proficiency in a particular subject area, or at a particular level, or in certain skills and processes (such as critical thinking). The topic defined here is not as narrow as a specific content standard or learning expectation (or in the case of the new Illinois Learning Standards for Science, a specific Performance Expectation); it is rather a general statement of the topic that will be the subject of the assessment. An example of a topic to be assessed in a middle school science class might be *writing and communicating about the interactions among organisms across multiple ecosystems.*

**Types of Assessments**

You may be familiar with a variety of terms describing different types of assessment. The image below illustrates three primary purposes of assessment and assessment types.

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Formative assessments allow teachers and students to gather information during, as opposed to after, the learning process. Formative assessments are designed to provide regular feedback to teachers so they can adjust instruction to improve student learning. For example, at the end of a class period focused on plate tectonics, a middle school science teacher may do a “3-2-1 check for understanding,” by asking students to write down three things they learned, two interesting things, and one remaining question.

Interim assessments are administered during instruction and are designed to evaluate students’ knowledge and skills relative to a specific set of goals in order to identify strengths and weaknesses in curriculum and instruction. For example, for her unit on the interaction of Earth’s major systems, Sue may ask students to construct an explanation for how ice changes the surface of a mountain. Conducting this interim assessment will help Sue assess students’ knowledge, prepare them to move on, or ascertain if certain content should be revisited.

Summative Assessments are formal assessments that are used to measure overall curriculum and program effectiveness. These assessments are standardized to allow comparison across groups. For example, after completing a unit on the stars and the solar system, an elementary science teacher might ask students to create a model that explains why the night sky appears different at various times during the year. This assessment would require students to use everything that they have learned about the position and motion of Earth in relation to the sun and stars. This assessment would serve as the final check that students have gained all the knowledge and skills taught in the full unit.

When determining an assessment’s purpose, a teacher should ask the following questions:

- Should the assessment provide evidence of student comprehension that will inform subsequent teaching?
- Should the assessment be geared to providing students with feedback on their progress toward learning targets?
- Should the assessment allow students to conduct a self-assessment or peer-assessment of their current understanding?
- Should the assessment inform students or their parents/guardians about the students’ current level of achievement during a given period?
- Should this assessment help in making decisions about students who need additional learning support?

An assessment can focus on just one of the elements above (it can be simply a formative assessment as in the first example of a “3-2-1 check for understanding”) or it can serve several purposes simultaneously, such as being both a formative and interim assessment. Regardless, it is important to clearly identify the assessment’s purpose, and the type or types of assessment to be developed, as this decision will inform the assessment’s design.
Defining Your Assessment’s Purpose

An assessment with a clearly identified purpose should:

1. Identify the *population* to be assessed.
2. Specify the *type* of assessment (formative, interim, or summative).
3. Include the *topic* that will be assessed.
4. Determine the *period of instruction* associated with the assessment.

Purpose Statement Structure

The following is a purpose statement structure that may be helpful in developing your assessment’s purpose. While it is not necessary to use this format, it may be helpful in generating a comprehensive statement of your purpose. Variations on this structure may be necessary to capture a particular context and assessment purpose. The basic structure states:

This task is a/an *(type)* assessment of learning that will offer an opportunity to gauge *(population)* students’ knowledge of *(topic of the assessment)* and allow for measurement of content covered over *(period of instruction)*.

Using this model, a purpose statement might be constructed as follows:

- This task is a *formative* assessment of learning that will gauge *Kindergarten students*’ ability to *interpret patterns in the natural world* and will be administered *after the first of three lessons about what plants and animals need to survive*.

- This task is an *interim* assessment of learning that will give *eighth-grade physical science students* a chance to *design a solution to a problem related to the interaction of forces on an object* and will be administered *after covering content related to Newton’s Third Law*.

- This task is a *summative* assessment of learning that will offer an opportunity for *seventh-grade Earth science students* to *develop and use a model* to demonstrate their understanding of *atmospheric and oceanic circulation patterns* after *the completion of a unit on weather and climate*.
You have already heard a bit about Sue’s assessment goals and what she hopes to achieve with her new performance assessment. To establish the specific population and purpose for her assessment, we’ve asked her a few questions:

Q: Help us understand a bit more about the context of an assessment you’d like to develop.

Sue: “I teach middle school students. One of the units I teach to my sixth graders is about the processes that change Earth’s surface. As part of the unit, I would like to incorporate the performance expectation for Earth science included in the new Illinois Learning Standards for Science related to geoscience processes that have changed Earth’s surface. I would like my students to demonstrate their understanding of these processes and also demonstrate their ability to construct a scientific explanation about why mountains are different sizes, based on evidence.”

Q: At what point in the learning process are you interested in assessing your students?

Sue: “I’d like to generate a few related assessments to be administered over the course of the unit for this Performance Expectation that allow me to capture students’ learning of the disciplinary content knowledge and also have them demonstrate a critical scientific practice of constructing a scientific explanation based on evidence.”

Directions for Activity:

(1) In small groups, consider Sue’s assessment goals.
(2) In the space below, develop a purpose statement for Sue’s assessment. Make sure that the statement includes the following elements: population, type of assessment, topic, and period of instruction the assessment is designed to measure.
Apply It Activity: Your Assessment’s Population and Purpose

On your own, take a few minutes to brainstorm the population and purpose for the assessment that you will work on as part of this workshop. You will revisit these ideas later in the workshop when you develop your assessment. Keep in mind that the assessment you will develop will be assessing the following Performance Expectation:

MS-LS1-6: *Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.*

During this time, think about:

1. The population of students you want to assess.
2. The type of assessment you may want to develop.
3. The topic of the assessment.
4. The period of instruction that the assessment will measure.

Step 1: Key Takeaways

- No single assessment can serve every purpose, so there is a need for a balanced (or comprehensive) assessment system.

- Specifying your assessment’s population and purpose as a first step will set you up for success.
Step 2: Identify Learning Expectations, Part I

In this section of the workshop, we introduce Step 2 of developing an assessment, which addresses the following questions:

- What will I use to develop learning expectations?
- What learning expectations will I measure through this assessment?
- How do I know if my assessment really measures the learning expectations I define?

This section focuses on the following standards from the Guiding Principles:

**F2 Learning Expectations**
Classroom assessment practices should align with the appropriate learning expectations and instruction intended for each student.

**Q4 Validity**
Classroom assessment practices should provide adequate and appropriate information that supports sound decisions about each student’s knowledge and skills.

Identifying the Learning Expectations to Be Assessed

Once teachers have identified “what” they will be assessing (i.e., the general topic of the assessment), the next step is to narrow the focus to the specific content standards for the course or content area that will be the focus of the assessment. Teachers can then begin to identify learning expectations. Learning expectations refer to the evidence related to the content standards that may be measured through assessment.

Learning expectations may be clear statements of what students are to learn, lesson by lesson or in overall units, and provide direction for both instruction and assessment. Learning expectations may be derived from nationally recognized content standards, such as the International Society for Technology in Education standards, the Draft National Core Arts standards, or they may derive from state standards for the content area (e.g., the new Illinois Learning Standards for Science incorporating Next Generation Science Standards and developed from the K-12 Framework for Science Education).
The use of the term *learning expectations* aligns to the *Guiding Principles for Classroom Assessment*. For the purposes of this middle school science-focused workshop, the new Illinois Learning Standards for Science’s *Performance Expectations* will be used. Whatever the terminology, the idea is to establish clear statements of what we expect students to learn and be able to do that can be demonstrated and measured via the assessment.

The new Illinois Learning Standards for Science’s Performance Expectations are, perhaps, somewhat broader than a learning expectation that may guide a specific individual assessment task, but these Performance Expectations encapsulate the content, practices, and crosscutting concepts that should be measured through assessment. In this workshop, you will unpack the three dimensions of the Performance Expectation into its key components and identify the components you plan to assess. This process will help you build an assessment that aligns to the Performance Expectation.
Practice It Activity: Build a Table of Specifications—Identifying and Unpacking the Performance Expectation

Requirements:
• Handout of standard MS-LS1-6
• Handout of Next Generation Science Standards Appendices E, F, G
• Performance Expectation Analysis Placemat (completed)
• Poster paper
• Post-its
• Blank Table of Specifications
• Completed Table of Specifications

Directions for Part 1: Unpacking the Performance Expectation by Dimension

You will now unpack Performance Expectation MS-LS1-6.

Instructions for participants:

1. In your group, read the Performance Expectation and discuss:
   • What is the topic embedded in the Performance Expectation?
   • How does the Performance Expectation relate to what you teach and how you currently assess students?

2. Your table will be assigned one of the three dimensions on which to focus. Fill out the second and third columns of the blank Table of Specifications for the dimension assigned to your table (e.g., disciplinary core ideas practice, or crosscutting concepts). You will need to refer to the handout of MS-LS1-6.
   • For column 2, review the completed Performance Expectation Analysis Placemat (and foundational table) for your dimension (disciplinary core ideas, practice, or crosscutting concepts), and select the information relevant to the Performance Expectation.
   • For column 3 (Components of Each Dimension), break down the dimension into specific components related to what students need to know, understand, and demonstrate to achieve the final Performance Expectation. Use both the appropriate Appendix for your group’s dimension (including the grade band endpoints) and your own language to capture components you want to assess for that dimension.
   • Discuss any questions you have about how or what you might assess related to the language of the dimensions and the grade band endpoints. Consider how you might combine components of the dimensions for the purposes of assessment.
Directions for Part 2: Build the Table of Specifications for All Dimensions

1. Move to your second group and share what you generated for each dimension. Fill out each dimension on large poster paper based on your group’s work.
2. In the same group, generate a list of any remaining questions that you have related to this process of unpacking the Performance Expectation. Post the three most salient questions on the paper.
3. Post your papers on the wall and view other papers during the “Gallery Walk”.
4. Large group discussion.
   • Review the completed table from ISBE/EDC.
   • What did you observe from the process of unpacking the dimensions?
   • How does this process relate to building the assessment?
   • What are the key takeaways for this process related to generating a series of assessment tasks for MS-LS1-6?

Apply it Activity: Turn & Talk

With a partner at your table, discuss the following questions:
• Does your current curriculum and instruction align with MS-LS1-6?
  o If yes, how do you address each of the dimensions in your current instruction and assessments?
  o If no, how does the unpacking of these dimensions relate to your own process of generating an assessment?
The Assessment Development Template includes many of the considerations outlined in this workshop. The purpose of this template is to walk educators through the assessment development process using criteria outlined in ISBE’s *Guiding Principles for Classroom Assessment*.

The Assessment Development Template is also guided by the three domains and standards within each domain from the *Guiding Principles*. A summary of each domain is presented below.

- **Foundations**
  The six foundation standards encompass the basis for developing and implementing sound and fair classroom assessment practices that are focused on the students to be assessed.

- **Use**
  The four use standards align with the assessment process and follow a logical progression from selecting and developing classroom assessments to communicating the assessment results.

- **Quality**
  The six quality standards address assessment practices to ensure that accurate and dependable information about students’ learning is collected.

In each section of the template, the author of the assessment is asked to answer each question completely. This is to help make the resulting document accessible to other teachers and assessment users as well as to reviewers of the assessments. At the end of each section, there is a checklist to remind the author that the assessment should meet the criteria outlined in the *Guiding Principles for Classroom Assessment*.

Many sections of the template allow the author to provide supplementary materials. Any documents that should accompany the submission of the Assessment Development Template to help provide a complete picture of the assessment should be included.

The template begins with an assessment profile that gathers some basic information about the assessment before its population and purpose are defined. You do not have to complete this profile until you have completed the rest of the Assessment Development Template. We will ask you to complete the Assessment Profile at the end of your assessment development process.
Step 1: Identify Population and Purpose

Step 1 of assessment development addresses the following questions:

- Who is being assessed?
- What is being assessed?
- Why do I need to assess students at this time?

The answers to these questions can be found in an assessment’s target population and purpose.

For this workshop you will be focusing on a middle school life sciences Performance Expectation from the new Illinois Learning Standards for Science:

MS-LS1-6: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

Now you may identify the specific population and purpose of your assessment.

Return to Step 1 on page 11 and review the content of that section. In particular, consider the following:

- Should the assessment provide evidence of student comprehension that will inform subsequent teaching?
- Should the assessment be geared toward providing students with feedback on their progress toward learning targets?
- Should the assessment allow students to conduct a self-assessment or peer assessment of their current understanding?
- Should the assessment inform students or their parents/guardians about the students’ current level of achievement over a given period?
- Should the assessment help in making decisions about students who need additional learning support?

Remember, an assessment can serve more than one goal. Once you’ve answered the questions above, your team will complete a purpose statement for the draft assessment.

As a reminder, an effective purpose statement should do the following:

1. Identify the population to be assessed.
2. Specify the type of assessment (formative, interim, and/or summative).
3. Include the topic that will be assessed.
4. Determine the period of instruction associated with the assessment.

The following is an example purpose statement structure, which may be helpful in developing purpose statements. However, variations in its form may be necessary to capture a particular context and assessment purpose.

This task is a/an (type) assessment of learning that will offer an opportunity to gauge (population) students’ knowledge of (topic) and allow for measurement of content covered over (period of instruction).

Now, complete Step 1 of the template. Use the purpose statement you have generated as a guide to completing Step 1 in the template.

**Step 2: Identify Learning Expectations**

Once you have completed the purpose statement and Step 1 of the template, turn to Step 2.

Step 2 addresses the following questions:

- What will I use to develop learning expectations?
- What learning expectations will I measure through this assessment?
- How do I know if my assessment really measures the learning expectations I define?

In the work you have already done in Step 2 to unpack the Performance Expectation and the three dimensions, you have begun the work that occurs in Step 2 of the assessment development template. Return to the Step 2 section on page 17 and review the content of this section.

With the new Illinois Learning Standards for Science, the Performance Expectation serves as the broad learning expectation that your assessment tasks are designed to measures. Once you have unpacked the Performance Expectation, as you have done in the first part of Step 2, you have all the information you need to generate a set of assessment tasks. Again, going through the systematic process of unpacking the three dimensions to understand and prioritize the components of the practices, disciplinary core ideas, and crosscutting concepts embedded in the Performance Expectation is the first step in developing your assessment.

Once you have unpacked the Performance Expectation and familiarized yourself with all three dimensions, you are ready to complete Step 2 of the Assessment Development Template. Note that the checklist for Step 2 is useful to keep in mind but will be completed during Step 3.

In Step 3, you have the chance to align a set of assessment tasks to the specific Performance Expectation and the components of the three dimensions you deem most relevant and important to assess. For now, you will concentrate on familiarizing yourself with the Performance Expectation and the components of all three dimensions.
Aligning Learning Expectations and Assessments

When teachers think about learning expectations as they relate to assessment, they have to consider the extent to which they have taught to the learning expectations and the extent to which their assessments actually measure the learning expectations. In short, in order to ensure the proper use of the assessment and to make the most out of the assessment results, there must be alignment between the knowledge, skills, and abilities individual students are expected to demonstrate (i.e., what the assessment is intended to measure) and what the assessment actually measures.

An easy way to understand the purpose of alignment is with an analogy. Consider a car mechanic’s job in aligning a vehicle. The purpose of wheel alignment is to ensure that the car travels straight and true without pulling to one side or the other. When teachers align an assessment, they ensure that the assessment fully measures all the learning expectations they intend to measure and not additional content that may be relevant to the course but does not relate to the learning expectations they have defined. Aligning the assessment to learning expectations means that teachers make sure an assessment is addressing the specified learning expectations and is not addressing other content. It also means ensuring that the assessment does not address only some of the specified learning expectations and not others, or “pulls to one side” like a car that is not aligned.

For example, if a science teacher wanted to create an assessment to measure students’ ability to develop a model that describes the cycling of carbon through the living and non-living parts of an ecosystem (MS-LS2-3), then the assessment (through the range of specific assessment tasks the teacher designs) would require demonstration of the knowledge and skills embedded in the specific components of the three dimensions of the Performance Expectation. If the resulting assessment required students to label a diagram of the carbon system (a disciplinary core idea in the Performance Expectation), but did not provide a way for the students to develop their own model describing this process (the practice dimension), the assessment would not align completely with the full intent of the Performance Expectation; it would cover some but not all of what is in MS-LS2-3. It is important to note that not all assessment tasks employed during instruction will address all aspects of a Performance Expectation. Rather, it may require several related assessment tasks to fully measure a Performance Expectation.

The graphic below demonstrates the relationship among learning expectations, curriculum and instruction, and assessment practices. The relationship among these three aspects of instruction is cyclical, as is reflected in the graphic below. The learning expectations inform the curriculum and assessment, and the assessment results inform the learning expectations and subsequent
curricular decisions. Alignment is therefore essential to the quality of curriculum and instruction, assessment, and learning expectations.

**Validity and Alignment**

Traditionally, when assessment experts discuss validity, they mean the extent to which a test measures what it claims to measure. The *Guiding Principles for Classroom Assessment* describes validity as the interplay among the following variables: learning expectations, curriculum and instruction, assessment design, analysis of responses, and the decisions that derive from this analysis. Another way to think about that interplay is in terms of the alignment of all these variables. Educators can address the alignment of the knowledge, skills, and abilities individual students are expected to demonstrate and what the assessment actually measures in three ways: aligning for content, coverage, and complexity. The boxes on the following pages describe these types of alignment as they relate to Sue’s assessment.
1. *Content alignment* refers to whether the assessment items or tasks are measuring the learning expectations they are intended to measure.

For a unit on geoscience processes relating to Earth’s surface, Sue is designing an assessment task that measures both the disciplinary core ideas and specific practices (as well as relevant cross cutting concepts). Specifically, she wants students to understand the disciplinary core idea that all Earth processes are a result of energy flowing and matter cycling with and among the planet’s systems *and* to practice constructing an explanation using models or representations.

Imagine her task asks students to label and describe the movement of three types of plates *in a model*. What is missing from this task that would align it to the content and practice she intends to measure?

The answer: the practice, which is “constructing an explanation using models or representations.” If Sue is interested in ensuring that her students can actually construct an explanation using a model or representation (in this case, a diagram) as well as understand key disciplinary content, her task must incorporate an opportunity for them to construct an explanation in order for the task to achieve full content alignment to the appropriate dimensions.
2. **Coverage alignment** refers to whether the set of items or tasks that make up the assessment measures all the identified standards and corresponding learning expectations for that assessment. Often, assessments do not address all the content standards for a given subject, but focus instead on those that have been identified as the priority and/or are most relevant to a given assessment or for a particular period of instruction. This is perfectly acceptable, but it is important that in developing the assessment, the teacher is clear about which standards and corresponding learning expectations will be the focus of the assessment.

Sue would like to assess her students’ knowledge of Earth science at the end of the semester. She has begun to identify the specific components of each dimension of the Performance Expectation she would like to address with her assessment. She has identified the following specific components related to the disciplinary core ideas, practices, and crosscutting concepts:

- All Earth processes are the result of energy flowing and matter cycling within and among the planet’s systems. This energy is derived from the sun and Earth’s hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth’s materials and living organisms (MS-ESS2-1).
- Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth’s plates have moved great distances, collided, and spread apart (MS-ESS2-3).
- Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students’ own experiments) and the assumption that theories and laws that describe nature operate today as they did in the past and will continue to do so in the future (Science and Engineering Practice #6, Grade 6-8).
- Scale, Proportion, and Quantity: As size scales change, so do time scales (crosscutting concept #3).

To achieve alignment in coverage, it is important for Sue to ensure that the assessment measures her students’ knowledge and skills related to all the specific components of the three dimensions listed above. If the assessment (as a whole) does not assess all these components, or only assesses these components indirectly, she should be
specific about the priority components that will be assessed and be sure not to make claims about the components that the assessment does not address. Remember that to have coverage alignment, the set of tasks, taken together, must align to the identified Performance Expectation, and the identified components within the Performance Expectation (e.g. the specific disciplinary core idea, practices, and crosscutting concepts), but not every task needs to assess each specific component.
3. **Complexity alignment** refers to whether the assessment items or tasks, taken together, measure the full range or complexity of the knowledge, skills, and abilities that are expected of students as defined in the learning expectations. Many standards and corresponding learning expectations include expectations related to the knowledge and skills that students may demonstrate that suggest more basic skills, such as describing material covered in class, as well as demanding more sophisticated or complex skills, such as critical thinking or creating.

As the previous examples explained, Sue is developing an assessment for her Earth science class. She is hoping to measure students’ performance related to the new Illinois Learning Standards for Science. As shown on the previous page, she has identified four components from the dimensions of the Performance Expectation that she explicitly wants to assess.

She has identified a practice students need to exhibit to demonstrate their mastery of the Performance Expectation. The practice requires students to construct a scientific explanation, specifically:

- **Construct** an explanation using models or representations.
- **Construct** a scientific explanation based on valid and reliable evidence obtained from sources (including the students’ own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
- **Apply** scientific reasoning to show why the data or evidence is adequate for the explanation or conclusion.

To achieve alignment in complexity, Sue should make sure that her assessment includes tasks that allow students to demonstrate all of these skills (construct an explanation using models or representations, construct an explanation based on evidence, and apply scientific reasoning). In so doing, she achieves alignment to the full range of complexity of the knowledge, skills, and abilities associated with the practice and, in turn, with the Performance Expectation she has identified.
When thinking about the alignment of your own assessment, think about these questions:

- Are there clear connections between the learning expectations I have identified and the tasks I am using in my assessment?
- Have I identified which components of the learning expectation(s) have the highest priority or are the most relevant? Are there any additional aspects of the learning expectation(s) that are being assessed that I have not clearly identified?
- Does the assessment provide an appropriate number of items or tasks to assess the various knowledge and skills that I need students to demonstrate? Is there anything important that I need to see that students won’t be able to demonstrate with the task(s)?

**Step 2: Key Takeaways**

✓ Identifying content standards and defining learning expectations provide the critical foundation for assessment development.

✓ Quality assessment requires the use of a systematic process to clearly define the learning expectations that the curriculum and instruction is designed to teach and the assessment is designed to measure.

✓ Alignment of content standards, learning expectations, curriculum and instruction, and classroom assessment practices provide more accurate information about students’ strengths and areas for growth

**Day I Wrap Up**

Today, we:

- Introduced the new Illinois Learning Standards for Science.
- Addressed Steps 1 and 2 of the assessment development process.
- Worked with the new Illinois Learning Standard Performance Expectation that will be the focus of your assessment development.

Tomorrow, we will:

- Begin with Step 3, in which we generate the tasks associated with the Performance Expectation and consider alignment to all identified components of the Performance Expectation.
- Generate mechanisms for evaluating student performance.
- Assess and reflect on the overall quality of assessments.
Introduction to Day 2

In Session I, you were introduced to Steps 1 and 2 of the assessment development process and you worked on Steps 1 and 2 for your assessment. Today, participants will be introduced to Steps 3 through 5 and will finish drafting their assessments. In addition, participants will provide substantive feedback to one another on the assessments.

The Assessment Development Process

As a reminder, the assessment development process includes the following five steps:

**Step 1:** Identify population and purpose (F1)
**Step 2:** Identify learning expectations (F2, Q4)
**Step 3:** Develop an assessment design and prepare the assessment (F3, F4, F5)
**Step 4:** Plan for analysis and use (U1-U4)
**Step 5:** Evaluate assessments for quality (Q1-Q6)

Yesterday, we walked through the first two steps of the assessment development process and drew on examples from Sue. Today, we will focus on steps three, four, and five, and you will complete these steps for the draft assessment you began yesterday.
### Day 2: Agenda

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Step 3: Develop an Assessment Design and Prepare an Assessment

In this section of the workshop, we examine the third step in developing an assessment, by addressing the following questions:

- What type of assessment is appropriate for my population, purpose, and learning expectations?
- What should the structure and format of my assessment be?
- How can I ensure that students are actively engaged in the assessment process?
- How much time and what resources are adequate for the classroom assessment?

This section focuses on the following standards:

**F3 Assessment Design**
The types and methods of classroom assessment used should clearly allow students to demonstrate their learning.

**F4 Student Engagement**
Students should be meaningfully engaged in the assessment process and the use of assessment evidence to enhance their learning.

**F5 Assessment Preparation**
Adequate teacher and student preparation in terms of resources, time, and learning opportunities should be part of classroom assessment practices.

**Assessment Design and Preparation**

Once the purpose has been defined and learning expectations have been identified, the next logical step is to consider the overall design of the assessment. Determining which type of assessment should be used to measure a particular learning expectation can be challenging, but classroom assessments are effective when the learning expectations to be measured match the type of assessment. For example, if a teacher wants to measure students’ knowledge of and ability to use algebraic equations, she may want students to complete a series of pencil and paper tasks to show that knowledge. However, if a teacher wants to assess students’ facility
with a computer operating system, she may want students to demonstrate their understanding by performing specific tasks and solving common problems they might encounter within that system. The key idea here is that there should be a clear match between the knowledge and skill articulated in the learning expectation and the knowledge and skill required by the assessment tasks.

A few commonly used assessment items or types⁴ include:

- Selected response (multiple choice, matching, true/false).
- Short answer (short constructed written response, fill in graphic organizer/diagram, explain your thinking, make and complete a table, etc.).
- Extended response (essay, multi-step response).
- Product (research paper, log, play, poem, model, multimedia products, portfolio pieces, etc.).
- Performance (demonstration, presentation, science lab, performance, debate, etc.).
- Process (creation, development, design, exploration, visualization, invention, etc.).

Note that the examples above are not mutually exclusive from one another, and sometimes an assessment includes many of these types.

Performance and Authentic Assessment

One form of assessment that may be particularly engaging for students and can be effective in measuring student learning is performance assessment. Another name for performance assessment is authentic assessment. Performance or authentic assessments (in this workshop, we will refer to these as performance assessments) refer to a form of assessment in which students are asked to perform real-world tasks that demonstrate meaningful application of essential knowledge and skills. These assessments call upon students to demonstrate specific skills and competencies and to apply the skills and knowledge they have mastered. The demonstration of mastery can take place during the normal course of everyday events (e.g., during regular classroom time) or in response to specific structured exercises provided by the teacher. Regardless, the student’s task is to construct an original response, performance, or product, which the teacher observes and evaluates.

Performance assessments can take many forms, such as demonstrations, speeches, exhibitions, and projects. Examples may include writing an essay, producing a work of art, planning and carrying out investigations, playing a musical instrument, or communicating scientific information in a written or oral report. A performance assessment can be formative, interim, and/or summative. It can provide teachers with information about how a student understands and applies knowledge. It is important to note that performance assessments consist of a series

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of tasks and that it is often the job of the teacher to help scaffold students’ skills to build up to the final performance or product they create.

**Portfolios**

Student portfolios are a particular type of performance assessment and are more than just a folder stuffed with student papers. Portfolios should be a collection of student work that demonstrates the student’s efforts, progress, or achievement in a certain content or subject area. A portfolio provides the teacher with a record of what a student has learned or is able to do. Portfolios may be designed such that students participate in the work selection process and also engage in thinking about their work. This process can motivate students as it allows them to witness their progress over time through self-assessment and engages them in self-reflection. When thinking about portfolio assessment for students, think about these questions:

- **What will it look like?** Think about the physical and conceptual structure.
- **Who is the intended audience for the portfolios?** What will this audience want to know about student learning?
- **What goes in?** What are the criteria for including work in the portfolio? Will the documents in the portfolio show student growth that cannot be captured in test scores?
- **How and when should work be selected?** Decisions about the process and timing associated with building the portfolio must be made throughout the school year.
- **How will the portfolio be evaluated?** Will each submission to the portfolio receive a separate assessment? Will the portfolio be evaluated in its entirety? Will a common rubric be employed?

The contents of a well-designed portfolio can vary greatly depending on the age of the students, the content taught, and the length of time covered by the portfolio collection. For example, in one district, middle school science students have to submit a portfolio of scientific explanations completed over the course of a year to demonstrate mastery of their ability to engage in constructing explanations from evidence. This portfolio includes various examples of fully developed scientific explanations supported by evidence to demonstrate growth over time. Each student must submit five scientific explanation assessments, and each example must include a written description that includes the student’s rationale for including the piece as a demonstration of his/her mastery of engaging in argument from evidence. This allows the teacher to see the student’s progress and the student to witness his or her own growth.

In addition, the use of a common rubric that the teacher and the student complete (either for each submission as it is completed or when the portfolio is finished) invites the student to reflect on his or her growth over time and opens up the conversation between student and teacher about areas of strength and areas for growth.
Aligning Learning Expectations to Assessment Tasks and Considering Complexity

As described and practiced in Step 2, regardless of the type of assessment (e.g., selected response, extended response, performance), the process of articulating the links from the learning expectations to the specific assessment tasks (such as specific items in a selected response assessment or specific tasks in a performance assessment) is a useful step to take once the learning expectations and the type of assessment have been determined.

For example, as described in the previous step, if Sue wants to assess her students’ skills in constructing an explanation through a performance assessment, then Sue would specify the specific components of the practice of constructing an explanation and generate a task or set of tasks to measure students’ mastery of this practice. That is to say, if Sue is specifically interested in measuring students’ ability to construct an explanation using a model, then Sue must develop a task that specifically requires students to demonstrate this skill.

Once Sue has aligned her assessment tasks and learning expectations, she would need to address the extent to which the tasks address the full complexity of the learning expectations, as described in Step 2. This may include examining whether the assessment tasks create opportunities for students to engage in the full range of skills associated with the learning expectations such as: applying factual knowledge; identifying patterns; planning and carrying out investigations; collecting data; applying concepts to new information; and engaging in complex procedural thinking, higher order thinking, and creative problem-solving. If you have a taxonomy that you use, such as Bloom’s Taxonomy or Webb’s Depth of Knowledge, it may be useful to consult these resources in considering the level of complexity of the various assessment tasks. It is also useful to consult the appendices provided and the specific progressions associated with the dimension(s) you will assess.

Assessment Design: Additional Considerations

Regardless of the type of assessment, there are some practical considerations regarding assessment design. Consider the following:

- **Age-appropriateness of the classroom assessment:** Is the assessment appropriate to the students’ age, experience, and background knowledge?

- **Text complexity:** Is all text included in the assessment appropriate to students’ reading ability?

- **Amount of space for answers:** In the physical design of the assessment, is there enough space for students to fully respond to the prompts?

- **Formatting of the questions or activities:** Are the questions and descriptions of activities presented in a way that is clear and accessible to students?

- **Clarity of diagrams and illustrations:** Are all images clear?
• Method of delivery (e.g., paper/pencil, computer administered): Have various methods of delivery been considered? Could an assessment originally conceived as paper and pencil also be delivered orally? Administered by computer?

• Clarity of the verbal or written instructions: Are the instructions, written and verbal, absolutely clear?

Assessment Preparation: Time and Resources

Once an assessment that carefully aligns to learning expectations has been designed, a teacher needs to consider the practical resources that are needed to prepare and complete all components of the assessment. This includes time and resources to adequately prepare materials for the assessment, sufficient time for students to learn the content and expectations of the assessment, and adequate time to complete the actual assessment. The amount of time and resources will vary depending on the nature of the assessment. For example, the preparation time required to evaluate a portfolio or a performance assessment will likely be longer than what is needed to evaluate students’ performance in a classroom discussion. Teachers should think about all the components that are necessary for an assessment and the time and resources needed. Consider the following:

• Teacher instructions (prerequisites, description of instructions, etc.): Make sure the instructions are clear, concise, and unambiguous. Be as specific as possible. For example: “The students will need to have a basic understanding of United States geography, including where the specific cities under investigation are in relation to mountains, ocean, etc.” or “Make sure the lab materials (microscopes, petri dishes, bacteria samples) are out and ready for students at the beginning of the assessment administration period.”

• Materials (for students and/or educator): Describe the materials the students will receive. Also explain to the students what they should do with the documents and/or materials you provide. For example, if students are expected to graph data on a scatterplot from a spreadsheet, the teacher will need to explain where the students get the data and what they need to do with it. If the data is from an online source, the teacher will need to be sure students have access to the data and understand how to use it. Be consistent in the use of titles for these different resources. Even if you refer to a data chart as the red sheet, always refer to it this way so students are not unduly confused about the expectations.

5 The climate-related examples in this section are adapted from a sample NGSS assessment created by Achieve. The assessment was retrieved on 03/16/15 from http://www.nextgenscience.org/sites/ngss/files/MS-ESS_Four_Cities-Nov%202014.pdf.
• **Evaluation guide/rubric**: Make sure the language used is understandable to students. For example, using first-person language will help reinforce student ownership of the assessment process. Make sure to focus on measured stated objectives and describe the performance for each objective at several levels with descriptors (this will be covered in more detail in the section on rubrics to follow).

• **Estimated time for students to complete all tasks that make up the assessment**: Have information on the estimated amount of time the assessment will take. If there are several parts to the assessment, estimate the time for each task. For example, if students are supposed to compare daily temperatures across cities, create scatterplots based on the data, explain their conclusions from the scatterplot, and make a model to predict the types of regional climates in the Western half of the United States, then address the time needed for each one of these tasks.

• **Sample evidence**: If appropriate, provide samples of other student work, or exemplars, so that it is clear to students what is expected of them.

• **Student directions and assessment task/prompt (what do the students see/use?)**: Make sure the student directions are clear, detailed, and written at the appropriate grade level. For example, for the same climate assessment example as above, in which students are asked to examine the United States’ climate system, the overview of the assessment directions might include: “You will be studying four different cities and their climates. You will describe and interpret plotted climate data to explain the reasons different cities, in different parts of the United States, have different weather. There are two parts to your assessment. First, you will compare daily temperatures in each of these cities with the average monthly temperature for our town. Second, you will compare the climate data for each of the four cities and examine why there are differences. You will study factors for each city such as latitude, topography, and ocean circulation patterns. This assessment will take a total of six class periods to complete.”

In designing the assessment, these types of considerations should become part of the development process. Otherwise, there may be too little time, inadequate resources, or unrealistic expectations when it comes time for students to complete the assessment.

**Student Engagement**

Research has shown that increasing a student’s engagement in his/her learning leads to higher academic achievement. Considering how to engage students in the assessment process is a critical component of effective assessment. Some common strategies for engaging students include:

• **Establish success criteria with students**: Guide students through a process of identifying a quality product for a particular assessment.
• *Develop scales and rubrics with students:* Facilitate a conversation or activity in which students build the scales or rubrics that will be used to assess their work (rubrics will be discussed further in the next section).

• *Create opportunity for peer feedback:* With explicit modeling from the teacher, guide students through a process of providing one another with feedback on their work.

• *Create opportunity for self-assessment:* Build time into the curriculum for students to reflect on their progress toward reaching learning goals, and guide them through the process of looking at their work and providing evidence of their development.

• *Use student-led conferences to engage students in self-reflection:* These meetings between students, their teachers, and their parents or guardians provide a culminating opportunity for students to reflect on their learning and their progress, with a focus on providing evidence of their strengths and areas for improvement.

These types of student engagement help to make the whole assessment process a meaningful and central part of the learning that takes place in the classroom. The teacher should model all these tasks so that the students know what is expected of them and know how to conduct this type of assessment. Engaging students in the assessment process should be ongoing and will require teachers to continuously re-evaluate how students are engaging with the assessments to determine whether they are achieving the goals for the assessment process.
Consider the following student engagement strategies:

- Establish success criteria with students.
- Develop scales and rubrics with students.
- Create opportunity for peer feedback.
- Create opportunity for self-assessment.
- Use student-led conferences.

How are you currently engaging students in the assessment process? What have you done that has worked particularly well? Is there a strategy described above that you would like to try in your classroom? Talk in pairs and make notes, for your future reference, in the space provided below.
Step 3: Key Takeaways

- The assessment should be designed with its population, purpose, and learning expectations in mind.

- Bringing students into the assessment process will increase the impact of the assessment and motivate students do their best work.

- Assessment preparation requires careful thinking about the time and resources needed for both the student and the teacher to complete the assessment.

- Performance assessments are a great way to engage students in their learning, but they require careful planning and scaffolding.
A lot of work takes place in Step 3. In this step, you will address the following questions:

- What type of an assessment is appropriate for my population, purpose, and learning expectations?
- What should the structure and format of my assessment be?
- How can I ensure that students are actively engaged in the assessment process?
- How much time and what resources are adequate for the classroom assessment?
- How can I create assessment tasks that fully align with the key components of the dimensions I want to assess?

In this section of the development process, you design the overall assessment and consider any preparation or resources that are necessary. You will break the assessment into a series of tasks that will, together, provide evidence of the extent to which the students have mastered the Performance Expectation you unpacked for the assessment.

Review the content of Step 3 on page 33. In the appendix, and available electronically, you will find a table to complete by defining:

- The Performance Expectation.
- The three dimensions related to the Performance Expectation, building on your work in Step 2.
- The components of the three dimensions you intend to assess, building on your work in Step 2.
- The assessment tasks aligned to the specific components of the three dimensions of the Performance Expectation.
- The resources needed for each task.

**Directions for Step 3:**

1. Start with the Performance Expectation, the three dimensions, and key components you identified in Step 2.

2. Review the components of the different dimensions. Define the specific tasks associated with one or more dimensions of the Performance Expectation. Brainstorm these as a group. It may be helpful to work backwards from a final product if you want to build a set of tasks leading to a final performance or product.
   
   Consider: What is the final performance or product? What tasks will students be asked to do to arrive at the final product? Which of those preliminary tasks will you assess? For example, Sue asked students to make a claim based on evidence to answer the question,
“Why are some mountains bigger than others?” This was her summative assessment. She required students to use evidence gathered over the course of the instructional unit, drawing on their development of a model of tectonic plates, and the additional scientific explanation work (including the other assessments that required them to generate scientific explanations on related content).

(3) Once you have drafted these tasks, return to the table with the three dimensions unpacked and explicitly align the tasks to the dimensions. If any task addresses more than one of the dimensions, note that in the table by repeating the task in the table for all relevant dimensions.

(4) Map the specific task by number (e.g., Task 1, Task 2, etc.) to the specific component(s) within the dimension that you are assessing with the task. For example, in Sue’s table of specifications, Task 1, in which students develop a model of Earth’s tectonic plates, aligns to several disciplinary core idea components, including the disciplinary core idea component: the motion of tectonic plates is part of convection of Earth’s mantle. It also aligns to several practices, including construct an explanation using models or representations. She has captured this alignment in her table (see Sue’s example for guidance).

Once you have completed the table, think more about the assessment preparation. Step 3 of the Assessment Development Template includes several fields related to considerations for preparation. Please complete Step 3 of the Assessment Development Template.
Now that you have completed Steps 1, 2, and 3 of the Assessment Development Template and the table of specifications, exchange materials with another team. This team will review your work and provide you with concrete feedback and recommendations. Meanwhile, you and your team will review another team’s assessment. In reviewing the first three steps, ask the following questions of the assessment you review:

- Does the purpose statement provide a clear description of:
  - The *population* to be assessed.
  - The *type* of assessment (formative, interim, or summative).
  - The *topic* to be assessed.
  - The *period of instruction* associated with the assessment.

- Are the learning expectations (the three dimensions of the Performance Expectation and the specific components within them) clearly and fully articulated?

- Does the set of tasks that make up the assessment fully measure the Performance Expectation in terms of:
  - Disciplinary core ideas?
  - Science and engineering practices?
  - Crosscutting concepts?

- Does the assessment allow students to demonstrate a full range of knowledge, skills, and abilities that are expected of students as defined in the:
  - Disciplinary core ideas?
  - Science and engineering practices?
  - Crosscutting concepts?

- Does the assessment clearly communicate the learning expectations to students?

- Does the assessment specify an administration time and does it seem reasonable?

- Are student directions provided and are they clear and straightforward?

- Are ideas for student engagement included in the assessment materials?

Once you have reviewed the assessment and provided concrete feedback on the document, you will provide a brief overview of your feedback in a face-to-face conversation.
In this section, we address Step 4, planning for analysis and use. In Step 4, we consider our strategies for evaluating the students’ work on the assessment. While there are many ways to evaluate an assessment, this section focuses on rubrics as useful tools for analyzing student performance. We address the following questions:

- How should rubrics be used to evaluate student responses?
- What kind of feedback should be provided to students from a rubric?
- How can the assessment results inform teacher instruction?
- What types of evidence will be needed to produce a report that supports and informs a student’s learning?

This section focuses on the following standards:

**U1 Analysis of Student Performance**
The methods for analyzing evidence of student learning should be appropriate for the assessment purpose.

**U2 Effective Feedback**
Classroom assessment practices should provide timely and targeted feedback to improve student learning.

**U3 Instructional Planning**
Analysis of student performance should inform instructional planning and provide next steps to support ongoing student learning.

**U4 Reporting**
Student assessment reports should be based on a sufficient body of evidence and provide a summary of student learning in a clear, timely, accurate, and useful manner.
Analysis of Student Performance

Evaluating student performance is part of the assessment development process, and the methods used will vary based on the nature of the assessment items and tasks: The purpose of the assessment will determine the most effective method to use in evaluating students’ work. Methods may be formal and fairly lengthy or may only require a short descriptive response. For open-ended, constructed-response formats or performance assessments, clearly developed rubrics are beneficial. In this section we will introduce rubrics, discuss how they may be useful in providing feedback, and how they may be used for instructional planning. Using rubrics may be appropriate for your assessment because many times, a numerical value may not indicate how a student can improve his or her performance. Rubrics provide descriptions that define what is expected at each performance level.

Introduction to Rubrics

A rubric is an evaluation tool (usually in a table format) that is used to assess student performance along a set of criteria. Rubrics are a means of communicating expectations for student performance on an assessment and providing focused feedback on a student’s progress. Using a rubric focuses both students and teachers on:

- The importance of learning and understanding.
- Clear expectations for student performance.
- Meaningful feedback concerning a student’s strengths and weaknesses.

A rubric typically consists of two components: criteria (the characteristics of good performance on a task) and levels of performance (the degree to which a criterion has been met). The criteria in a rubric (generally found as the table rows on a rubric) include a description of each element of the assessment and may also include performance samples that illustrate each of the levels of performance. The levels of performance in a rubric (generally found as the table columns on a rubric) determine to what degree the student has met the criterion. Rubrics provide a standardized means of evaluation that can be tailored to the goals of your assessment.

Types and Uses of Rubrics

Teachers may choose a certain kind of rubric depending on the task or tasks being assessed. Two different types of rubrics will be discussed as part of this workshop: generalized rubrics and task-specific rubrics. The table below summarizes the differences between these two types of rubrics.
<table>
<thead>
<tr>
<th>Types</th>
<th>Purpose/Distinction</th>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generalized</td>
<td>Applies essential criteria to evaluate several authentic, content-specific tasks or assessments.</td>
<td>Teacher can use the same rubric across different tasks, providing evaluation consistency to students.</td>
<td>Feedback may not be specific enough on certain components of the assessment.</td>
</tr>
<tr>
<td>Task-specific</td>
<td>Applies essential criteria to evaluate a single content-specific assessment or task.</td>
<td>Provides students with specific criteria that guide performance.</td>
<td>Time consuming to construct rubrics for each assessment.</td>
</tr>
</tbody>
</table>

**Generalized Rubrics**

The table that follows is an example of a generalized rubric that may be used to evaluate a student’s performance. It is considered a generalized rubric because a teacher can use it for any scientific explanation activity assigned as part of the course. If a generalized rubric is used, students can understand that these criteria will be used to evaluate each similar assignment that they complete, regardless of the specific content. The value of a generalized rubric is that students are presented clear and consistent criteria for each assignment. If the expectations are consistent across assessments, students can learn from previous feedback and improve performance as they move from one similar task to another.

The example that follows is for a scientific explanation rubric. This rubric specifically addresses students’ abilities to construct, use, and/or present an oral and written scientific explanation supported by empirical evidence about a phenomenon. By using this generalized rubric, a teacher can provide consistent feedback on students’ practice of constructing an explanation.
## Sample Generalized Rubric: Claim, Evidence, Reasoning Scientific Explanation Rubric

<table>
<thead>
<tr>
<th>Below</th>
<th>Approaching</th>
<th>Meeting</th>
<th>Exceeding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Claim</strong></td>
<td>The claim does not address the purpose of the lab, is unclear or incomplete, and does not address the critical content or concept of the lab.</td>
<td>The claim addresses the purpose of the lab but is unclear or incomplete and may be missing some critical content or concepts of the lab.</td>
<td>The claim addresses the purpose of the lab, is clear and complete, and contains all critical content or concepts of the lab. In addition, the student includes original ideas or predictions.</td>
</tr>
<tr>
<td><strong>Evidence</strong></td>
<td>The evidence does not support the claim.</td>
<td>The evidence supports the claim but data is unclear or incomplete.</td>
<td>The evidence supports the claim using clear and complete data.</td>
</tr>
<tr>
<td><strong>Reasoning</strong></td>
<td>The reasoning does not explain the connection between the evidence and the claim.</td>
<td>The reasoning explains the connection between the evidence and the claim but is unclear or incomplete.</td>
<td>The reasoning clearly explains the connection between all of the evidence and the claim. In addition, the student includes original ideas or applications.</td>
</tr>
</tbody>
</table>

**Notes:**

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Task-Specific Rubrics

Task-specific rubrics are helpful for assessments that require specialized performance criteria, making it difficult to use the same rubric across many different assessments. A task-specific rubric allows the teacher to clearly articulate the different criteria that will be involved in identifying the student’s level of performance on a particular assessment. For example, for her middle school Earth science course, Sue may regularly ask students to construct a scientific explanation for various content, and this may take several forms (e.g., a written response, an oral response, a slide presentation). However, she may also ask each student to develop a model to specifically illustrate the ways Earth’s tectonic plates interact and she may be interested in explicitly assessing her students’ grasp of the Earth science content. In this instance, a task-specific rubric might be appropriate.

This task-specific rubric, related to Sue’s first task for her assessment, evaluates the accuracy with which students’ models identify the three types of tectonic plate boundaries and indicate the direction of movement to explain the different ways Earth’s tectonic plates can interact with each other at their boundaries, and what causes these patterns of movement. This rubric focuses explicitly on a disciplinary core idea that Sue wants to assess.

Sample Task-Specific Rubric: Plate Tectonic Boundaries and Movement

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Incomplete</th>
<th>Inaccurate</th>
<th>Somewhat Accurate</th>
<th>Mostly Accurate</th>
<th>Accurate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Response is incomplete, irrelevant, contains insufficient evidence to demonstrate understanding of the disciplinary core idea OR the student has failed to respond to the prompt.</td>
<td>Response indicates minimal understanding. Only one or two of the plates is drawn and both the labels and direction of motion are incorrect.</td>
<td>Response indicates errors or omissions. Two or three of the plates are drawn correctly. The labels are incorrect or the direction of motion is incorrect.</td>
<td>Response indicates minor errors or omissions. All three plates are drawn correctly but either the labels are incorrect or the direction of motion is incorrect.</td>
<td>Response demonstrates no errors or omissions. All three plates are drawn correctly and both the labels and the direction of motion are correct.</td>
</tr>
</tbody>
</table>

Notice that in both the generalized and the task-specific rubric examples, a few details have been included in the performance-level cells to expand upon the rubric’s criteria. These details, called descriptors, are often helpful because they spell out what is expected of students for each level of performance. Descriptors also help teachers distinguish between varying levels of student work.

Both types of rubrics can improve a student’s performance because they make the teacher’s expectations clear and show students how they can meet those expectations, which can result in marked improvements in the quality of student work and learning. A rubric can help define and communicate quality and can also encourage students to be more thoughtful judges of their own work.
Regardless of the type of rubric that is used, teachers should provide the rubric to students as they embark on the task so that students can use the rubric to assess their own work rather than the teacher using it only at the end of the assessment process to review the final product.

**Using Rubrics for Effective Feedback**

Rubrics are an excellent way to ensure that feedback on assessments is specific and targeted. When the feedback is targeted and linked to the explicit learning expectations, students will have a better understanding of their strengths and weaknesses and will be able to take responsibility for their learning. A quality rubric enables and supports conversation between the teacher and learner, or peer and learner, and allows for self-reflection. Therefore, quality rubrics:

- Communicate expectations.
- Use language that focuses on what is present and not just what is absent.
- Clearly communicate strengths and weaknesses and how the student may improve.
- Provide effective feedback that is directly related to student performance on the assessment task.

To ensure that you are able to provide effective feedback to your students, your rubric should include enough performance levels to showcase a range of student abilities. A rubric should provide feedback to students who may exceed the standards or expectations as well as students who may be approaching a concept or skill for the first time. To accomplish this, the rubric should include clearly articulated descriptors within each performance level. To showcase the difference between a poorly written and well-written descriptor, see the example below. In this example, the teacher is evaluating student papers for the presence of reference citations.

<table>
<thead>
<tr>
<th>Example of a Poorly Constructed Descriptor</th>
<th>Student includes many sources and citations both in-text and in the references section.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example of a Well-constructed Descriptor</td>
<td>Student includes 10-12 sources in bibliography, along with all in-text citations, formatted properly according to APA guidelines.</td>
</tr>
</tbody>
</table>

In the poorly constructed descriptor, there is vague language about expectations. What does the word “several” mean? How many sources are required? Are students expected to complete in-text citations along with a works cited page? Is there a particular format to follow for the references? A student may have all these questions. However, as you will see in the well-constructed descriptor, the teacher answers all the students’ questions, clearly describing how their work will be evaluated.
Rubric Development

Consider the following elements of a quality rubric:

- Criteria are objective and based on observable behaviors.
- Language clearly communicates expectations for students.
- Language focuses on what is present and not just what is absent.
- Rubric clearly communicates strengths and weaknesses and how students may improve their work.
- Rubric provides effective feedback that is directly related to student performance on the assessment or task.
- Each performance level is clearly stated so that it can easily be distinguished from the others.

The table below provides some guidance on how to develop a rubric. The questions on the left of the table indicate what to consider in the development of the rubric. On the right, the action describes the placement of content for your rubric associated with your response to these questions.

<table>
<thead>
<tr>
<th>Question</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>What criteria or essential elements must be present in a student's work to ensure that it is high quality?</td>
<td>Include these as rows in your rubric.</td>
</tr>
<tr>
<td>• These should be the criteria that help the teacher distinguish quality work from poor work.</td>
<td></td>
</tr>
<tr>
<td>How many levels of performance do I wish to illustrate for students?</td>
<td>Include these as columns in your rubric and label them.</td>
</tr>
<tr>
<td>• The levels should describe a range of performance from beginning to advanced (e.g., beginning, developing, proficient, and advanced).</td>
<td></td>
</tr>
<tr>
<td>For each criterion or essential element, what is a clear description of performance at each achievement level?</td>
<td>Include descriptions in the appropriate cells of the rubric.</td>
</tr>
<tr>
<td>• Use objective descriptions that help provide guidance to students.</td>
<td></td>
</tr>
<tr>
<td>When I use the rubric, what aspects work well and what aspects need improvement?</td>
<td>Revise the rubric accordingly.</td>
</tr>
<tr>
<td>• Does the rubric help you distinguish among the levels of performance in a student sample?</td>
<td></td>
</tr>
<tr>
<td>• Are the criteria appropriate?</td>
<td></td>
</tr>
</tbody>
</table>


Here are a few tips on how to develop each of these rubric sections:

**Criteria:** When defining your assessment’s criteria, it may be helpful to think back to Step 2. The learning expectations help to define the essential elements of student performance. The specific
components of each dimension of the unpacked Performance Expectation completed in Step 2 provide information that may be helpful in specifying what you are looking for in students’ products or performance. These considerations will guide the development of the rubric’s criteria. Keeping this information in mind will help ensure that your rubric is well aligned with the assessment’s purpose and the Performance Expectation.

**Levels of Performance:** When you determine your performance levels, it helps to think about the development of learning over time. To represent this chronologically, we suggest listing your performance levels from left to right in order of increasing mastery.

**Performance Descriptors:** In your performance descriptors, the information listed should tell students precisely what performance should look like at each level. In addition, the descriptors should be clear about how a student’s work might be distinguished from the work of other students. Writing clear descriptors, aligned with specific tasks or learning expectations, will present students with clear expectations and provide teachers with an opportunity to provide consistent and objective evaluations. The rubric will ultimately offer quality feedback to students for self-reflection on their learning.

In conclusion, here are some reasons to use rubrics:

- Rubrics enable multiple evaluators to apply the same criteria to evaluating assessments.
- Rubrics may be used to provide formative feedback for drafts of work before a final submission is due. For example, a student can use a rubric to assess his or her peers' work.
- Rubrics allow teachers to help students understand more clearly and completely how the teacher evaluated their work or performance.
- Rubrics also help teachers authentically monitor a student’s learning process.
- Rubrics may inform instructional practice by allowing teachers to modify future lessons based on student performance.

A final note about the use of rubrics: It is important to remember that student performance on an assessment should inform instruction. Rubrics may be useful evaluation tools that accompany assessments for this purpose. Teachers should be attentive to patterns that may suggest the need to modify instruction or the need to revisit the content, based on patterns that emerge across student performance using the rubric.
Directions: In a small group, please follow the steps below to review the claim, evidence, reasoning scientific explanation rubric for Sue.

Step 1: Review Sue’s table of specifications, with a focus on the Performance Expectation, the components of the practice dimension (i.e., constructing an explanation), and the aligned tasks. Re-familiarize yourself with what she is trying to accomplish with her assessment.

Step 2: Review Sue’s claim, evidence, reasoning scientific explanation rubric to develop an overall impression of what you see. Note any observations in the box below.

What aspects of the rubric meet your expectations? Is there anything that could be improved?

Step 3: Read the criteria on Sue’s rubric and annotate the criteria for alignment to the Performance Expectation, specifically focusing on the practice: constructing an explanation. To do so, put a plus sign (+) where you see good alignment and a minus sign (-) where you don’t see alignment between the criteria on the rubric and the dimensions of the Performance Expectation.

Overall, does the rubric clearly align to the Performance Expectation and the components of the practice dimension? If not, what do you see missing from the rubric? What needs to be changed or added for the rubric to properly align with the appropriate practice of the Performance Expectation?
Step 4: Read the performance levels of the rubric. Then, consider the following question.

Are the differences in performance levels clearly defined on the rubric? If not, note any suggested changes in order to clearly define the performance levels.

Step 5: Consider how effective the rubric’s feedback is for students.

Does the rubric allow the teacher to provide high-quality feedback to students across a range of abilities? How could the rubric be strengthened to provide better feedback?

Step 4: Key Takeaways

✓ When developing a rubric, make sure that it appropriately aligns with your learning expectations.

✓ The differences in performance levels should be clearly defined within the rubric.

✓ The rubric should address all the tasks that make up the assessment.
In this section of the workshop, you will turn your attention to rubric development for the assessment you are generating. In Step 4, we consider our strategies for evaluating the assessment. We address the following questions:

- How should rubrics be used to evaluate student responses?
- What kind of feedback should be provided to students from a rubric?
- How can the assessment results inform teacher instruction?
- What types of evidence will be needed in order to produce a report that supports and informs a student’s learning?

Review the content for Step 4 and remember that high-quality rubrics:

- Communicate expectations.
- Use language that focuses on what is present and not just what is absent.
- Clearly communicate strengths and weaknesses and how students may improve their work.
- Provide effective feedback that is directly related to student performance on the assessment or task.

The next page provides a rubric template. Draw on the resources in this workbook to develop a high-quality rubric for your assessment. This rubric may be generalized or task-specific, depending on your assessment and your needs. If you have several tasks within your assessment and want to evaluate them separately, you may also consider developing a rubric for each of the tasks. Note that rubrics generally move from low levels of performance on the left to higher levels of performance on the right.

Once you have completed the rubric, please review Step 4 in the Assessment Development Template.
<table>
<thead>
<tr>
<th>Criterion</th>
<th>Description of identifiable performance characteristics reflecting a beginning level of performance.</th>
<th>Description of identifiable performance characteristics reflecting development and movement toward mastery of performance.</th>
<th>Description of identifiable performance characteristics reflecting mastery of performance.</th>
<th>Description of identifiable performance characteristics reflecting the highest level of performance.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Criterion 1:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Criterion 2:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Criterion 3:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Criterion 4:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Now that you have completed Step 4, you will again exchange your work with the same team. The team will review your work in Step 4 and provide you with concrete feedback and recommendations on any changes to improve the rubric. Your team will review another team’s work. In reviewing the rubric, ask the following questions:

- **Does the rubric clearly align to the appropriate learning expectation(s) (i.e., the Performance Expectation and components of the three dimensions)?** If not, what must be changed/added for the rubric to properly align with the expectation(s) and related dimensions?

- **Are the differences in performance levels clearly defined on the rubric?** If not, make any necessary changes to clearly define the performance levels.

- **Does the rubric address all the tasks in the assessment?** If not, make any necessary changes so that the rubric addresses all the tasks.

It may be helpful to follow the same process for review that you did when reviewing Sue’s rubric.

**Step 1:** Review the assessment’s table of specifications. Re-familiarize yourself with what the teacher is trying to accomplish with the assessment.

**Step 2:** Review the assessment’s rubric to develop an overall impression of what you see. Note any observations in the box below.

| What aspects of the rubric meet your expectations? Is there anything that could be improved? |
| Does the rubric address all the tasks in the assessment? If not, what changes should be made in order to evaluate all tasks? |

**Step 3:** Read the criteria on the rubric and annotate the criteria for alignment to the assessment’s Performance Expectation. To do so, put a plus sign (+) where you see good
alignment, and a minus sign (-) where you don’t see alignment between the criteria on the rubric and the Performance Expectation and related dimensions.

| Overall, does the rubric clearly align to the Performance Expectation and the language for the relevant dimension(s)? If not, what do you see missing from the rubric? What needs to be changed or added for the rubric to properly align with the appropriate dimension(s) of the Performance Expectation? |

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**Step 4:** Read the performance levels of the rubric. Then, consider the following question.

| Are the differences in performance levels clearly defined on the rubric? If not, note any suggested changes in order to clearly define the performance levels. |

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**Step 5:** Consider how effective the rubric’s feedback is for students.

| Does the rubric allow the teacher to provide high-quality feedback to students across a range of abilities? How can the rubric be strengthened to provide better feedback? |

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Step 5: Evaluate Assessment for Quality

In this section, we address Step 5, in which we evaluate our assessment’s quality. We address the following questions:

- Is the assessment appropriate for students of all cultural and linguistic backgrounds?
- Are the tasks presented in a way that is free from cultural or unintended bias?
- Is this assessment designed to be accessible to the broadest range of learners?

This workshop has already addressed two important quality standards from the Guiding Principles: Validity (Q4) and Reliability (Q5). As described previously, we have addressed the validity of an assessment as it relates to how the assessment and its specific tasks align to the learning expectations. In your work to make explicit connections from the learning expectations to the assessment, you have focused on the validity of the assessment. In your work to establish criteria for evaluating an assessment such that different people would arrive at similar evaluations of an assessment, you were addressing reliability. These are important quality standards, but they are not the only quality standards that must be considered when developing an assessment.

In this section of the workshop, we will focus on the following standards:

**Q1 CULTURAL AND LINGUISTIC DIVERSITY OF STUDENTS**
Classroom assessment practices should be responsive to, and respectful of, the cultural and linguistic diversity of students and their communities.

**Q2 DIFFERENTIATION**
Classroom assessment practices should be appropriately differentiated to meet the specific educational needs of all students.

**Q3 FAIRNESS**
Classroom assessment practices and subsequent decisions should not be influenced by factors unrelated to the intended purposes of the assessment.
Guiding Principles Activity: Examining the Quality Standards

Requirements:
- Guiding Principles for Classroom Assessment
- Pencil
- Partner(s)

Directions:
1. Review the text for the particular standard your table has been assigned.
2. Annotate the text for that standard in the following ways:
   - √ - Affirmed your prior understanding
   - ! - Surprised you
   - ? - Raised a question for you
3. Discuss your annotations at your table. Answer the following question: What is the key takeaway for the standard as it relates to your content area? Be prepared to share your group’s answer with the room.

Cultural and Linguistic Diversity of Students

Students come from a range of backgrounds and bring different knowledge and experiences to bear when responding to their teachers’ instruction and assessment. These assessment practices should be appropriate and accessible to all students, regardless of their cultural and linguistic background. Ultimately, when teachers consider their students’ backgrounds in developing the assessment, they benefit from greater student engagement and more accurate information about what students know and can do.

So what are some strategies teachers can employ to acknowledge students’ backgrounds and linguistic diversity? Here are a few suggestions about how to design assessment practices to allow students to demonstrate what they know and can do:

- Simplify and/or model instructions.
- Simplify language in the assessment itself.
- Provide extra time for students to complete the assessment.
- Allow for oral responses in addition to, or rather than, written ones.
- Use visual representations in the assessment instructions or prompts as well as allowing for visual representations in students’ permitted responses.

Differentiation

In addition to their cultural and linguistic diversity, students have different learning needs. In particular, students with disabilities may need additional accommodations, modifications to assessments, or alternate assessments to demonstrate their learning. When developing assessments, think about the students in your classrooms and how best to structure the
assessments to allow every student to demonstrate his/her understanding. First, let’s define the following terms:

**Accommodations:** Accommodations refer to changes in the way a student accesses the assessment. Accommodations are alterations in the way tasks are presented that allow students with specific learning needs to complete the same tasks as other students. They do not alter the content of assessments, give students an unfair advantage, or change what an assessment measures. Accommodations may include:

- *Timing or scheduling accommodations:* These may include providing extended time or frequent breaks to complete an assessment or scheduling the assessment over a period of days or at a specific time of day.

- *Setting accommodations:* These may include such provisions as preferential seating, special lighting or acoustics, a space with minimal distractions, or a private room.

- *Presentation accommodations:* These may include such things as a large-print version of the assessment, an audio recording of the assessment task, a reduced number of assessment items per page, or a designated reader of the assessment.

- *Response accommodations:* These may include permitting verbal responses, dictation of responses to a scribe who writes for the student, or responses given via computer.

- *Linguistic accommodations:* These are based on language proficiency (different from accommodations based on a student’s disability or cognitive need) and may include translation, the option to respond to an assessment in the language of origin, and changes to response options. English learners may access assessment tasks or items by reducing the linguistic load. 6

**Modifications:** Modifications refer to changes in the instrument or evaluation procedures; they are instructional or assessment adaptations that allow students to demonstrate what they know and can do when the accommodations described above are not sufficient to the needs of a particular student. Modifications to an assessment might include additional scaffolding for the task, or even a change to the tasks themselves, such as reducing the complexity of the task or the total number of tasks. When teachers consider these modifications, they keep the learning expectations they intend to measure in mind. In considering modifications to an assessment, teachers should ask themselves the question, “How can I maintain the integrity of the assessment while also creating opportunities for all my students to demonstrate what they know and can do?”

**Alternate assessments:** An alternate assessment is used when students cannot participate in the regular assessment process. Typically, alternate assessments are appropriate for students

whose instruction is adapted from grade-level content and reduced in depth, breadth, and complexity.

It may be useful to consider the tenets of “universal design” (Thompson, Johnstone, and Thurlow, 2002) in considering how to differentiate assessments. In a universal-design approach, the assessments are designed, at the onset, to allow participation of the widest possible range of students, and are continually refined to address the needs and abilities of the students in the classroom. Thompson et al. (2002) put forth the following criteria to support accommodations and/or modifications of assessments.7

1. **Define an inclusive assessment population.** In other words, the population of students whom the teacher will assess should include the broadest range of students, including those with disabilities and limited English language proficiency.

2. **Define learning expectations precisely.** When teachers consider the knowledge and skills they expect students to demonstrate, they clearly define those overarching goals for mastery. Do teachers expect their students to construct explanations of phenomena in the natural world? Use evidence to support a claim? These will be the foundations for identifying and defining specific learning expectations (and the specific dimensions of the Performance Expectation) that teachers may want to measure with an assessment. These expectations should be clearly defined so that teachers are well aware of what accommodations could be made without compromising the integrity of the learning expectation to be measured.

3. **Create accessible, non-biased items.** In developing the assessment, the teacher should aim for language that is accessible and tasks that do not privilege some students over others. For example, a teacher who wants students to complete a series of mathematical word problems may want to use simple language and use examples that are accessible to the broadest range of students. The teacher might not ask urban fifth graders to solve a series of word problems that focus on tractor repair, using language about tractors that an urban fifth grader is unlikely to know. The assessment is not measuring students’ knowledge of a tractor’s components, so using tractor repair as the basis of the word problems might serve as a barrier to the students demonstrating their mathematical knowledge.

4. **Create tasks amenable to accommodations.** While teachers do not have to set up the task with all possible accommodations at the onset, they should design the task to be flexible enough that they could develop accommodations that would not interfere with assessing the important learning expectations.

5. **The procedures for completing the task should be simple, clear, and intuitive.** Instructions may be clear to us as teachers but entirely confounding to some students.

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7 These directions retrieved and adapted from [http://www.cehd.umn.edu/nceo/OnlinePubs/Technical42.htm](http://www.cehd.umn.edu/nceo/OnlinePubs/Technical42.htm).
Teachers should check the language used in all directions and consider how a student with language-based disabilities, for example, might interpret the directions.

(6) Related to (5), above, teachers should aim for maximum readability and comprehensibility for the broadest range of students. Consider how to make the directions accessible to students—will visual representations, for example, help to increase the comprehensibility?

(7) Aim for maximum legibility. Legibility is the physical appearance of the text/task. Use text size and fonts that are accessible to the broadest range of students. Consider the age and ability of students and how much text should be on a page, what size the text should be, how much space should be provided between directions, and so on.

Additional guidance related to readability and comprehensibility is included in the table below.

Plain Language Editing Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce excessive length</td>
<td>Reduce wordiness and remove irrelevant material.</td>
</tr>
<tr>
<td>Use common words</td>
<td>Eliminate unusual or low-frequency words and replace them with common words (e.g., replace “utilize” with “use”).</td>
</tr>
<tr>
<td>Avoid ambiguous words</td>
<td>For example, “crane” should be avoided because it could be a bird or a piece of heavy machinery.</td>
</tr>
<tr>
<td>Avoid irregularly spelled words</td>
<td>Examples of irregularly spelled words are “trough” and “feign.”</td>
</tr>
<tr>
<td>Avoid proper names</td>
<td>Replace proper names with simple common names such as first names.</td>
</tr>
<tr>
<td>Avoid inconsistent naming and graphic conventions</td>
<td>Avoid multiple names for the same concept. Be consistent in the use of typeface.</td>
</tr>
</tbody>
</table>

8 This table adapted from Thompson and Thurlow (2002), retrieved from http://cehd.umn.edu/nceo/OnlinePubs/Policy14.htm.
Avoid unclear signals about how to direct attention

Well-designed heading and graphic arrangements can convey information about the relative importance of information and order in which it should be considered.

Mark all questions

Give an obvious graphic signal (e.g., bullet, letter, number) to indicate separate questions.

It may help to inventory the students in the classroom, their learning needs, and the assessment accommodations and/or modifications they may need. It may be helpful to create a table that indicates who the student is, what an Individual Education Plan (IEP) states about accommodations or modifications, and how this translates to the assessments that are regularly administered.

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Accommodations in IEP /504</th>
<th>Adaptations for my classroom assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Smith</td>
<td>Extended time on test</td>
<td>Oral assessment may be conducted by video and submitted to teacher rather than performed in class. Allow student extra time to present the oral assessment.</td>
</tr>
<tr>
<td>Kaylee Williams</td>
<td>Reader for exams</td>
<td>Audio recording of all instructions for multi-step performance assessment will be provided so student can return to instructions whenever needed to help clarify the task and provide support, as needed, with related materials.</td>
</tr>
<tr>
<td></td>
<td>Quiet room with limited distractions</td>
<td></td>
</tr>
</tbody>
</table>

Again, consider the following accommodations\(^9\) in developing the above table for a roster of students:

- **Timing and scheduling accommodations**: extending time to complete an assessment or allowing flexible scheduling provisions.
- **Setting accommodations**: modifications/adjustments to the testing environment or conditions.
- **Presentation accommodations**: modifications/adjustments to the test administration (e.g., auditory/visual assistance, sign language, oral presentation, calculators, cues).

- **Response accommodations**: modifications/adjustments affecting provision of answers (e.g., answer dictation, assistive/adaptive/augmentative technology, visual assistance).

- **Linguistic accommodations**: allow English learners to access assessment tasks/items by reducing the linguistic load. Accommodations are based on an English learner’s limited English language proficiency (different than an accommodations based on a student’s disability or cognitive need).

**Fairness**

While we would all like to believe that our work with students is free of any bias, we may have preconceived notions about what a particular student or group of students can or cannot do, and this may affect how we assess students’ work. As educators, we have to examine our practices and be sure that we are not inadvertently letting bias creep into our assessment practices.

Employing a few checks on our assessments can help to reduce bias. Ask yourself the following questions:

- Does anything in my assessment promote stereotypes?
- Is the language appropriate to the task but not overly confusing or complex?
- Have I avoided highly sensitive content unless it is necessary for the assessment?
- Have I limited the irrelevant factors, focusing instead on the skills that are essential to the task and linked to the learning expectations/standards I want to assess?
- In my evaluation of individual students or groups of students, have I let my biases about these students interfere with my evaluation of their work?
Apply It Activity: Considering Accommodations and Modifications to Assessments

Turn and talk to a colleague: What kinds of accommodations and modifications to assessments have you had success with in the past? What are your ideas for accommodations and modifications to this or other assessments?

Talk in pairs and make notes, for future reference, in the space provided below.

Step 5: Key Takeaways

✓ When you consider your students’ cultural and linguistic backgrounds in developing the assessment, you will benefit from greater student engagement and more accurate information about what your students know and can do.

✓ When designing your assessment, consider how it can be made accessible to the broadest range of students, including those with disabilities and limited English language proficiency, while retaining the integrity of the learning expectations you intend to assess.

✓ Educators must continually reflect to ensure that we are not inadvertently letting bias creep into our assessment practices.
Reflection

Assessment development is an ongoing process. As the Reflection standard from the *Guiding Principles* describes, all classroom assessments—formative, interim, and summative—require ongoing review and revision. Changes in the curriculum, or in the students, necessitate changes in the assessment practices. As teachers, reflection about our teaching practice includes reflecting on and revising our assessment practices.

Reflection does not occur only after you administer your assessment. Rather, it is important to review an assessment before administering it. This will help you to understand if the assessment really “works.”

After administering an assessment, it is equally important to review the assessment and the data and information collected to make appropriate changes based on what you learn from administering the assessment.

---

Apply It Activity: Reflection

The final Quality standard from the *Guiding Principles* is Reflection. We will end the workshop by considering this standard.

**Requirements:**
- *Guiding Principles for Classroom Assessment*
- Pencil
- Partner(s)

**Directions**
1. Please open to Standard Q6 and review the questions listed.
2. Read the reflection questions listed on the page.
3. Select three questions from the list that you will ask yourself either before or after administering the assessment you have developed during this workshop, or another assessment you expect to administer soon.
4. Turn to a colleague and discuss at least one of the questions and why you selected it.
At this point, you should have developed familiarity with the five steps of assessment development. You have now made progress in developing a draft assessment and received feedback along the way.

In working through the template and the activities, we hope you have resolved some of the questions that may have emerged as we presented the five steps. Now is a good time to step back, examine the process, and ask questions of the presenters and one another about the process you have gone through in developing an assessment.
Appendices

Appendix A: Blank Assessment Development Template
Appendix B: Sue Case—Sample Middle School Earth Science Assessment Development Template
Appendix C: Related Materials for Sue’s Middle School Earth Science Assessment
Appendix D: Overview of Developing Learning Expectations Step
Appendix E: MS-LS1-6 from the Illinois Learning Standards for Science
Appendix F: References
Appendix A: Blank Assessment Development Template
Assessment Development Template

Overview
The purpose of this template\(^\text{10}\) is to guide educators through the assessment development process using criteria set forth in the Illinois State Board of Education (ISBE) Guiding Principles for Classroom Assessment for the purpose of the Local Assessment Support (LAS) project. The goal of the LAS project is to support the development of quality classroom assessments in commonly non-tested grades and subject areas. ISBE encourages educators to adapt and use the template for regular use within local contexts. The template is intended to provide non-regulatory guidance.

Organization
The Guiding Principles for Classroom Assessment defines assessment as the process of collecting and interpreting information that can be used to inform teachers, students, and when applicable, parents/guardians or other users of assessment information about students’ progress in attaining the knowledge, skills, attitudes, and behaviors to be learned or acquired in school.

Like the Guiding Principles for Classroom Assessment, this assessment template is organized into three domains: Foundations, Use, and Quality. A summary of each is presented below:

**Foundations**
The six foundation standards encompass the basis for developing and implementing sound and fair classroom assessment practices that are focused on the students to be assessed.

**Use**
The four use standards align with the assessment process and follow a logical progression from selecting and developing classroom assessments to communicating the assessment results.

**Quality**
The six quality standards address assessment practices to ensure that accurate and dependable information about students’ learning is collected.

Instructions
Please fill out the template by answering each question completely. At the end of each section, there is a checklist to help ensure that the assessment meets the criteria outlined in the Guiding Principles for Classroom Assessment.

You are encouraged to write your answers in the template and to save your work frequently throughout the process.

\(^{10}\) Some of the questions in this template have been adapted from the Colorado Department of Education Assessment Review Tool, [http://www.coloradoplc.org/assessment/assessment-review-tool-0](http://www.coloradoplc.org/assessment/assessment-review-tool-0).
**Assessment Profile**

<table>
<thead>
<tr>
<th>Name of assessment:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Content area of assessment:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Submitted assessment type (check all that apply):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Selected Response (multiple choice, matching, true/false)</td>
<td></td>
</tr>
<tr>
<td>□ Short Answer (short constructed written response, fill in graphic organizer/diagram, explain your thinking, make and complete a table, etc.)</td>
<td></td>
</tr>
<tr>
<td>□ Extended Response (essay, multi-step response)</td>
<td></td>
</tr>
<tr>
<td>□ Product (research paper, log, play, poem, model, multimedia products, portfolio pieces, etc.)</td>
<td></td>
</tr>
<tr>
<td>□ Performance (demonstration, presentation, science lab, performance, debate, etc.)</td>
<td></td>
</tr>
<tr>
<td>□ Process (creation, development, design, exploration, visualization, invention, etc.)</td>
<td></td>
</tr>
</tbody>
</table>

| Please provide a brief description (50 words or less) of this assessment. |  |
Step 1: Defining the Assessment Population and Purpose (F1)

Assessment Population

Please select the appropriate grade level(s) for this assessment.

- Pre-K
- K
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

Does this assessment apply to specific student subgroups? If so, specify here (e.g., advanced automotive course).

Assessment Purpose

Intended purpose of assessment (check all that apply):

- To provide regular feedback to teachers so they can adjust instruction to improve student learning. (formative assessment)
- To identify strengths and weaknesses in curriculum and instruction. (interim assessment)
- To measure overall curriculum and program effectiveness. (summative assessment)
- To engage students in self-assessment.
- To engage students in peer assessment.
- To assist the educator in making diagnostic decisions.
- Other: ________________________________

Step 1 Checklist

- Is this assessment appropriate for the stated purposes?
- Is the assessment appropriate for the specified grade levels?
Step 2: Identifying and Defining the Learning Expectation to Assess (F2/Q4)

Selecting Content Standards and Defining Learning Expectations

Please list the specific content standards and related learning expectations the assessment is designed to measure. Then list the accompanying tasks that address each content standard and learning expectation(s). Please include information about the source of content standards in addition to the specific content standards (e.g., National Business Education Association standards, new Illinois Learning Standards for Science).

1. List each content standard once in the appropriate column.
2. For each content standard, clarify the explicit learning expectation(s) associated with the content standard.
3. List all tasks that apply to that content standard and learning expectation(s). Tasks may appear more than once if they are related to more than one content standard and learning expectation. In other words, the same task may be repeated in the aligned tasks column if the task addresses more than one of the learning expectations listed in the learning expectations column.

Note: In the absence of content standards from which to develop learning expectations, clearly articulate the learning expectations aligned to the tasks. In the case of the Illinois Learning Standards for Science, please use the table of specifications in the appendix.

Please note the following definitions:

Content Standards: Descriptions of what students should know and be able to do in a specific content area.

Learning Expectations: Evidence related to the content standards that may be measured through assessment.

Step 2 Checklist

✓ Does this assessment use appropriate levels of academic language for the grade and content area?
✓ Does this assessment allow students to demonstrate a full range of knowledge, skills, and abilities according to your specified content standards and learning expectations?
✓ Does the assessment clearly communicate the learning expectations to students?
✓ Do the assessment items or tasks fully measure all of the content standards and learning expectations the assessment is said to measure (alignment in content and alignment in complexity)?
✓ Does the set of items or tasks that make up the assessment measure the full range of the knowledge, skills, and abilities that students will be required to demonstrate (alignment in complexity)?
### Step 3: Building Authentic Assessments (F3-F5)

#### Assessment Preparation (F5)

<table>
<thead>
<tr>
<th><strong>Please describe any prerequisite skills and/or concepts to which students should have had exposure to prepare them for successfully completing this assessment.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Please indicate the amount of class time that should be allocated for assessment administration inclusive of all phases of assessment.**

*Please make note of how much time administration should take.*

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Please list the materials and/or resources a teacher would need in order to implement this assessment in the classroom. Include materials needed by both teachers and/or students.**

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Please summarize any preparations that should be carried out prior to classroom assessment administration (e.g., copying of materials, prepping visuals, etc.).**

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
**Student Engagement (F4)**

<table>
<thead>
<tr>
<th>Please describe any strategies employed to support student engagement during the assessment process (e.g., peer review, self-review).</th>
</tr>
</thead>
</table>

**Assessment Design (F3)**

<table>
<thead>
<tr>
<th>Please include a list of teacher instructions for this assessment.</th>
</tr>
</thead>
</table>
Please include a list of student instructions for this assessment. Please also include any assessment prompts that should be provided to students.

<table>
<thead>
<tr>
<th>Step 3 Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Does the assessment contain instructions or supplementary materials for stakeholders (such as students, or when appropriate, parents) that explain the purpose and use of the assessment?</td>
</tr>
<tr>
<td>✓ Are these instructions clearly written such that a teacher could pick them up and use them in the classroom with little instruction?</td>
</tr>
</tbody>
</table>

Please list any other materials necessary for assessment administration (e.g., worksheets, work samples for students, table/figure templates).
### Step 4: Developing and Using High Quality Evaluation Criteria (U1-U4, Q5)

#### Analysis of Student Performance (U1)

Please identify which evaluation tools are present for this assessment (Check all that apply.).

- Answer key, scoring template
- Generalized rubric (e.g., for all persuasive writing, all science labs)
- Task-specific rubric (only used for particular task)
- Checklist (with score points for each part)
- Teacher observation sheet/checklist
- Other ____________________________

#### Effective Feedback (U2)

Please list any recommendations about how the tools should be used to evaluate student work.

#### Instructional Planning (U3)

Please describe how the assessment will inform a teacher’s instructional practice. How will this assessment help teachers modify future lessons based on their students’ performance?

Assessment Development Template
<table>
<thead>
<tr>
<th>How will you use the assessment to differentiate instruction?</th>
</tr>
</thead>
</table>

### Step 4 Checklist

- ✓ Do the evaluation tools clearly address the appropriate content standards?
- ✓ Are the differences in performance levels easily determined by the evaluation tools included with this assessment?
- ✓ Do the evaluation tools address all the tasks in the assessment?
- ✓ Is the evaluation tool specific enough that another teacher could use the tool?
Step 5: Ensuring Assessment is Accessible for All Learners (Q1-3)

Assessment Accommodations and Modifications (Q1-3)

<table>
<thead>
<tr>
<th>What kinds of accommodations or modifications are appropriate for this assessment (consider special student populations such as students with disabilities, English learners, and gifted students)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodations refer to changes in the way a student accesses the assessment.</td>
</tr>
<tr>
<td>Modifications refer to changes to the instrument or evaluation procedure.</td>
</tr>
</tbody>
</table>

Step 5 Checklist

- Have you considered the following types of accommodations: timing and scheduling, setting, presentation, response, and linguistic accommodations (Q2)?
- Is the assessment appropriate for students of all cultural and linguistic backgrounds?
- Is this assessment designed and formatted to be visually clear and uncluttered?
- Are the tasks presented in a way that is free from unintended bias?
- Does the assessment limit the usage of words that can be confused with one another (i.e. homonyms: ate/eight, awl/all, billed/build)?
Table of Specifications for Illinois Learning Standards for Science

Assessment Title:

Population:

Purpose:

<table>
<thead>
<tr>
<th>Performance Expectation</th>
<th>Disciplinary Core Ideas, Practices, and Crosscutting Concepts</th>
<th>Components of Each Dimension (Alignment to assessment tasks in parentheses following each statement)</th>
<th>Aligned Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>List the Performance Expectation(s).</td>
<td>List the disciplinary core ideas (DCIs) embedded in the performance expectation.</td>
<td>Break down the DCI into concepts students need to know, understand, and demonstrate to reach the final DCI (Appendix E provides examples).</td>
<td>List the task(s) associated with the DCI(s).</td>
</tr>
<tr>
<td>List the Performance Expectation(s.)</td>
<td>List the practice(s) students will exhibit to demonstrate their understanding of the DCI(s.)</td>
<td>Break down the practice(s) students need to know and be able to perform (Appendix F provides examples.)</td>
<td>List the task(s) associated with the practice(s.)</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>List the Performance Expectation(s.)</td>
<td>List the crosscutting concepts (CCC) relevant to the Performance Expectation.</td>
<td>Break down the CCC. (Appendix G provides additional information for each grade band)</td>
<td>List the task(s) associated with the CCC(s.)</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assessment Development Template
Appendix B:
Sue Case—Sample Middle School Earth Science Assessment Development Template
Assessment Development Template

Overview

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The four use standards align with the assessment process and follow a logical progression from selecting and developing classroom assessments to communicating the assessment results.

Quality
The six quality standards address assessment practices to ensure that accurate and dependable information about students’ learning is collected.

Instructions

Please fill out the Template by answering each question completely. At the end of each section, there is a checklist to help ensure that the assessment meets the criteria outlined in the Guiding Principles for Classroom Assessment.

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11 Some of the questions in this template have been adapted from the Colorado Department of Education Assessment Review Tool, http://www.coloradoplc.org/assessment/assessment-review-tool-0.
<table>
<thead>
<tr>
<th>Assessment Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name of assessment:</strong></td>
</tr>
<tr>
<td><strong>Content area of assessment:</strong></td>
</tr>
<tr>
<td><strong>Submitted assessment type (check all that apply):</strong></td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Please provide a brief description (50 words or less) of this assessment.</strong></td>
</tr>
</tbody>
</table>
**Step 1: Defining the Assessment Population and Purpose (F1)**

### Assessment Population

<table>
<thead>
<tr>
<th>Please select the appropriate grade level(s) for this assessment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Pre-K ☐ K ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ 6 ☐ 7</td>
</tr>
<tr>
<td>☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Does this assessment apply to specific student subgroups? If so, specify here (e.g., advanced automotive course).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 6 Earth science students</td>
</tr>
</tbody>
</table>

### Assessment Purpose

<table>
<thead>
<tr>
<th>Intended purpose of assessment (check all that apply):</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ To provide regular feedback to teachers so they can adjust instruction to improve student learning (formative assessment).</td>
</tr>
<tr>
<td>☒ To identify strengths and weaknesses in curriculum and instruction (interim assessment).</td>
</tr>
<tr>
<td>☒ To measure overall curriculum and program effectiveness (summative assessment).</td>
</tr>
<tr>
<td>☐ To engage students in self-assessment.</td>
</tr>
<tr>
<td>☒ To engage students in peer assessment.</td>
</tr>
<tr>
<td>☐ To assist the educator in making diagnostic decisions.</td>
</tr>
<tr>
<td>☐ Other: ___________________________________________</td>
</tr>
</tbody>
</table>

**Step 1 Checklist**

- ☑ Is this assessment appropriate for the stated purposes?
- ☑ Is the assessment appropriate for the specified grade levels?
Step 2: Identifying and Defining the Learning Expectation to Assess (F2/Q4)

Selecting Content Standards and Defining Learning Expectations

Please list the specific content standards and related learning expectations the assessment is designed to measure. Then list the accompanying tasks that address each content standard and learning expectation(s). Please include information about the source of content standards in addition to the specific content standards (e.g., National Business Education Association standards, new Illinois Learning Standards for Science).

1. List each content standard once in the appropriate column.
2. For each content standard, clarify the explicit learning expectation(s) associated with the content standard.
3. List all tasks that apply to that content standard and learning expectation(s). Tasks may appear more than once if they are related to more than one content standard and learning expectation. In other words, the same task may be repeated in the aligned tasks column if the task addresses more than one of the learning expectations listed in the learning expectations column.

Note: In the absence of content standards from which to develop learning expectations, clearly articulate the learning expectations aligned to the tasks. In the case of the new Illinois Learning Standards for Science, please use the table of specifications in the appendix.

Please note the following definitions:

**Content Standards:** Descriptions of what students should know and be able to do in a specific content area.

**Learning Expectations:** Evidence related to the content standards that may be measured through assessment.

**Step 2 Checklist**

- Does this assessment use appropriate levels of academic language for the grade and content area?
- Does this assessment allow students to demonstrate a full range of knowledge, skills, and abilities according to your specified content standards and learning expectations?
- Does the assessment clearly communicate the learning expectations to students?
- Do the assessment items or tasks fully measure all of the content standards and learning expectations the assessment is said to measure (alignment in content and alignment in complexity)?
- Does the set of items or tasks that make up the assessment measure the full range of the knowledge, skills, and abilities that students will be required to demonstrate (alignment in complexity)?
## Step 3: Building Authentic Assessments (F3-F5)

### Assessment Preparation (F5)

<table>
<thead>
<tr>
<th>Please describe any prerequisite skills and/or concepts to which students should have had exposure to prepare them for successfully completing this assessment.</th>
<th>Please indicate the amount of class time that should be allocated for assessment administration inclusive of all phases of assessment.</th>
</tr>
</thead>
</table>
| • Earth’s major systems are the geosphere, the hydrosphere, the atmosphere, and the biosphere.  
• The geosphere is layered with a lithosphere, a hot convecting mantle, and a dense metallic core.  
• Lithosphere plates constantly move at rates of centimeters per year in response to movements in the mantle.  
• Land forms are a result of a combination of constructive and destructive forces.  
• Some changes in the solid Earth can be described as the rock cycle. Old rocks at the surface weather, forming sediments that are buried, compacted, heated, and often become new rock. New rock may be brought to the surface by plate motions.  
• Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.  
• Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.  
• A claim answers a question.  
• Evidence is data that supports a claim.  
• Reasoning is the use of ideas or concepts that support a claim. | Please make note of how much time administration should take.  
This assessment is designed to take place over 5-6 class sessions. Tasks 1 and 3 will each take three class sessions. Tasks 2 and 4 can be completed in one class session. The breakdown by task is:  
• Task 1: Three sessions of 20 minutes each (60 total), plus optional 20-minute peer assessment.  
• Task 2: 20 minutes, plus optional 30-minute peer assessment.  
• Task 3: Three sessions of 30 minutes each (90 total).  
• Task 4: 30 minutes. |
The total amount of time that should be allocated to administration for all four tasks is 220 minutes, including 5 minutes for assessment instructions per task. If the first optional peer-assessment is included, the total time is 240 minutes. If the second optional peer-assessment is included, the total time is 270 minutes.

<table>
<thead>
<tr>
<th>Please list the materials and/or resources a teacher would need in order to implement this assessment in the classroom. Include materials needed by both teachers and/or students.</th>
<th>Teachers will need:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers will need:</td>
<td>• Claim, evidence, reasoning scientific explanation rubric.</td>
</tr>
<tr>
<td>• Curricula materials relating to the Performance Expectation and the Next Generation Science Standards appendices.</td>
<td>• Artifacts for Task 3, including: maps from the last 200 years showing how the continents moved; diagrams of the shapes of the continents; pictures of the plant and animal fossils found on the different continents; and lists of rocks found on the different continents.</td>
</tr>
<tr>
<td>• Artifacts for Task 3, including: maps from the last 200 years showing how the continents moved; diagrams of the shapes of the continents; pictures of the plant and animal fossils found on the different continents; and lists of rocks found on the different continents.</td>
<td>Students will need:</td>
</tr>
<tr>
<td>Students will need:</td>
<td>• Assessment task/prompts.</td>
</tr>
<tr>
<td>• Scientific explanation chart.</td>
<td>• Pencil and colored pencils.</td>
</tr>
<tr>
<td>• Scratch paper.</td>
<td>• Claim, evidence, reasoning, scientific explanation rubric shared ahead of time.</td>
</tr>
</tbody>
</table>

Please summarize any preparations that should be carried out prior to classroom assessment administration (e.g., copying of materials, prepping visuals, etc.).

The teacher should ensure that each student is provided with three copies of the scientific explanation chart.

The teacher may want to share the claim, evidence, reasoning, scientific explanation rubric with students before they complete the first of the scientific explanation prompts. This will help students have a clear understanding of how their performance will be evaluated.

The teacher should plan for student accommodations, such as reserving quiet rooms for students needing extra time, prior to administration.
### Student Engagement (F4)

| Please describe any strategies employed to support student engagement during the assessment process (e.g., peer review, self-review). | Students are encouraged to use a peer review process after completing their model in Task 1. Students can exchange their model with another student and identify pieces of the model that need more explaining or clarification, as well as where evidence is needed. Students can assign a performance level as well as provide written or verbal feedback to one another. This activity should take approximately 20 minutes. Students can also use a peer review process to review the claims they make at the end of Task 2. Students can exchange their written claim statements, evidence, and scientific reasoning with another student and use a copy of the claim, evidence, reasoning rubric to evaluate their peer’s response. Students can assign a performance level for the claim, evidence, and reasoning independently, as well as provide written or verbal feedback to each other. This activity should take approximately 30 minutes. |

### Assessment Design (F3)

| Please include a list of teacher instructions for this assessment. |
| Task 1: *Students develop a model to explain the different ways Earth’s tectonic plates can interact with each other at their boundaries and what causes these patterns of movement.* |

**Class Session 1—After student investigation on earthquakes:**
1. Distribute paper and pencils.
2. Distribute the Task 1 prompt.
3. Allow students 20 minutes to individually complete the task of creating a model.
5. Check for student misconceptions.

**Class Session 2—After student investigation on mid-ocean ridges and rises and colliding plates:**
1. Re-distribute student models.
2. Allow students 20 minutes to modify and revise their model based on the new information they learned during their investigation.
3. Collect responses.

Class Session 3—Constructing an explanation using a model:
1. Re-distribute student models.
2. Allow students 20 minutes to use their model to construct an explanation about why different geological features appear at the different plate boundaries and the forces that are acting on them.
3. (OPTIONAL STEP) Allow students to exchange models and scientific explanations. Students identify areas where the model doesn’t make sense to them, where more evidence may be needed, or areas where the author may need to explain his or her reasoning more clearly.

Task 2: Students use scientific reasoning to make a claim based on evidence collected from content covered prior to the interim task about the following question: Can ice change the surface of a mountain?
1. Distribute the scientific explanation chart, which students will use to scaffold their responses.
2. Distribute the Task 2 prompt.
3. Allow students approximately 20 minutes to complete the scientific explanation chart and create a written response.
4. (OPTIONAL STEP) After everyone has completed the task, students can exchange papers with one another, and use the claim, evidence, reasoning, scientific explanation rubric to review their peer’s response. Students can provide written and verbal feedback to one another. This should take approximately 30 minutes.
5. Collect responses.
6. Evaluate each student’s response using the claim, evidence, reasoning, scientific explanation rubric, noting discrepancies between the peer reviewer and his or her own review. The teacher’s review should serve as the final evaluation of the student work.
7. Note any themes or common areas of success and
challenges for the class. Share these with the class, and if needed, spend additional time on challenging topics.

Task 3: Students use scientific reasoning and evidence gathered in an activity to make a claim about the question: Did the land on Earth start out as one giant continent? In the activity, students rotate through different stations that include readings and activities where they obtain evidence scientists have collected to investigate this question, such as shapes of the continents, the types of plant and animal fossils found on the different continents, and the types of rocks found on the different continents (adapted from McNeill and Krajcik, 2012).

Class Session 1
1. Set up the artifact stations (prior to start of class).
2. Distribute the scientific explanation charts.
3. Distribute the Task 3 prompt.
4. Assign students an order to their rotation through the stations.
5. Allow students approximately 30 minutes to explore the artifact station and fill out the scientific explanation chart.
6. By the end of 30 minutes, students should at least have started to fill out the evidence section.
7. Collect students’ scientific explanation charts.

Class Session 2
1. Set up the artifact stations (prior to start of class).
2. Distribute students’ partially completed scientific explanation charts.
3. Allow students approximately 30 minutes to continue exploring the artifact stations and filling out the chart.
4. By the end of 30 minutes students should have completed the evidence section.
5. Collect students’ scientific explanation charts.

Class Session 3
1. Set up the artifact stations (prior to start of class).
2. Distribute students’ scientific explanation charts.
3. Allow students approximately 30 minutes to
continue exploring the artifact stations and filling out the chart.

4. By the end of 30 minutes students should have completed the entire chart.

5. Collect the charts.

6. Evaluate each student’s scientific explanation chart using the claim, evidence, reasoning scientific explanation rubric.

7. The teacher should note any themes or common areas of success and challenges for the class. Share these with the class, and if needed, spend additional time on challenging topics.

Task 4: Students use scientific reasoning and evidence gathered throughout the instructional unit to make a claim about the question: Why are some mountains bigger than others?

1. Distribute the scientific explanation charts.

2. Distribute the Task 4 prompt.

3. Allow students approximately 30 minutes to complete the chart, create a written extended response, and prepare a brief oral presentation.

4. Collect the written responses and have students present their oral presentations.

5. Evaluate each student’s response and presentation using the claim, evidence, reasoning scientific explanation rubric.

6. The teacher should note any themes or common areas of success and challenges for the class. Share these with the class, and if needed, spend additional time on challenging topics.

* Note: If students need extra time beyond the allotted time, make accommodations for those students. These accommodations should be planned for prior to administration.
Please include a list of student instructions for this assessment. Please also include any assessment prompts that should be provided to students.

<table>
<thead>
<tr>
<th><strong>Task 1 Prompt:</strong> Develop a model to explain the different ways Earth’s tectonic plates can interact with each other at their boundaries. Explain what causes these patterns of movement.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Student Instructions for Task 1 (can be used on all three days):</td>
</tr>
<tr>
<td>1. Use a piece of blank paper and colored pencils to develop a model that can be used to explain what causes the different motions that can be found at a tectonic plate boundary and what forces are present at these boundaries. (On days 2 and 3, change to: Revise your model based on the new information you learned today.).</td>
</tr>
<tr>
<td>2. You will have 20 minutes to complete this task.</td>
</tr>
<tr>
<td>3. When you are finished, you may read quietly.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Task 2 Prompt:</strong> Can ice change the surface of a mountain?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Student Instructions for Task 2:</td>
</tr>
<tr>
<td>1. Read the task prompt.</td>
</tr>
<tr>
<td>2. Complete the scientific explanation chart to respond to the prompt.</td>
</tr>
<tr>
<td>3. Write an extended response to answer the prompt, using the scientific explanation chart as a guide.</td>
</tr>
<tr>
<td>4. You will have 20 minutes to complete this task.</td>
</tr>
<tr>
<td>5. When you are finished, you may read quietly.</td>
</tr>
<tr>
<td>6. Once everyone has completed the task, exchange your written response with a peer.</td>
</tr>
<tr>
<td>7. Use the claim, evidence, reasoning scientific explanation rubric to evaluate your peer’s responses. Be sure to provide a performance level for the claim, each evidence statement, and the reasoning. Provide written notes on your evaluation, and when you are both finished, discuss your performance levels with one another. You will have 30 minutes.</td>
</tr>
<tr>
<td>8. Hand your written responses to the teacher. He or she will also evaluate them to provide you with your final ratings.</td>
</tr>
<tr>
<td>Task 3 Prompt: Did the land on Earth start out as one giant continent?</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td><strong>1.</strong> Over three class periods, you will complete the scientific explanation chart to respond to the prompt.</td>
</tr>
<tr>
<td><strong>2.</strong> Read the task prompt.</td>
</tr>
<tr>
<td><strong>3.</strong> Review the materials and artifacts at each of the stations to obtain evidence to support your claim.</td>
</tr>
<tr>
<td><strong>4.</strong> Be sure to leave time during each class session to fill out your scientific explanation chart. By the end of the second class session your evidence section should be complete. Use the last class session to complete the reasoning section of the scientific explanation chart.</td>
</tr>
<tr>
<td><strong>5.</strong> At the end of each class session return your scientific explanation chart to the teacher. After you’ve completed your chart, your teacher will evaluate it to provide you with your final performance level.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task 4 Prompt: Why are some mountains bigger than others?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Read the task prompt.</td>
<td><strong>1.</strong> Read the task prompt.</td>
</tr>
<tr>
<td><strong>2.</strong> Complete the scientific explanation chart to respond to the prompt.</td>
<td><strong>2.</strong> Complete the scientific explanation chart to respond to the prompt.</td>
</tr>
<tr>
<td><strong>3.</strong> Write an extended response to answer the prompt, using the scientific explanation chart as a guide. Prepare a short (2-minute) oral presentation of your written response.</td>
<td><strong>3.</strong> Write an extended response to answer the prompt, using the scientific explanation chart as a guide. Prepare a short (2-minute) oral presentation of your written response.</td>
</tr>
<tr>
<td><strong>4.</strong> You will have 30 minutes to complete this task.</td>
<td><strong>4.</strong> You will have 30 minutes to complete this task.</td>
</tr>
<tr>
<td><strong>5.</strong> When you are finished, you may read quietly.</td>
<td><strong>5.</strong> When you are finished, you may read quietly.</td>
</tr>
</tbody>
</table>

Please list any other materials necessary for assessment administration (e.g., worksheets, work samples for students, table/figure templates). See section “Materials & Resources” box above on bottom of page 90.
### Step 3 Checklist

- Does the assessment contain instructions or supplementary materials for stakeholders (such as students, or when appropriate, parents) that explain the purpose and use of the assessment?
- Are these instructions clearly written such that a teacher could pick them up and use them in the classroom with little instruction?

### Step 4: Developing and Using High Quality Evaluation Criteria (U1-U4, Q5)

#### Analysis of Student Performance (U1)

| Please identify which evaluation tools are present for this assessment (Check all that apply.) | □ Answer key, scoring template | □ Generalized rubric (e.g., for all persuasive writing, all science labs) |
|                                                                                  | □ Task-specific rubric (only used for particular task) | □ Checklist (with score points for each part) |
|                                                                                  | □ Teacher observation sheet/checklist                   | □ Other ____________________________________________ |

#### Effective Feedback (U2)

| Please list any recommendations about how the tools should be used to evaluate student work. | The claim, evidence, reasoning scientific explanation rubric can be used to provide an overall performance level rating for each task for the student’s (1) claim, (2) evidence, and (3) reasoning. These may be used to demonstrate how a student’s performance improved over the course of completing these related tasks. |
|                                                                                           | Based on students’ performance on the initial task, in which students develop a model, the teacher can assess students’ understanding of Earth’s systems, plate tectonics, the kind and rate of plate movement, constructive and destructive forces, scale, proportion and quantity, and their skill at the practice of claim-evidence-reasoning. |

#### Instructional Planning (U3)

| Please describe how the assessment will inform a teacher’s instructional practice. How will this assessment help teachers modify future lessons based on their students’ performance? | Based on students’ performance on the initial task, in which students develop a model, the teacher can assess students’ understanding of Earth’s systems, plate tectonics, the kind and rate of plate movement, constructive and destructive forces, scale, proportion and quantity, and their skill at the practice of claim-evidence-reasoning. |
How will you use the assessment to differentiate instruction?

The assessment results can be used to differentiate instruction in multiple ways. Depending on where a student may be struggling, such as in writing claims, providing evidence, or constructing reasoning statements, additional support can be provided in any of these areas. For example, a teacher could provide a partially completed scientific explanation chart to a student who needed additional scaffolding. If students are struggling with the content in general, additional instruction can be provided to ensure that they understand the content, the practices, and the concepts.

Step 4 Checklist

- Do the evaluation tools clearly address the appropriate content standards?
- Are the differences in performance levels easily determined by the evaluation tools included with this assessment?
- Do the evaluation tools address all the tasks in the assessment?
- Is the evaluation tool specific enough that another teacher could use the tool?

Step 5: Ensuring Assessment is Accessible for All Learners (Q1-3)

Assessment Accommodations and Modifications (Q1-3)

| Accommodations refer to changes in the way a student accesses the assessment. |
| Modifications refer to changes to the instrument or evaluation procedure. |

Appropriate accommodations include the following:

- Timing or scheduling: Students can be allowed extra time or be allowed to take the assessment during a different time of day.
- Setting: Students can take the assessment in a different setting, such as a quiet office with few distractions.
- Presentation: The assessment may be provided on paper (default), on a computer, or in Braille or read aloud. The teacher could provide sentence and paragraph starters to students as they develop their claim statements.
- Response options: Students can respond on paper by writing (default), on a computer by typing, or orally using a scribe to record their responses.
• Linguistic: The assessment may be translated into a student’s native language, or read aloud in English to an English learner student. Students may also respond in their native language.

**Step 5 Checklist**

- Have you considered the following types of accommodations: timing and scheduling, setting, presentation, response, and linguistic accommodations (Q2)?
- Is the assessment appropriate for students of all cultural and linguistic backgrounds?
- Is this assessment designed and formatted to be visually clear and uncluttered?
- Are the tasks presented in a way that is free from unintended bias?
- Does the assessment limit the usage of words that can be confused with one another (i.e. homonyms: ate/eight, awl/all, billed/build)?
Table of Specifications for Illinois Learning Standards for Science

**Assessment Title:** How are mountains formed?

**Population:** Sixth-grade Earth science students

**Purpose:** This assessment combines formative, interim, and summative tasks to measure sixth-grade students’ ability to construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales during and at the end of a unit of instruction on how mountains are formed.
### Performance Expectation

**Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at time and spatial scales (MS-ESS2-2).**

#### Clarification Statement:
Emphasis is on how processes change Earth’s surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.

### Disciplinary Core Ideas, Practices, and Crosscutting Concepts

**ESS2.A: Earth’s Materials and Systems**
All Earth processes are the result of energy flowing and matter cycling within and among the planet’s systems. This energy is derived from the sun and Earth’s hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth’s materials and living organisms (MS-ESS2-1).

The planet’s systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth’s history and will determine its future (MS-ESS2-2).

**ESS2.B: Plate Tectonics and Large-Scale System Interactions**
Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth’s plates have moved great distances, collided, and spread apart (MS-ESS2-3).

### Components of Each Dimension

**Break down the DCI into concepts students need to know, understand, and demonstrate to reach the final DCI (Appendix E provides examples).**

**Based on ESS2.A Grade Band Endpoints**
1. Plate tectonics is a result of complex interactions between the geosphere, hydrosphere, atmosphere, and biosphere. (Task 1)
2. The motion of tectonic plates is part of convection in Earth’s mantle. (Task 1)
3. This heat from the Earth’s hot interior and the downward pull of gravity, results in the formation and changes of earth’s land and undersea surface. (Task 1)
4. The planet’s systems interact over scales that range from microscopic to global in size. (Task 2)
5. Components of Earth’s systems may appear stable, changing slowly over time or change abruptly. (Task 3)
6. These interactions have shaped Earth’s history and will determine its future. (Tasks 2 & 3)

**Based on ESS2.B Grade Band Endpoints**
1. Earth’s plates have moved great distances, collided, and spread apart. (Task 3)
2. Maps of ancient land and water show patterns of rocks and fossils. (Task 3)

### Aligned Tasks

**Task 1 (formative):** Students develop a model to explain the different ways Earth’s tectonic plates can interact with each other at their boundaries, and what causes these patterns of movement.

**Task 2 (interim):** Students use scientific reasoning to make a claim based on evidence collected from content covered prior to the interim task about the following question: Can ice change the surface of a mountain?

**Task 3 (interim):** Students use scientific reasoning and evidence gathered in an activity to make a claim about the question: Did the land on Earth start out as one giant continent? In the activity, students rotate through different stations that include readings and activities where they obtain evidence scientists have collected to investigate this question, such as shapes of the continents, the types of plant and animal fossils found on the different continents, and the types of rocks found on the different continents. (adapted from McNeill and Krajcik, 2012).

**Task 4 (summative):** Students use scientific reasoning and evidence gathered throughout the instructional unit to make a claim about the following question: Why are some mountains bigger than others?
<table>
<thead>
<tr>
<th>List the Performance Expectation(s).</th>
<th>List the practice(s) students will exhibit to demonstrate their understanding of the DCI(s).</th>
<th>Break down the practice(s) students need to know and be able to perform (Appendix F provides examples).</th>
<th>List the task(s) associated with the practice(s).</th>
</tr>
</thead>
</table>
| Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales (MS-ESS2-2). | **Practice 6: Constructing explanations**  
Construct a scientific explanation based on valid and reliable evidence obtained from the sources (including the students’ experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue in the future. | **Based on Practice 6 Grade Bands Endpoints**  
1. Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena. (Tasks 2, 3, & 4).  
2. Construct an explanation using models or representations. (Tasks 1, 2, 3, & 4)  
3. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students’ own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (Tasks 2, 3, & 4)  
4. Apply scientific ideas, principles, and/or evidence to construct, revise, and/or use an explanation for real-world phenomena, examples, or events. (Task 2, 3, & 4)  
5. Apply scientific reasoning to show why the data or evidence is adequate for the explanation or conclusion. (Tasks 2, 3, & 4) | **Task 1 (formative):** Students develop a model to explain the different ways Earth’s tectonic plates can interact with each other at their boundaries, and what causes these patterns of movement.  
**Task 2 (interim):** Students use scientific reasoning to make a claim based on evidence collected from content covered prior to the interim task about the following question: Can ice change the surface of a mountain?  
**Task 3 (interim):** Students use scientific reasoning and evidence gathered in an activity to make a claim about the question: Did the land on Earth start out as one giant continent? In the activity, students rotate through different stations that include readings and activities where they obtain evidence scientists have collected to investigate this question, such as shapes of the continents, the types of plant and animal fossils found on the different continents, and the types of rocks found on the different continents. (adapted from McNeill and Krajcik, 2012).  
**Task 4 (summative):** Students use scientific reasoning and evidence gathered throughout the instructional unit to make a claim about the following question: Why are some mountains bigger than others? |
<table>
<thead>
<tr>
<th>List the Performance Expectation(s).</th>
<th>List the Crosscutting concepts (CCC) relevant to the Performance Expectation.</th>
<th>Break down the CCC (Appendix G provides additional information for each grade band).</th>
<th>List the task(s) associated with the CCC(s).</th>
</tr>
</thead>
</table>
| Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales (MS-ESS2-2). | CCC 3: Scale, Proportion and Quantity  
Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small (MS-ESS2-2). | Based on progressions for Scale, Proportion and Quantity  
1. Systems and processes vary in size, in time span and the amount of energy flowing through them and in the relationships between the scales of these different quantities. (Tasks 1, 2, 3, & 4)  
2. As size scales change, so do time scales. (Tasks 2 & 3)  
3. There are three major scales: macroscopic that is directly observable, scales that are too small or fast to observe directly, and those that are too large or too slow. (Tasks 2, 3, & 4) | Task 1 (formative): Students develop a model to explain the different ways Earth’s tectonic plates can interact with each other at their boundaries, and what causes these patterns of movement. |
| CCC 6: Stability and Change  
Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale (MS-ESS2-1). | | Based on progressions for Stability and Change  
1. Stability denotes a condition in which some aspects of a system are unchanging, at least at the level of observation. (Tasks 2, 3, & 4)  
2. Stability can take different forms, such as static equilibrium and dynamic equilibrium. (Task 1)  
3. A system can be stable on a small time scale, but on a larger time scale it may be seen as to be changing. (Tasks 3 & 4)  
4. When studying a system’s patterns of changing over time, it is also important to study what is unchanging. (Tasks 3 & 4)  
5. Stability can be the result of multiple competing forces. (Tasks 3 & 4) | Task 2 (interim): Students use scientific reasoning to make a claim based on evidence collected from content covered prior to the interim task about the following question: Can ice change the surface of a mountain?  
Task 3 (interim): Students use scientific reasoning and evidence gathered in an activity to make a claim about the question: Did the land on Earth start out as one giant continent? In the activity, students rotate through different stations that include readings and activities where they obtain evidence scientists have collected to investigate this question, such as shapes of the continents, the types of plant and animal fossils found on the different continents, and the types of rocks found on the different continents. (adapted from McNeill and Krajcik, 2012).  
Task 4 (summative): Students use scientific reasoning and evidence gathered throughout the instructional unit to make a claim about the following question: Why are some mountains bigger than others? |

The QUESTION: ________________________________________________________________

CLAIM: When you start your response to the question, state your claim.  

EVIDENCE: Support the claim with accurate, sufficient, and appropriate evidence. Use the chart below to state your evidence and explain what the evidence means.

<table>
<thead>
<tr>
<th>Evidence #1</th>
<th>My EVIDENCE</th>
<th>My INTERPRETATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Support your claim with accurate evidence from your investigations, readings, discussions, and research. Be SPECIFIC and RELATE DIRECTLY to your CLAIM!</td>
<td>Explain what your evidence means. How does it relate to the claim? Use words such as: means, tells, shows, and demonstrates.</td>
</tr>
<tr>
<td>Evidence #2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence #3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence #4</td>
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<table>
<thead>
<tr>
<th>Evidence #5</th>
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<tbody>
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<td></td>
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<table>
<thead>
<tr>
<th>Evidence #6</th>
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<td></td>
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</tr>
</tbody>
</table>

**REASONING:** Thoroughly relate your evidence to a scientific principle in order to support the claim.

The scientific principle states ________________________________

__________________________

__________________________

The evidence shows________________

__________________________

__________________________

Therefore,__________________

__________________________

__________________________
<table>
<thead>
<tr>
<th></th>
<th>Below</th>
<th>Approaching</th>
<th>Meeting</th>
<th>Exceeding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Claim</strong></td>
<td>The claim does not address the purpose of the lab, is unclear or incomplete, and does not address the critical content or concept of the lab.</td>
<td>The claim addresses the purpose of the lab but is unclear or incomplete and may be missing some critical content or concepts of the lab.</td>
<td>The claim addresses the purpose of the lab, is clear and complete, and contains all critical content or concepts of the lab.</td>
<td>The claim addresses the purpose of the lab, is clear and complete, and contains all critical content or concepts of the lab. In addition, the student includes original ideas or predictions.</td>
</tr>
<tr>
<td><strong>Evidence</strong></td>
<td>The evidence does not support the claim.</td>
<td>The evidence supports the claim but data is unclear or incomplete.</td>
<td>The evidence supports the claim using clear and complete data.</td>
<td>The evidence supports the claim using clear and complete data. In addition, the student presents the evidence in a narrative form.</td>
</tr>
<tr>
<td><strong>Reasoning</strong></td>
<td>The reasoning does not explain the connection between the evidence and the claim.</td>
<td>The reasoning explains the connection between the evidence and the claim but is unclear or incomplete.</td>
<td>The reasoning clearly explains the connection between all the evidence and the claim.</td>
<td>The reasoning clearly explains the connection between all of the evidence and the claim. In addition, the student includes original ideas or applications.</td>
</tr>
</tbody>
</table>

**Notes:**
Appendix D: Overview of Developing Learning Expectations

This appendix is based on the original LAS workbook and provides guidance about generating learning expectations when the content standards do not provide clear and explicit language about the knowledge and skills to be measured through assessment. While the new Illinois Learning Standards for Science have clearly defined Performance Expectations and related materials to support the development of assessments that are well aligned to these Performance Expectations, the process described below may be valuable to educators in considering how to generate clear learning expectations in the absence of those materials and resources.

Identifying and Defining the Learning Expectations to Be Assessed

Once teachers have identified “what” they will be assessing (i.e., the general topic of the assessment), the next step is to narrow the focus to the specific content standards for the course or content area that will be the focus of the assessment. Teachers can then begin to generate learning expectations. Learning expectations refer to evidence related to the content standards that may be measured through assessment. Learning expectations may be clear statements of what students are to learn, lesson by lesson, or for overall units, and provide direction for both instruction and assessment. These learning expectations may be derived from nationally recognized content standards, such as the International Society for Technology in Education, the Draft National Core Arts standards, or they may derive from state standards for the content area. In some cases, these learning expectations may be referred to as Performance Expectations. Whatever the terminology, the idea is to establish clear statements of what we expect students to learn and be able to do that can be demonstrated and measured via the assessment.

The process of clearly defining the learning expectations helps facilitate the creation of assessment tasks and helps to ensure that the tasks will be aligned to the identified standards. In order to do this, the following steps are recommended:

**Step A:** Review appropriate source documents, such as the NGSS Framework for K-12 Science Education, to identify important content and skills to teach and assess. For example, an agricultural science teacher might look to the state’s agricultural standards, or other related content standards, to identify the priority content to teach and assess, such as engaging in scientific investigations in agriculture. The teacher may create a master list of all of the prioritized content to be taught and assessed, which serves as the basis for defining specific learning expectations.

**Step B:** Visualize competent exiting learners: What should they know and be able to do at the end of the unit of instruction if they have mastered the course work? If the content standards that the teacher has identified are not sufficiently clear in specifying the concrete learning expectations for students that relate to engaging in scientific investigations in agriculture, then the teacher can create these statements. This is helpful even when the assessment is
formative in nature. To begin, the teacher would think about what a competent exiting learner should know and be able to do at the end of instruction for the topic area. In other words, when the students have mastered engaging in scientific investigations in agriculture, what do students know and what are they able to do?

**Step C:** Write learning expectations to focus on end results of instruction, not on instructional activities. Identify both the content to be assessed and the practice involved, and include BOTH in the learning expectation. Once a picture of a successful exiting learner has been generated, the teacher can write learning expectations—clear statements of what students should know and be able to do that may be measured through assessment. For example, the agricultural science teacher would write statements based on the competent exiting learner he or she has visualized, making sure to write the statements so that both the content, such as natural resource management, and the science and engineering practice, such as developing and using models or using mathematics and computational thinking are included. These learning expectations would be generated for each topic area identified. For example, three possible, related learning expectation statements associated with the overall topic of natural resource management in agriculture might be:

(a) *The students will evaluate competing design solutions for maximizing agricultural efficiency.*
(b) *The students will create a mathematical simulation to predict the agricultural output of a given area.*
(c) *The students will evaluate a technological solution that reduces the impacts of human activities on a given area.*

When writing your learning expectations, try to avoid broad and ambiguous statements. Use observable action verbs or words to add clarity to behaviors in the statements. For example, instead of terms such as “know” and “understand,” which are not observable, use terms such as “explain” or “use.”

**Step D:** Formulate learning expectations so that they are clear, unambiguous statements. If possible and relevant to the assessment, specify the conditions and/or setting of the assessment. For example, the agricultural science teacher interested in assessing several learning expectations related to the general topic of engaging in scientific investigation in agriculture may want to assess students’ mastery of their ability to engage in this skill, under the specific condition of sampling soil, and in the particular setting of a wheat field. Whereas a more general learning expectation such as, “*The students will create a mathematical simulation to predict the agricultural output of a given area,*” may apply to several assessments, a targeted learning expectation statement might be, “*Using the soil taxonomy system, students will predict which type of soil will provide the most crop yield for a wheat field.*” In this example, the assessment condition refers to the use of the soil taxonomy system to predict which type of soil will provide the most crop yield, and the assessment setting is the wheat field. The content being assessed is a student’s understanding of both the soil taxonomy system and the growth conditions that provide the best crop yield for
wheat (which is related to the larger topic of engaging in scientific investigations in agriculture) and the behaviors being assessed are use and predict.

<table>
<thead>
<tr>
<th>Verbs</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask</td>
<td>Ask questions about what would happen if a variable is changed. (3-5)</td>
</tr>
<tr>
<td>Define</td>
<td>Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2)</td>
</tr>
<tr>
<td>Develop</td>
<td>Develop and/or use a model to predict and/or describe phenomena. (6-8)</td>
</tr>
<tr>
<td>Use</td>
<td>Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system. (3-5)</td>
</tr>
<tr>
<td>Plan and Carry Out</td>
<td>Plan and conduct an investigation or test a design solution in a safe and ethical manner including considerations of environmental, social, and personal impacts. (9-12)</td>
</tr>
<tr>
<td>Analyze and Interpret</td>
<td>Analyze data from tests of an object or tool to determine if it works as intended. (K-2)</td>
</tr>
<tr>
<td>Use Mathematics and Computational Thinking</td>
<td>Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations. (9-12)</td>
</tr>
<tr>
<td>Construct</td>
<td>Construct an explanation using models or representations. (6-8)</td>
</tr>
<tr>
<td>Design</td>
<td>Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (9-12)</td>
</tr>
<tr>
<td>Engage in Argument</td>
<td>Compare and refine arguments based on an evaluation of the evidence presented. (3-5)</td>
</tr>
<tr>
<td>Obtain</td>
<td>Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim. (K-2)</td>
</tr>
<tr>
<td>Evaluate</td>
<td>Evaluate data, hypotheses, and/or conclusions in scientific and technical texts in light of competing information or accounts. (6-8)</td>
</tr>
<tr>
<td>Communicate</td>
<td>Communicate scientific and/or technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (i.e., orally, graphically, textually, mathematically). (9-12)</td>
</tr>
</tbody>
</table>

Appendix E: MS-LS1-6 from the Illinois Learning Standards for Science
### MS-LS1-6 From Molecules to Organisms: Structures and Processes

Students who demonstrate understanding can:

**MS-LS1-6.** Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. *(Clarification Statement: Emphasis is on tracing movement of matter and flow of energy) [Assessment Boundary: Assessment does not include the biochemical mechanisms of photosynthesis.]*

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

<table>
<thead>
<tr>
<th>Constructing Explanations and Designing Solutions</th>
<th>LS1.C: Organization for Matter and Energy Flow in Organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constructing explanations and designing solutions in 6-8 builds on K-5 experiences and progressions to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.</strong></td>
<td><strong>• Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.</strong></td>
</tr>
<tr>
<td><strong>• Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the student’s own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.</strong></td>
<td><strong>• Energy and Matter</strong></td>
</tr>
<tr>
<td><strong>• Connections to Nature of Science</strong></td>
<td><strong>• Within a natural system, the transfer of energy drives the motion and/or cycling of matter.</strong></td>
</tr>
<tr>
<td><strong>Scientific Knowledge is Based on Empirical Evidence</strong></td>
<td><strong>Energy and Matter</strong></td>
</tr>
<tr>
<td><strong>• Science knowledge is based upon logical connections between evidence and explanations.</strong></td>
<td><strong>• Within a natural system, the transfer of energy drives the motion and/or cycling of matter.</strong></td>
</tr>
</tbody>
</table>

Connections to other DCIs in this grade-band:

**MS.PS1.B, MS.ESS2.A**

Articulation of DCIs across grade-bands:


Common Core State Standards Connections:

**ELA/Literacy -**

| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts. *(MS-LS1-6)* |
| RST.6-8.2 | Draw evidence from informational texts to support analysis, reflection, and research. *(MS-LS1-6)* |

**WHST.6-8.2**

| Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. *(MS-LS1-6)* |

**Mathematics - 6.EE.C.9**

| Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *(MS-LS1-6)* |

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.*

Appendix F: References


