



Understanding Rubric Level Progressions

**Secondary Science
Version 01**

Candidate Support Resource

SCALE

Stanford Center for Assessment, Learning, & Equity

URLP_SES_v01

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Overview

edTPA's portfolio is a collection of authentic artifacts and evidence from a candidate's actual teaching practice. *Understanding Rubric Level Progressions* (URLP) is a KEY resource that is designed to describe the meaning behind the rubrics. A close read of the following URLP sections will help program faculty and supervisors internalize the criteria and level distinctions for each rubric.

This document is intended as a resource for program faculty and supervisors who are supporting candidates with edTPA. Faculty and supervisors are strongly encouraged to share this document with candidates and use it to support their understanding of the rubrics, as well as their development as new professionals. The *Understanding Rubric Level Progressions* is intended to enhance, not replace, the support that candidates receive from programs in their preparation for edTPA.

In the next section, we provide definitions and guidelines for making scoring decisions. The remainder of the document presents the score-level distinctions and other information for each edTPA rubric, including:

1. Elaborated explanations for rubric Guiding Questions
2. Definitions of key terms used in rubrics
3. Primary sources of evidence for each rubric
4. Rubric-specific scoring decision rules
5. Examples that distinguish between levels for each rubric: Level 3, below 3 (Levels 1 and 2), and above 3 (Levels 4 and 5).

Scoring Decision Rules

When evidence falls across multiple levels of the rubric, scorers use the following criteria while making the scoring decision:

1. **Preponderance of Evidence:** When scoring each rubric, scorers must make score decisions based on the evidence provided by candidates and how it matches the rubric level criteria. A pattern of evidence supporting a particular score level has a heavier weight than isolated evidence in another score level.
2. **Multiple Criteria:** In cases where there are two criteria present across rubric levels, greater weight or consideration will be for the criterion named as "primary."
3. **Automatic 1:** Some rubrics have Automatic 1 criteria. These criteria outweigh all other criteria in the specific rubric, as they reflect essential practices related to particular guiding questions. NOTE: Not all criteria for Level 1 are Automatic 1s.

SECONDARY SCIENCE LEARNING SEGMENT FOCUS:

Candidate's instruction should support students to use science concepts and scientific practices during inquiry to explain a real-world phenomenon.

Planning Rubric 1: Planning for Scientific Understandings

SCI1: How do the candidate's plans build students' abilities to use science concepts and scientific practices during inquiry to explain or make predictions about a real-world phenomenon?

The Guiding Question

The Guiding Question addresses how a candidate's plans build a learning segment of three to five lessons around a central focus. Candidates will explain how they plan to organize tasks, activities, and/or materials to align with the central focus and the standards/objectives. The planned learning segment must develop students' use of science concepts and the ability to apply scientific practices through inquiry to develop evidence-based explanations or to make predictions for a real-world phenomenon.

Key Concepts of Rubric:

- *Aligned*—Standards, objectives, instructional strategies and learning tasks are "aligned" when they consistently address the same/similar learning outcomes for students.
- *Significant content inaccuracies*—Content flaws in commentary explanations, lesson plans, or instructional materials that will lead to student misunderstandings and the need for reteaching.

Science Terms Central to the edTPA:

- *Scientific practices through inquiry*—The practices, as defined by the Next Generation of Science Standards, focus on eight key components:
 - Asking questions
 - Developing and using models
 - Planning and carrying out investigations
 - Analyzing and interpreting data
 - Using mathematics and computational thinking
 - Constructing explanations
 - Engaging in argument from evidence
 - Obtaining, evaluating, and communicating information
- *Evidence-based explanation*—An evidence-based explanation of a phenomenon includes a claim (statement) about the underlying cause using scientific concepts or principle(s), consistent with scientific data.
- *Making predictions*—Making predictions is a claim (statement) about the phenomenon based on the gathered scientific data and/or evidence.

Primary Sources of Evidence:

Context for Learning Information

Planning Commentary **Prompt 1**

Strategic review of Lesson Plans & Instructional Materials

Scoring Decision Rule

▶ Multiple Criteria	■ N/A for this rubric
▶ AUTOMATIC 1	■ Pattern of significant content inaccuracies that are core to the central focus or a key learning objective for the learning segment ■ A pattern of misalignment is demonstrated in relation to standards/objectives, learning tasks and materials across two or more lessons

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- Plans for instruction are **logically sequenced** to facilitate students' learning.
- Plans are presented in a sequence in which **each lesson builds on the previous one(s)**.
- In addition, the sequencing of the plans supports students' learning by connecting science concepts, a phenomenon, and evidence-based explanations or predictions from inquiry during the learning segment. **These connections are explicitly written in the plans or commentary**, and how the connections are made is not left to the determination of the scorer. The explanations or the predictions may only address a piece of the phenomenon related to the inquiry, and not the complete phenomenon.
- Be sure to pay attention to each component of the subject-specific emphasis (learn science concepts, investigate a phenomenon, generate explanations or make predictions through engagement in scientific practices through inquiry).

Below 3

Evidence that demonstrates performance below 3:

- Plans for instruction support student learning of facts and engagement in inquiry but **with little or no** planned instruction to guide understanding of how to generate evidence-based explanations or make predictions of scientific phenomena through inquiry.

What distinguishes a Level 2 from a Level 3: At Level 2,

- The candidate is directing student engagement in an "inquiry" with some opportunities for students to collect, analyze, and interpret data, but opportunities to use evidence to construct or adjust explanations of a phenomenon are at best **fleeting or vague**, e.g., completing sections of a lab report to accept or reject a claim on a basis that is not strongly connected to data from the inquiry. (For example, students will take measurements and record data, but will not use data to arrive at a conclusion or to describe a pattern seen in data.)

What distinguishes a Level 1 from a Level 2: At Level 1,

- The candidate is **focused on teaching memorization of facts or following prescribed procedures for an "inquiry"** with no opportunities for students to collect, analyze, and interpret data to adjust their understandings.

Automatic Score of 1 is given when:

- There is a pattern of **significant content inaccuracies** that will lead to student misunderstandings. Content flaws in the plans or instructional materials are significant and systematic, and interfere with student learning.
- **Standards, objectives, learning tasks, and materials are not aligned** with each other. There is a pattern of misalignment across two or more lessons. If one standard or objective does not align within the learning segment, this level of misalignment is not significant enough for a Level 1.

Above 3

Evidence that demonstrates performance above Level 3:

- Learning tasks are designed to support students to use both data and science concepts to construct explanations of the phenomenon or reasonable predictions based on patterns in evidence and/or data by the end of the learning segment.

What distinguishes a Level 4 from a Level 3: At Level 4,

- In the commentary, the candidate addresses supporting students in constructing an **evidence-based explanation regarding a scientific phenomenon or in supporting predictions with patterns in evidence and/or data**. Be sure to pay attention to each component of the subject-specific emphasis (learn science concepts, investigate a phenomenon, generate explanations or support predictions by engagement in scientific practices through inquiry).
- The candidate uses this support to **deepen student understanding of the central focus**.

What distinguishes a Level 5 from a Level 4: At Level 5,

- The candidate supports students in not only constructing but also **evaluating the fit of evidence to a scientific explanation or prediction** and what the students know about the science concepts to revise or refine a claim about the phenomenon.

Planning Rubric 2: Planning to Support Varied Student Learning Needs

SCI2: How does the candidate use knowledge of his/her students to target support for students to use science concepts and scientific practices during inquiry to explain or make predictions about a real-world phenomenon?

The Guiding Question

The Guiding Question addresses how the candidate plans to support students in relationship to students' characteristics. This includes using the candidate's understanding of students to develop, choose, or adapt instructional strategies, learning tasks and materials.

Key Concepts of Rubric:

- *Planned Supports* include instructional strategies, learning tasks and materials, and other resources deliberately designed to facilitate student learning of the central focus.

Primary Sources of Evidence:

Context for Learning Information (required supports, modifications, or accommodations)

Planning Commentary **Prompts 2 and 3**

Strategic review of Lesson Plans and Instructional Materials to clarify planned supports

Scoring Decision Rules

▶ Multiple Criteria	▪ N/A for this rubric
▶ AUTOMATIC 1	▪ Planned support according to requirements in IEP or 504 plans is completely missing. The automatic 1 is only related to the support for IEP or 504 plans, not for students with other learning needs. ▪ If there are no students with IEPs or 504 plans, then this criterion is not applicable.

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- Candidate explains how planned supports for students address the learning needs of the whole class while assisting them in achieving the learning objectives.
- Candidate addresses at least one of the requirements from IEPs and 504 plans as described in the Context for Learning Information.
 - Requirements must be explicitly addressed in the commentary and/or the Planning Task 1 artifacts. List of requirements and/or accommodations in the Context for Learning Information document is not sufficient by itself.

Below 3

Evidence that demonstrates performance below 3: Candidate plans insufficient supports to develop students' learning relative to the identified learning objectives or the central focus. Evidenced by ONE or more of the following:

- Candidate does not plan supports for students.
- Planned supports are not closely tied to learning objectives or the central focus.
- Evidence does not reflect ANY instructional requirements in IEP or 504 plans.

What distinguishes a Level 2 from a Level 3: At Level 2,

- Plans address at least one of the instructional requirements set forth in IEPs and 504 plans. However, it is not clear that other planned supports will be helpful in supporting students to meet the learning objectives.
- The supports would work for almost any learning objective. The support is written in general terms and could fit any class and/or any subject area. Therefore, supports are not closely connected to the learning objectives or central focus (e.g., pair high and low students during partner work without a specific description of how that supports students with a specific need, check on students who are usually having trouble, without any specific indication of what the candidate might be checking for, such as correctly setting up a data table).
- Supports are tied to learning objectives within each lesson, but there is no central focus.

What distinguishes a Level 1 from a Level 2: At Level 1,

- Evidence of intentional support for students' needs as described by the candidate is absent.

Automatic Score of 1:

- If IEP/504 requirements are described in the Context for Learning or commentary but none are included in the planned support, then the rubric is scored as an Automatic Level 1, regardless of other evidence of support for the whole class or groups or individuals in the class. If the candidate describes one or more of the IEP or 504 plan requirements for any student in the lesson plans or commentary, then the score is determined by the Planned Support criterion. **(If there are no students with IEPs or 504 plans, then this criterion is not applicable.)**

Above 3

Evidence that demonstrates performance above 3:

- Plans address specific student needs (beyond those required in IEP and 504 plans) by including scaffolding or structured supports that are explicitly selected or developed to help individual students and groups of students with similar needs to gain access to content and meet the learning objectives.

What distinguishes a Level 4 from a Level 3: At Level 4,

- The candidate explains how the supports tied to the learning objectives are intended to meet specific needs of individuals or groups of students with similar needs, in addition to the whole class. Supports should be provided for more than one student—either more than one individual or for a specific group of students with similar needs (e.g., more instruction in a prerequisite skill).

What distinguishes a Level 5 from a Level 4: At Level 5, the candidate meets Level 4
AND

- Identifies possible preconceptions, errors, or misconceptions associated with the central focus, and describes specific strategies to identify and respond to them.
- If the plans and commentary attend to preconceptions, errors, or misconceptions without also satisfying Level 4 requirements, this is not sufficient evidence for Level 5.

Planning Rubric 3: Using Knowledge of Students to Inform Teaching and Learning

SCI3: How does the candidate use knowledge of his/her students to justify instructional plans?

The Guiding Question

The Guiding Question addresses how the candidate justifies the ways in which learning tasks and materials make content meaningful to students, by drawing upon knowledge of individuals or groups, as well as research or theory.

Key Concepts of Rubric:

- *Deficit thinking* is revealed when candidates explain low academic performance based primarily on students' cultural or linguistic backgrounds, the challenges they face outside of school or from lack of family support. When this leads to a pattern of low expectations, not taking responsibility for providing appropriate support, or not acknowledging any student strengths, this is a deficit view.

For the following terms from the rubric, see the handbook glossary:

- *prior academic learning*
- *assets* (personal, cultural, community)

Primary Sources of Evidence:

Planning Commentary **Prompts 2 and 3**

Scoring Decision Rules

▶ Multiple Criteria	<ul style="list-style-type: none">▪ Criterion 1 (primary): Justification of plans using knowledge of students—i.e., prior academic learning AND/OR assets (personal, cultural, community) Criterion 2: Research and theory connections▪ Place greater weight or consideration on criterion 1 (justification of plans using knowledge of students).
▶ AUTOMATIC 1	<ul style="list-style-type: none">▪ Deficit view of students and their backgrounds

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- *Primary Criterion*: The candidate explains how the learning tasks are explicitly connected to the students' prior academic knowledge OR knowledge of students' assets (personal, cultural, community). Assets include students' cultural and linguistic backgrounds, interests, community or family resources and personal experiences.
- *Secondary Criterion*: The candidate refers to research or theory in relation to the plans to support student learning. The connections between the research/theory and the tasks are superficial/not clearly made. They are not well connected to a particular element of the instructional design.

- If evidence meets the primary criterion at Level 3, the rubric is scored at Level 3 **regardless of the evidence for the secondary criterion.**
- If evidence meets the primary criterion at Level 4, and candidate has NO connection to research/theory, the rubric is scored at Level 3.

Below 3

Evidence that demonstrates performance below 3:

- There is a limited amount of evidence that the candidate has considered his/her particular class in planning.

OR

- The candidate justifies the plans through a deficit view of students and their backgrounds.

What distinguishes a Level 2 from a Level 3: At Level 2,

- The candidate's justification of the learning tasks makes some connection with what they know about students' prior academic learning OR assets (personal, cultural, community). These connections are not strong, but are instead vague or unelaborated, or involve a listing of what candidates know about their students in terms of prior knowledge or background without making a direct connection to how that is related to planning. For example, the candidate might mention a previous lesson or unit the students have learned, but does not justify or explain how the previous lesson/unit connects to the learning segment presented.

What distinguishes a Level 1 from a Level 2: At Level 1,

- There is no evidence that the candidate uses knowledge of students to plan.

Automatic Score of 1 is given when:

- Candidate's justification of learning tasks includes a pattern representing a deficit view of students and their backgrounds. (See the explanation of deficit thinking listed above under Key Concepts of Rubric.)

Above 3

Evidence that demonstrates performance above 3:

- The candidate's justification not only uses knowledge of students—as both academic learners AND as individuals who bring in personal, cultural or community assets—but also uses research or theory to inform planning.

What distinguishes a Level 4 from a Level 3: At Level 4,

- The evidence includes specific examples from students' prior academic learning **AND** knowledge of students' assets (personal, cultural, community), and explains how the plans reflect this knowledge. The explanation needs to include **explicit connections** between the learning tasks and the examples provided.
- The candidate explains how research or theory informed the selection or design of at least one learning task or the way in which it was implemented. The connection between the research or theory and the learning task(s) must be explicit.
- Scoring decision rules: To score at Level 4, the candidate must meet the primary criterion at Level 4 and make at least a fleeting, relevant reference to research or theory (meet the secondary criterion at least at Level 3).

**What distinguishes a Level 5 from a Level 4: At Level 5, the candidate meets Level 4
AND**

- Explains how principles of research or theory support or **set a foundation for** their planning decisions. The connection should include explicit reference to theory and/or research. For example, the candidate could state, "This learning segment is developed based on the constructivism theory, which states, "Learning is an active process. The learners construct their own knowledge and build their own understanding by linking new information to prior knowledge." So, for example, "In the last unit, the students used Celsius thermometers to take the temperature of the room and outside on the window ledge (prior knowledge). In this learning segment, they will use the same thermometers to take the temperatures as ice is heated in a beaker (new information) as we study phase changes. References have been made to the fact that it is spring and the ice on the closest Great Lake has begun to melt; we can hear the sounds of the ice cracking here at school. The students know the ice is moving and changing in the lake (connect new knowledge to what the students already know and to a real world phenomenon) and will be able to see the changes that ice will go through as it is heated in the beaker and make a connection back to the Great Lake. My students are in the concrete operational stage of Piaget's cognitive development theory (his work contributed to the Constructivism Theory). They are starting to make sense of abstract thinking (temperature), to follow multi-step complex procedure (carry an investigation independently in collaborative group), and to make connections to the world around them (connection to the Great Lake). In addition, according to Bonwell's theory of active learning, when the students are up and moving, they are engaged, and so to make sure that the students are thinking about phase changes, we will be recording the temperatures while working at the lab stations."
- The justifications are explicit, well-articulated, and demonstrate a thorough understanding of the research/theory principles that are clearly reflected in the plans.

Planning Rubric 4: Identifying and Supporting Language Demands

SCI4: How does the candidate identify and support language demands associated with a key science learning task?

The Guiding Question

The Guiding Question focuses on how the candidate describes the planned instructional supports that address the identified language demands for the learning task.

Key Concepts of Rubric:

use the definitions below and the subject-specific Academic Language handout to further clarify concepts on Rubric 4.

- **language demands**—Specific ways that academic language (vocabulary, functions, discourse, syntax) is used by students to participate in learning tasks through reading, writing, listening, and/or speaking to demonstrate their disciplinary understanding.
- **language functions**—Purpose for which language is used. The content and language focus of the learning task, often represented by the active verbs within the learning outcomes. Common language functions in science include **analyzing** scientific data; **interpreting** written investigative procedures, diagrams, figures, tables, graphs, and dense authoritative text; **explaining** models of scientific phenomena; **predicting** from models and data from scientific inquiries; **justifying** conclusions with scientific evidence; and so on.
- **vocabulary**—Words and phrases that are used within disciplines including: (1) words and phrases with subject-specific meanings that differ from meanings used in everyday life (e.g., table, control, variable, alcohol, cell); (2) general academic vocabulary used across disciplines (e.g., compare, explain, analyze, evaluate, discuss); and (3) subject-specific words and/or symbols defined for use in the discipline.
- **discourse**—How members of the discipline talk, write, and participate in knowledge construction, using the structures of written and oral language. Discipline-specific discourse has distinctive features or ways of structuring oral or written language (text structures) or representing knowledge visually that provide useful ways for the content to be communicated. In science, language structures include graphic and tabular representations (which are shorthand language for complex sets of data), lists (e.g., materials lists), and narratives (e.g., analysis and conclusions sections in a lab report). If the function is to draw conclusions, then appropriate structures could include charts of investigative results or sentence starters to structure an analysis such as "The results of the investigation show...", "This data suggests that....," "The design called for the control of..."
- **syntax**—The rules for organizing words or symbols together into phrases, clauses, sentences or visual representations. One of the main functions of syntax is to organize language in order to convey meaning.

- **language supports**—The scaffolds, representations, and pedagogical strategies teachers intentionally provide to help learners understand and use the concepts and language they need to learn within disciplines. The language supports planned within the lessons in edTPA should directly support learners to understand and use identified language demands (vocabulary and/or symbols, language function, and syntax or discourse) to deepen content understandings.

Primary Sources of Evidence:

Planning Commentary **Prompt 4a–d**

Strategic review of Lesson Plans

Scoring Decision Rules

▶ Multiple Criteria	■ N/A
▶ AUTOMATIC 1	■ None

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- General supports are planned and described, though not in specific detail, for students' application of any two or more of the language demands (function, vocabulary and/or symbols and syntax or discourse).
 - Language supports must go beyond providing opportunities for students to practice using the language demands either individually or with other students within the learning segment. Examples of general language supports include describing and defining the function, modeling vocabulary, syntax or discourse, providing an example with little explanation, questions and answers about a language demand, whole group discussion of a language demand, or providing pictures to illustrate vocabulary.
- The candidate may inaccurately categorize a language demand (e.g., identifies syntax as discourse), but does describe general supports for two of the language demands required of students within the learning task. For example:
 - "For discourse, I will model how to identify and substitute terms into the formula $\text{acceleration} = \text{velocity} / \text{time}$. To support vocabulary, we will review the terms (acceleration, -velocity, time) and solve several sample problems as a class." This example would be scored at a Level 3 because there are supports for two language demands, vocabulary and syntax, even though the candidate categorizes using formulas (a form of syntax) as discourse.

Below 3

Evidence that demonstrates performance below 3:

- The candidate has a superficial view of academic language and provides supports that are misaligned with the demands or provides support for only one language demand (e.g., vocabulary, and/or symbols, function, syntax, or discourse).

What distinguishes a Level 2 from a Level 3: At Level 2,

- The primary focus of support is on only one of the language demands (vocabulary and/or symbols, function, syntax, or discourse) with little attention to any of the other language demands.
- Support may be general, (e.g., discussing, defining or describing a language demand), or it may be targeted, (e.g., modeling a language demand while using an example with labels). Regardless, the support provided is limited to one language demand.

What distinguishes a Level 1 from a Level 2: At Level 1,

- There is a pattern of misalignment between the language demand(s) and the language supports identified. For example, the language function is listed as explain, but the language task is that the students will describing the relationship between two variables with support from a sentence frame: As the mass increased, the speed (stayed about the same, increased, decreased).

OR

- Language supports are completely missing.

Above 3

Evidence that demonstrates performance above 3:

- The supports specifically address the language function, vocabulary and/or symbols, and at least one other language demand (syntax, discourse) in relation to the use of the language function in the context of the chosen task.

What distinguishes a Level 4 from a Level 3: At Level 4,

- The candidate identifies specific planned language supports and describes how supports address each of the following: vocabulary/symbols, the language function, and at least one other language demand (syntax, discourse).
- Supports are focused (e.g., provide structures or scaffolding) to address specific language demands, such as sentence starters (syntax or function); modeling how to construct an argument, explanation, or paragraph using a think aloud (function, discourse); graphic organizers tailored to organizing text (discourse or function); identifying critical elements of a language function using an example; or more in-depth exploration of vocabulary development (vocabulary mapping that includes antonym, synonym, student definition and illustration).

What distinguishes a Level 5 from a Level 4: At Level 5, the candidate meets all of Level 4 **AND**

- The candidate includes and explains how one or more of the language supports are either designed or differentiated to meet the needs of students with differing language needs.

Planning Rubric 5: Planning Assessments to Monitor and Support Student Learning

SCI5: How are the informal and formal assessments selected or designed to monitor students' progress toward using science concepts and scientific practices during inquiry to explain or predict a real-world phenomenon?

The Guiding Question

The Guiding Question addresses the alignment of the assessments to the standards and objectives and the extent to which assessments provide multiple forms of evidence to monitor student progress throughout the learning segment. It also addresses required adaptations from IEPs or 504 plans. The array of assessments should provide evidence of students' understanding of science concepts, phenomena, and the application of scientific practices during scientific inquiry to explain a real-world phenomenon.

Key Concepts of Rubric:

- **assessment (formal and informal):** "[R]efer[s] to all those activities undertaken by teachers and by their students . . . that provide information to be used as feedback to modify the teaching and learning activities."¹ Assessments provide evidence of students' prior knowledge, thinking, or learning in order to evaluate what students understand and how they are thinking. Some examples of informal assessments are student questions and responses during instruction and teacher observations of students as they work or perform. Some examples of formal assessments are quizzes, homework assignments, lab reports, journals, projects, and performance tasks.

Primary Sources of Evidence:

Context for Learning Information (required supports, modifications, or accommodations for assessments)

Planning Commentary **Prompts 2 and 5**

Assessment Materials

Strategic review of Lesson Plans

Scoring Decision Rules

▶ Multiple Criteria	■ N/A for this rubric
▶ AUTOMATIC 1	■ None of the assessment adaptations required by IEPs or 504 plans are made. (If there are no students with IEPs or 504 plans, then this criterion is not applicable.)

¹ Black, P., & William, D. (1998). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan*, 80(2), 139–148.

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- The planned assessments provide evidence of students' understanding of science concepts, phenomena, AND the application of scientific practices during scientific inquiry at various points within the learning segment. The assessments must provide evidence of all three (science concepts, a phenomenon, and application of scientific practices during scientific inquiry).
- Requirements from the IEP or 504 plan must be explicitly addressed in the commentary and/or the Planning Task 1 artifacts. List of assessment requirements and/or accommodations in the Context for Learning Information document is not sufficient by itself.

Below 3

Evidence that demonstrates performance below 3:

- The planned assessments will yield insufficient evidence to monitor students' understanding of science concepts, phenomena, and the use of scientific practices during scientific inquiry (e.g., a single summative assessment).

What distinguishes a Level 2 from a Level 3: At Level 2,

- Assessments will produce evidence of student learning, but evidence is limited. Examples of limited assessments include a single assessment or assessments for only procedures or conceptual understanding and not the other areas.
- Although assessments may provide some evidence of student learning, they do not monitor all areas of learning across the learning segment.

What distinguishes a Level 1 from a Level 2: At Level 1,

- The assessments only focus on memorization of facts or following procedures without providing evidence of conceptual understanding or application of scientific inquiry skills.

Automatic Score of 1:

- If there is NO attention to ANY assessment-related IEP/504 plan requirements (e.g., more time; a scribe for written assignments) in either the commentary or the Planning Task 1 artifacts, the score of 1 is applied; otherwise the evidence for the other criteria will determine the score. **(If there are no students with IEPs or 504 plans, then this criterion is not applicable.)**

Above 3

Evidence that demonstrates performance above 3:

- The array of assessments provides consistent evidence of students' understanding of science concepts, phenomena, AND the application of scientific practices during scientific inquiry.
- Assessment evidence will allow the candidate to determine students' progress toward developing an understanding of science concepts and the use of scientific practices during inquiry (e.g., planned targeted, formative assessments).

What distinguishes a Level 4 from a Level 3: At Level 4,

- There are multiple forms of evidence, not just the same kind of evidence collected at different points in time or in different settings, to monitor student students' understanding of science concepts, phenomena, AND the application of scientific practices during scientific inquiry for the central focus. "Multiple forms of evidence" means that different types of evidence are used—e.g., written explanations, drawings or diagrams representing student understanding of a phenomenon, data- based laboratory reports with conclusions, applications of knowledge to novel situations—and not that there is only one type of evidence on homework, exit slips, and the final test.
- The array of assessments provides evidence to track student progress toward developing the understanding of science concepts and the phenomenon and use of scientific practices during inquiry defined by the standards and learning objectives.
- This evidence is collected for all three areas (science concepts, a phenomenon, and the application of scientific practices during inquiry) in every lesson OR the assessments correspond to a plan for the learning segment that builds understandings in one or more areas and uses that understanding to address other areas.

What distinguishes a Level 5 from a Level 4: At Level 5, the candidate meets Level 4
AND

- Describes how assessments are targeted and explicit in design to allow individuals or groups with specific needs to demonstrate their learning without oversimplifying the content. For example, the candidate differentiates the assessment to meet the needs of individuals or groups of students. The candidate explains how and why the assessment is differentiated to measure the progress of all students' toward developing an understanding of science concepts, the phenomenon, and the use of scientific practices during inquiry.
- Strategic design of assessments goes beyond, for example, allowing extra time to complete an assignment or adding a challenge question.

Instruction Rubric 6: Learning Environment

SCI6: How does the candidate demonstrate a safe and respectful learning environment that supports students' engagement in learning?

The Guiding Question

The Guiding Question addresses the type of learning environment that the candidate establishes and the degree to which it fosters respectful interactions between the candidate and students, and among students.

Key Concepts of Rubric:

- *Respect*—A positive feeling of esteem or deference for a person and specific actions and conduct representative of that esteem. Respect can be a specific feeling of regard for the actual qualities of the one respected. It can also be conduct in accord with a specific ethic of respect. Rude conduct is usually considered to indicate a lack of respect, **disrespect**, whereas actions that honor somebody or something indicate respect. Note that respectful actions and conduct are culturally defined and may be context dependent. **Scorers are cautioned to avoid bias related to their own culturally constructed meanings of respect.**
- *Rapport*—A close and harmonious relationship in which the people or groups understand each other's feelings or ideas and communicate well.

For the following term from the rubric, see the handbook glossary:

- *Learning environment*

Primary Sources of Evidence:

Video clips

Instruction Commentary **Prompt 2**

Note that for the Instruction Task, the commentary is intended to provide context for interpreting what is shown in the video. Candidates sometimes describe events that do not appear in the video or conflict with scenes from the video—**such statements should not override evidence depicted in the video.**

Scoring Decision Rules

- | | |
|----------------------------|--|
| ▶ Multiple Criteria | ▪ N/A |
| ▶ AUTOMATIC 1 | ▪ Safety issues are seen in the clip(s) that pose an immediate danger to students that are not addressed by the candidate. |

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3: In the clips:

- The candidate's interactions with students are respectful, demonstrate rapport (evidence of relationship between the candidate and students and/or ease of interaction that goes back and forth based on relevance or engaged conversation), and students communicate easily with the candidate.
- There is evidence that the candidate facilitates a positive learning environment wherein students are willing to answer questions and work together in task-related interactions and where criticism of responses does not inhibit discussion.
- There is evidence of mutual respect among students. Examples include attentive listening while other students speak, respectful attention to another student's idea (even if disagreeing), working together with a partner or group to accomplish tasks.

Below 3

Evidence that demonstrates performance below 3: The clips:

- Do not exhibit evidence of positive relationships and interactions between the candidate and students.
- Reveal a focus on classroom management and maintaining student behavior and routines rather than engaging students in learning.

What distinguishes a Level 2 from a Level 3: At Level 2,

- Although clips reveal the candidate's respectful interactions with students, there is an emphasis on candidate's rigid control of student behaviors, discussions, and other activities in ways that limit and do not support learning. For example, in a "discussion", the students are saying a word or two followed by the candidate providing the detailed explanations so that students do not get practice in trying out their ideas or in discovering and correcting errors in thinking.

What distinguishes a Level 1 from a Level 2: At Level 1, there are **two different ways** that evidence is scored:

1. The clips reveal evidence of candidate-student or student-student interactions that discourage student contributions, disparage the student(s), or take away from learning.
2. The classroom management is so weak that the candidate is not able to or does not successfully redirect students, or the students themselves find it difficult to engage in learning tasks because of disruptive behavior. *Disruptive behavior* should be considered in relation to the intended classroom learning environment and classroom management approach.

Note: Classroom management styles vary. Video clips that show classroom environments where students are productively engaged in the learning task should not be labeled as disruptive. Examples of this may include students engaging in discussion with peers, speaking without raising their hands, or being out of their seats.

Automatic 1:

- The clip(s) include situations with safety issues posing an immediate danger to students that are not addressed by the candidate.

Above 3

Evidence that demonstrates performance above 3: The clips:

- Reveal a positive learning environment that includes tasks/discussions that challenge student thinking and encourage respectful student-student interaction.

What distinguishes a Level 4 from a Level 3: At Level 4,

- The learning environment supports learning tasks that appropriately challenge students by promoting higher-order thinking or application to develop new learning. There must be evidence that the environment is challenging for students. Examples include: students cannot answer immediately, but need to think to respond; the candidate asks higher-order thinking questions; students are trying to apply their initial learning to another context. The candidate may ask questions such as, "What do you mean by that?", "What evidence do you have?", "Does that always apply?", "How might that affect things?", "I don't understand, can you explain from the beginning?" or "Imagine if X was not the case, then what?"
- The learning environment encourages and supports mutual respect among students, e.g., candidate reminds students to discuss ideas respectfully with each other.

What distinguishes a Level 5 from a Level 4: At Level 5,

- The learning environment encourages students to express, debate, and evaluate differing perspectives about content with each other. Perspectives could be from curricular sources, students' ideas, and/or lived experiences. For example, the candidate might ask, "Do you agree with the statement/answer made by...? Why/why not?" and students build off other students' responses and may challenge other students in a respectful way.

Instruction Rubric 7: Engaging Students in Learning

SCI7: How does the candidate actively engage students in analyzing and interpreting scientific data to construct evidence-based explanations of or predictions about a real-world phenomenon?

The Guiding Question

The Guiding Question addresses how the candidate provides video evidence of engaging students in meaningful tasks and discussions to develop their abilities to construct scientific explanations or make predictions based on science concepts and data.

Key Concepts of Rubric:

Science-specific term:

- *Evidence-based explanation*—An evidence-based explanation of a phenomenon includes a claim (statement) about the underlying cause using scientific concepts or principle(s), consistent with scientific evidence or data.
- *Making predictions*—Making predictions is constructing a claim (statement) about the phenomenon based on the gathered scientific data and/or evidence.

For the following terms from the rubric, see the handbook glossary:

- *Engaging students in learning*
- *Assets* (personal, cultural, community)

Primary Sources of Evidence:

Video Clips

Instruction Commentary **Prompt 3**

Note that for the Instruction Task, the commentary is intended to provide context for interpreting what is shown in the video. Candidates sometimes describe events that do not appear in the video or conflict with scenes from the video—**such statements should not override evidence depicted in the video.**

Scoring Decision Rules

- | | |
|----------------------------|--|
| ▶ Multiple Criteria | <ul style="list-style-type: none">▪ Criterion 1 (primary): Engagement in learning tasks▪ Criterion 2: Connections between students' academic learning AND/OR assets (personal, cultural, community) and new learning▪ Place greater weight or consideration on the criterion 1 (engagement in learning tasks). |
| ▶ AUTOMATIC 1 | <ul style="list-style-type: none">▪ None |

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- *Primary criterion:* The clips show that the students are engaged in learning tasks that focus on analyzing and interpreting scientific data or using relevant science concepts to construct or engage in an evidence-based explanation or prediction. Note that the claim in the explanation or prediction may or may not be accurate, but should be consistent with the data from the inquiry and/or with student understanding of relevant science concepts. Although the students make references to data and/or acceptable science concepts the connection between the explanation or prediction and the data and/or acceptable science concept is implicit. For example, students answer the candidate's question while looking at predator-prey interaction graph, "What happens to the number of prey as the predator numbers decrease?" Student(s) answer, "Down," but do not explain how they arrived at that conclusion.
- *Secondary criterion:* The clips show the candidate **making connections** to students' prior academic learning to help them develop the new content or skills.

Below 3

Evidence that demonstrates performance below 3:

- Students are participating in tasks that do not involve either a scientific explanation or a prediction about a real-world phenomenon or references to data from the inquiry.

What distinguishes a Level 2 from a Level 3: At Level 2,

- Students are engaged in tasks to construct explanations of or predictions about the phenomenon, but are not using data or science concepts to support their claims or predictions due to the structure of the learning task or the way in which it is implemented. For example, students may be seen collecting temperatures during a phase change laboratory experiment, and may even create a time versus temperature graph, but students do not refer to data while answering questions posed by candidate.
- In addition, the candidate may refer to students' learning from prior units, but the references are indirect or unclear and do not facilitate new learning.

What distinguishes a Level 1 from a Level 2: At Level 1,

- There is no evidence seen in the video clips of any attempt by candidate to engage students to construct an explanation of or prediction about the phenomenon. For example, data were collected in a lab inquiry, but there is no discussion or reference to the data collected in the video clip(s), just students' unsupported opinions.
- In addition, the candidate is not using either students' prior academic learning or assets (personal, cultural, community) to build new learning.

Above 3

Evidence that demonstrates performance above 3:

- The learning tasks as seen in the clip are structured to engage students to explain how data and relevant science concepts support a claim or prediction about the phenomenon. Note that the claim in the argument may or may not be accurate, but should be consistent with the data from the inquiry and with student understanding of relevant science concepts.

- Connections between students' prior academic learning and assets (personal, cultural, community) are made to support the new learning.

What distinguishes a Level 4 from a Level 3: At Level 4,

- The learning tasks in the clips include structures or scaffolding that promotes the learning of how to engage in constructing evidence-based explanations of or predictions about the phenomenon using data from the inquiry AND relevant science concepts.
- In addition, the candidate draws upon not only prior academic learning, but also students' assets (personal, cultural, community) to develop new learning. For example, the candidate may tie the athletes' weight lifting experiences to lactic acid build up in the muscles or the students' driving experience to a lesson on the Doppler Effect heard when an ambulance drives by them parked along the roadside.

What distinguishes a Level 5 from a Level 4: At Level 5,

- Candidate supports students in constructing evidence-based explanations of or predictions about the phenomenon AND students use evidence and/or data and acceptable science to support or refute alternative explanations or predictions. For example, candidate would scaffold students to arrive at the conclusion that most cleaning products are in the basic range on the pH scale upon completion of a scientific inquiry using common household items, during which soaps, detergents, and ammonia-based cleaning products resulted in high pH values (above 7) **AND** the students would use the data to support a statement such as, food items are prominently in the acidic range of the pH scale (if orange juice, soda, and lemonade were used in inquiry).
- In addition, the candidate encourages students to connect and use their prior knowledge and assets (personal, cultural, community) to support new learning. For example, to help students interpret the pH paper, the candidate would ask the students to relate the pH color chart to a rainbow (ROYGBIV) and make a connection between a stop sign being red and the slowest a car could go is zero mph or being stopped with the lowest number on the pH scale represented with the pH paper turning red to show a very low pH value. A second connection to previous knowledge could be made with the sky being blue and the sky's position relative to the classroom (high), likewise the blue pH color range is the higher values on the pH scale.

Instruction Rubric 8: Deepening Student Learning

SCI8: How does the candidate elicit responses to promote thinking and understanding of science concepts and abilities to apply scientific practices during scientific inquiry?

The Guiding Question

The Guiding Question addresses how, in the video clips, the candidate brings forth and builds on student responses to guide learning; this can occur during whole class discussions, small group discussions, or consultations with individual students.

Key Concepts of Rubric:

- *Evidence-based explanation*—An evidence-based explanation of a phenomenon includes a claim (statement) about the underlying cause using scientific concepts or principle(s), consistent with scientific evidence or data.
- *Making predictions*—Making predictions is constructing a claim (statement) about the phenomenon based on the gathered scientific data and/or evidence.
- *Significant content inaccuracies*—Candidate exhibits a pattern of presenting and/or referencing information to students that does not align with correct and current scientific knowledge. These are not minor misstatements or incomplete metaphors, but serious errors that will mislead and/or misinform students unless corrected in the future.

Primary Sources of Evidence:

Video clips

Instruction Commentary **Prompt 4a**

Note that for the Instruction Task, the commentary is intended to provide context for interpreting what is shown in the video. Candidates sometimes describe events that do not appear in the video or conflict with scenes from the video—**such statements should not override evidence depicted in the video.**

Scoring Decision Rules

▶ Multiple Criteria	■ N/A for this rubric
▶ AUTOMATIC 1	■ Pattern of significant content inaccuracies that are core to the central focus or a key learning objective for the learning segment

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- The candidate prompts students to offer responses that require thinking related to science concepts, scientific practices through inquiry, **AND/OR** the phenomenon being investigated, e.g., by using "how" and "why" questions. Some instruction may be characterized by initial questions focusing on facts to lay a basis for later higher-order questions in the clip.

Below 3

Evidence that demonstrates performance below 3:

- In the clips, classroom interactions provide students with limited or no opportunities to think and learn.

What distinguishes a Level 2 from a Level 3: At Level 2,

- The candidate asks questions that elicit right/wrong or yes/no answers and do little to encourage students to think about the content being taught. The students are answering the candidate, but with one-word answers that demand no follow up or reasoning to be explained. The candidate is focused on recalling facts. For example, students are asked, "What happens to the atomic number as we examine elements on the Periodic Table from left to right across a row?" Student(s) answer, "It gets bigger." There is no tie into the number of protons increasing, nor to the size of the atom decreasing due to an increase in nuclear charge.

What distinguishes a Level 1 from a Level 2: At Level 1,

- There are few opportunities shown in the clips that students were able to express ideas. For example, the candidate is presenting information using a PowerPoint presentation and asks students who are taking notes, "Is everyone done with this slide?"

Automatic Score of 1 is given when:

- There is a pattern of **significant content inaccuracies** that will lead to student misunderstandings.
- The candidate makes a significant error in content that is core to the central focus or a key standard for the learning segment. (For example, the candidate introduces an inaccurate definition of a central concept before students work independently or presents that electrons are located in the nucleus or that green plants are primary consumers and continues to reference and teach this information, with no correction throughout the video clip(s).

Above 3

Evidence that demonstrates performance above 3:

- In the clips, the candidate uses student ideas and thinking to develop students' science thinking or their abilities to evaluate their own thoughts about science concepts, scientific practices through inquiry, AND/OR the phenomenon.

What distinguishes a Level 4 from a Level 3: At Level 4,

- The candidate follows up on student responses to encourage the student or his/her peers to explore or build on the ideas expressed.
- The candidate uses this strategy to develop students' understanding of science concepts, scientific practices through inquiry, AND/OR the phenomenon.

- Examples of "building on student responses" includes referring to a previous student response in developing a point or an argument; calling on the student to elaborate on what s/he said; posing questions to guide a student discussion; soliciting student examples and asking another student to identify what they have in common; asking a student to summarize a lengthy discussion or rambling explanation; and asking another student to respond to a student comment or answer a question posed by a student to move instruction forward. As a specific example, one student might respond that the number of earthquakes in an area where the fracking drilling process is currently being used is increasing. The candidate would follow with, "Why do you say that?" as a way to encourage that student or a classmate to tie in the geological data that the students are using in class inquiry and discussion.

What distinguishes a Level 5 from a Level 4: At Level 5, the candidate meets all of Level 4 **AND**

- There is evidence in the clips that the candidate structures and supports student-student conversations and interactions that facilitate students' ability to evaluate and self-monitor their own data collection, procedures, interpretations, or evidence-based explanations.

Instruction Rubric 9: Subject-Specific Pedagogy: Analyzing Evidence and/or Data

SCI9: How does the candidate facilitate students' analysis of the evidence and/or data based on scientific inquiry?

The Guiding Question

The Guiding Question addresses how the candidate guides students in examining and drawing conclusions about the evidence and/or data collected?

Key Concepts of Rubric:

- N/A

Primary Sources of Evidence:

Video Clips

Instruction Commentary **Prompt 4b**

Note that for the Instruction Task, the commentary is intended to provide context for interpreting what is shown in the video. Candidates sometimes describe events that do not appear in the video or conflict with scenes from the video—**such statements should not override evidence depicted in the video.**

Scoring Decision Rules

▶ Multiple Criteria	▪ N/A for this rubric
▶ AUTOMATIC 1	▪ None

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- In the clips, the candidate asks student to present or record evidence and/or data in tables, maps, diagrams, or other graphical or statistical displays AND candidate guides students to find patterns and/or inconsistencies in the data. For example, the candidate asks students specific questions regarding the color changes that are occurring with litmus solution and students present data by responding that the litmus solution starts blue but turns pink in some solutions, but is remaining blue in cleaning products. Then the candidate would ask, "What does this mean?" or "What can you conclude from this data?"

Below 3

Evidence that demonstrates performance below 3:

- In the clips, candidate does not engage students in an analysis of data.

What distinguishes a Level 2 from a Level 3: At Level 2,

- The candidate asks students to present or record evidence and/or data AND the candidate takes the lead in analyzing the data. For example, during the video clip(s) the candidate asks a set of lab partners what the volumes of base were needed to titrate the acid of unknown concentration. The students respond with volume amounts that are smaller than the amount of base used and the candidate begins to sum up the idea that the acid must have a lower concentration than that of the base used during the titration.

What distinguishes a Level 1 from a Level 2: At Level 1,

- Candidate does not ask students to present or record their evidence and/or there is essentially no data analysis. For example, the video clip(s) show students actively engaged in a lab situation during which the students are using molecular model kits to create 3-D molecules, but the students are not drawing the structures in a lab notebook or on a sheet for later use and comparison.

Above 3

Evidence that demonstrates performance above 3:

- In the clips, the candidate supports the students in specifically **looking for patterns AND/OR inconsistencies in the data**.

What distinguishes a Level 4 from a Level 3: At Level 4,

- In the clips, the candidate guides students to organize the data to better identify relationships—in a graph, table, map, or diagram. The candidate then engages students in a discussion during which s/he supports the students to **find patterns AND/OR inconsistencies in the data**. For example, the candidate would ask, "So what does the trend in the period of oscillation for the spring seem to be as we add weight to the system?" The students would say, "the oscillations lengthen" or "take longer." Then the candidate would point to data that does not seem to fit, "How about this number? What should we consider with this data point?" and then a discussion could ensue regarding outliers, or data that will not be used or considered.

What distinguishes a Level 5 from a Level 4: At Level 5, the candidate meets Level 4 **AND**

- In the clips, the candidate supports the students in considering limitations of evidence and/or data, methods used to collect evidence and/or data, or analysis. For example, the candidate may ask students to consider their use of a triple beam balance and compare the data's accuracy to masses that are taken using an electronic single pan balance to collect mass measurements. This comparison could lead to an extension into using mass to calculate force and the precision and accuracy of calculations that follow based on mass measurements.

Instruction Rubric 10: Analyzing Teaching Effectiveness

SCI10: How does the candidate use evidence to evaluate and change teaching practice to meet students' varied learning needs?

The Guiding Question

The Guiding Question addresses how the candidate examines the teaching and learning in the video clips and proposes what s/he could have done differently to better support the needs of diverse students. The candidate justifies the changes based on student needs and references to research and/or theory.

Key Concepts of Rubric:

- N/A

Primary Sources of Evidence:

Video Clips (for evidence of student learning)

Instruction Commentary **Prompt 5**

Scoring Decision Rules

▶ Multiple Criteria	<ul style="list-style-type: none">■ Criterion 1 (primary): Proposed changes■ Criterion 2: Connections to research/theory■ Place greater weight or consideration on criterion 1 (proposed changes).
▶ AUTOMATIC 1	<ul style="list-style-type: none">■ None

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- *Primary criterion:* The proposed changes address the central focus and the candidate explicitly connects those changes to the learning needs of the class as a whole.
 - Proposed changes noted by the candidate should be related to the lessons that are seen or referenced in the clips, but do not need to be exclusively from what is seen in the clips alone. This means that since only portions of the lessons will be captured by the clips, candidates can suggest changes to any part of the lesson(s) referenced in the clips, even if those portions of the lesson(s) are not depicted in the clips, but were part of the lesson plans in Task 1.
- *Secondary criterion:* The candidate refers to research and/or theory in relation to the plans to support student learning. The connections between the research/theory and the tasks are vague/not clearly made.
- If evidence meets the primary criterion at Level 3, the rubric is scored at Level 3 **regardless of the evidence for the secondary criterion.**

- If evidence meets the primary criterion at Level 4, and candidate has NO connection to research/theory, the rubric is scored at Level 3.

Below 3

Evidence that demonstrates performance below 3:

- The changes proposed by the candidate are not directly related to student learning.

What distinguishes a Level 2 from a Level 3: At Level 2,

- The changes address improvements in teaching practice that mainly focus on how the candidate structures or organizes learning tasks, with a superficial connection to student learning. There is little detail on the changes in relation to either the central focus or the specific learning that is the focus of the video clips. Examples include asking additional higher-order questions without providing examples, improving directions, repeating instruction without making significant changes based on the evidence of student learning from the video clips, or including more group work without indicating how the group work will address specific learning needs.
- If a candidate's proposed changes have nothing to do with the central focus, this rubric cannot be scored beyond a Level 2.

What distinguishes a Level 1 from a Level 2: At Level 1,

- The changes are not supported by evidence of student learning from lessons seen or referenced in the clips.

Above 3

Evidence that demonstrates performance above 3:

- The proposed changes relate to the central focus and explicitly address individual and collective needs that were within the lessons seen in the video clips.
- The changes in teaching practice are supported by research and/or theory.

What distinguishes a Level 4 from a Level 3: At Level 4,

- The changes clearly address the learning needs of individuals in addition to the learning needs of the whole class in the video clips by providing additional support and/or further challenge in relation to the central focus. Candidate should explain how proposed changes relate to each individual's needs. The candidate explains how research or theory is related to the changes proposed. Candidates may cite research or theory in their commentary, or refer to the ideas and principles from the research; either connection is acceptable, as long as the candidate clearly connects the research/theory to the proposed changes.
- Scoring decision rules: To score at Level 4, the candidate must meet the primary criterion at Level 4 and make at least a fleeting, relevant reference to research or theory (meet the secondary criterion at least at Level 3).

What distinguishes a Level 5 from a Level 4: At Level 5, the candidate meets Level 4 **AND**

- Explains how principles of research or theory **support or frame the proposed changes**. The justifications are explicit, well-articulated, and demonstrate a thorough understanding of the research/theory principles that are clearly reflected in the explanation of the changes.

Assessment Rubric 11: Analysis of Student Learning

SCI11: How does the candidate analyze evidence of student learning related to conceptual understanding, the use of scientific practices during inquiry, and evidence-based explanations or reasonable predictions about a real-world phenomenon?

The Guiding Question

The Guiding Question addresses the candidate's analysis of student work to identify patterns of learning across the class.

Key Concepts of Rubric:

- *Aligned*—The assessment, its evaluation criteria, learning objectives and analysis are aligned with each other.
- *Evaluation criteria*—Evaluation criteria should indicate differences in level of performance, e.g., a rubric, a checklist of desired attributes, points assigned to different parts of the assessment. Summative grades are not evaluation criteria. Evaluation criteria must be relevant to the learning objectives, though they may also include attention to other desired features of the assessment response, e.g., neatness, spelling.

For the following term from the rubric, see the handbook glossary:

- *Patterns of learning*

Primary Sources of Evidence:

Evaluation criteria

Student work samples

Assessment Commentary **Prompt 1a–d**

Scoring Decision Rules

▶ Multiple Criteria	▪ N/A for this rubric
▶ AUTOMATIC 1	▪ Significant misalignment between evaluation criteria, learning objectives, and/or analysis

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at **Level 3**:

- The analysis is an accurate listing of what students did correctly and incorrectly.
- The analysis is aligned with the evaluation criteria and/or assessed learning objectives.
- Some general differences in learning across the class are identified.

Below 3

Evidence that demonstrates performance below 3:

- The analysis is superficial (e.g., primarily irrelevant global statements) or focuses only right or wrong answers.
- The analysis is contradicted by the work sample evidence.
- The analysis is based on an inconsistent alignment with evaluation criteria and/or standards/objectives.

What distinguishes a Level 2 from a Level 3: At Level 2,

- Although aligned with the summary, the analysis presents an incomplete picture of student learning by only addressing either successes or errors.

What distinguishes a Level 1 from a Level 2: There are **two different ways** that evidence is scored at Level 1:

1. The analysis is superficial because it ignores important evidence from the work samples, focusing on trivial aspects.
2. The conclusions in the analysis are not supported by the work samples or the summary of learning.

Automatic Score of 1 is given when:

- There is a significant lack of alignment between evaluation criteria, learning objectives, and/or analysis. A lack of alignment can be caused by a lack of relevant evaluation criteria to assess student performance on the learning objectives.

Above 3

Evidence that demonstrates performance above 3: The analysis:

- Identifies patterns of learning (quantitative and qualitative) that summarize what students know, are able to do, and still need to learn.
- Describes patterns for the whole class, groups, or individuals.
- Is supported with evidence from the work samples and is consistent with the summary.

What distinguishes a Level 4 from a Level 3: At Level 4,

- The analysis describes consistencies in performance (patterns) across the class in terms of what students know and are able to do and where they need to improve.
- The analysis goes beyond a listing of students' successes and errors, to an explanation of student understanding in relation to their performance on the identified assessment. An exhaustive list of what students did right and wrong, or the % of students with correct or incorrect responses, should be scored at Level 3, as that does not constitute a pattern of student learning. A pattern of student learning goes beyond these quantitative differences to identify specific content understandings or misunderstandings, or partial understandings that are contributing to the quantitative differences.

- Specific examples from work samples are used to demonstrate the whole class patterns. For example, the candidate would state, "In general, the class as a whole can identify the dorsal and ventral sides of the starfish, but during the dissection, at least half of the students had difficulty locating the vascular system. As seen in both Student 1's (large-type format per IEP requirements) and Students 2's (no IEP, representing the class average students) submitted lab sheet, both students were able to complete Section A identifying the ventral and dorsal sides, but in Part B, both Student 1 and 2 could not complete the vascular system parts. The work submitted by Student 3 represents the six-student gifted and talented group, and both sections A and B were completed with only minor spelling errors."

What distinguishes a Level 5 from a Level 4: At Level 5,

- The candidate uses specific evidence from work samples to demonstrate qualitative patterns of understanding. The analysis uses these qualitative patterns to interpret the range of similar correct or incorrect responses from individuals or groups (e.g., quantitative patterns); and to determine elements of what students learned and what would be most productive to work on. The qualitative patterns may include struggles, partial understandings, and/or attempts at solution. An example would be, "Most students could use correct stoichiometric procedures to solve for the volume of a gas produced (See problems 1–10), as illustrated by Students A and B. But most students were like Student B, who could not set up the equation on any of the word problems missing either a reactant or a product, while Student A's work sample represented the few students who could. Even though Student A made a procedural error on Problem 8, the balanced chemical equation for the reaction was correct. While Student B found the correct solution to problems 1–10 while solving for the volume of gas produced, he was unable to construct the correct equation for any of the word problems (problems 11–13.) This suggests that most of my students understood the procedures and how to use them, but most had difficulty with writing the balanced chemical equations when the reactions were written in words and appeared in a real-world context. They appeared to be really confused by the additional descriptors in the word equations that represented the states of matter of the reactants and products, because like Student B, these confused students included or left out part of the reaction. So in Problem 11, the students wrote a compound's formula (N_2O) instead the gas's diatomic molecule representation, $N_2(g)$. In Problem 12, the atomic representation for the evolution of oxygen gas is shown as just an O, and in Problem 13, a combustion reaction requires oxygen on the reactant side and these students did not include $O_2(g)$ which means that they did not understand that $CO_2(g)$ and $H_2O(g)$ cannot be produced straight from the burning of ethanol as a fuel."

Assessment Rubric 12: Providing Feedback to Guide Learning

SCI12: What type of feedback does the candidate provide to focus students?

The Guiding Question

The Guiding Question addresses the evidence of feedback provided to the focus students. Feedback may be written on the three student work samples or provided in a video/audio format. The feedback should identify what students are doing well and what needs to improve in relation to the learning objectives.

Key Concepts of Rubric:

- *Significant content inaccuracies*—Content flaws in the feedback are significant and systematic, and interfere with student learning
- *Developmentally inappropriate feedback*—Feedback addressing concepts, skills, or procedures well above or below the content assessed (without clearly identified need) OR feedback that is not appropriate for the developmental level of the student (e.g., lengthy written explanations for English learners or feedback to a student with an explanation that references a concept later in the curriculum).

Primary Sources of Evidence:

Evidence of feedback (written, audio/video)

Assessment Commentary **Prompts 1a, 2a–b**

Scoring Decision Rules

▶ Multiple Criteria	<ul style="list-style-type: none"> ▪ N/A
▶ AUTOMATIC 1	<ul style="list-style-type: none"> ▪ One or more content errors in the feedback that will mislead student(s) in significant ways ▪ No evidence of feedback for one or more focus students
▶ Preponderance of Evidence	<ul style="list-style-type: none"> ▪ You must apply the preponderance of evidence rule when the focus students receive varying types of feedback. For example, when the candidate provides feedback on both strengths and needs for 2 out of the 3 focus students, this example would be scored at a level 4 according to the preponderance of evidence rule.

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- The feedback identifies specific strengths OR needs for improvement. At Level 3, the candidate **MUST** provide the focus students with qualitative feedback about their performance that is aligned with the learning objectives. Specific feedback includes such things as pointing to successful use of a strategy ("I like how you are using colored pencils to write the units beside each value in your conversion factors"), naming a type of problem successfully solved ("your percentage error problems are all correct"), pointing to and naming errors ("in each of these 5 problems, you forgot to change from C to Kelvin temperatures"), suggesting information that would help solve the problem successfully ("why don't you write Avogadro's number at the top of the worksheet, then when you need it in a conversion factor, it will be right there for you to reference"). Checkmarks, points deducted, grades, or scores do not meet the Level 3, even when they distinguish errors from correct responses.

Below 3

Evidence that demonstrates performance below 3:

- Evidence of feedback is general, unrelated to the assessed learning objectives, developmentally inappropriate, inaccurate, or missing for one or more focus students.

What distinguishes a Level 2 from a Level 3: At Level 2:

- Although the feedback is related to the assessed learning objectives, it is also vague and does not identify specific strengths or needs for improvement. At Level 2, general feedback includes identifying what each focus student did or did not do successfully with little detail, e.g., checkmarks for correct responses, points deducted, and comments such as, "Watch out for negative signs when you look up the entropy values!" that are not linked to a specific strength or need. General feedback does not address the specific error or correct solution (e.g., "Check your work" or "Yes!").

What distinguishes a Level 1 from a Level 2: There are **two different ways** that evidence is scored at Level 1:

1. Feedback is not related to the learning objectives. Feedback that is limited to a single statement or mark, such as identifying the total percent correct (86%), an overall letter grade (B), or one comment like "Nice work!" with no other accompanying comments or grading details does not meet the Level 2 requirement and should be scored at a Level 1. These examples of a single piece of feedback do not provide **any** general feedback to focus students that is related to the learning objectives.
2. Feedback is not developmentally appropriate.

Automatic Score of 1 is given when:

- Feedback includes content inaccuracies that will misdirect the focus student(s). For example, "Remember that the atomic number is ALWAYS the one at the top of the square, in red, on the Periodic Table."

- There is no evidence of feedback for the analyzed assessment for one or more focus students. This includes when there is only a description of feedback in the commentary rather than actual feedback (video, audio or written) presented to the focus student(s) as presented on the work samples, an audio file, or in a video clip from Task 2 with time-stamp reference.

Above 3

Evidence that demonstrates performance above 3:

- Feedback is specific and is related to assessed learning objectives, and addresses students' strengths AND needs.

What distinguishes a Level 4 from a Level 3: At Level 4,

- Specific feedback addresses both strengths and needs. For example, the candidate would write, "The objectives for the lab experiment are written well, but you need to justify your predictions using science concepts or data collected."

What distinguishes a Level 5 from a Level 4: At Level 5, the candidate meets Level 4 **AND**

- The feedback for at least one focus student includes:
 - A strategy to address a specific learning need, including the need for a greater challenge. For example, "You got the right answer. Make sure you slow down and show all of your work so that if you don't get the right answer, I'll be able to help you figure out where you went wrong."

OR

- A meaningful connection to experience or prior learning. For example, the candidate refers back to a prior physics lesson: "I want you to visualize the new situation as you did in the problem you solved yesterday, to be able to compare the two different scenarios. Then sketch the situation and label all the forces present before you work on solving it. This will help you see the problem as you solve it."

Assessment Rubric 13: Student Understanding and Use of Feedback

SCI13: How does the candidate support focus students to understand and use the feedback to guide their further learning?

The Guiding Question

The Guiding Question addresses how the candidate explains how s/he will help focus students understand and use the feedback provided in order to improve their learning.

Key Concepts of Rubric:

- N/A

Primary Sources of Evidence:

Evidence of feedback (written, audio/video)

Assessment Commentary **Prompt 2c**

Scoring Decision Rules

▶ Multiple Criteria	▪ N/A for this rubric
▶ AUTOMATIC 1	▪ None

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- Candidate describes how the focus students will understand **OR** use feedback related to the learning objectives. This description needs to relate to the feedback given to one or more of the focus students.
- The description should be specific enough that you understand what the candidate and/or students are going to do. Otherwise, it is vague and the evidence should be scored at Level 2.
 - Example for *understanding* feedback: Candidate reviews work with whole class focusing on common mistakes that explicitly includes content that one or more focus students were given feedback on.
 - Example for *using* feedback: Candidate asks focus students to revise work using feedback given and resubmit revised work.

Below 3

Evidence that demonstrates performance below 3:

- Opportunities for understanding or using feedback are superficially described or absent.

What distinguishes a Level 2 from a Level 3: At Level 2,

- The description of how focus students will understand or use feedback is very general or superficial. Details about how the focus students will understand or use the feedback are missing. For example, candidate will state that the focus students will use the feedback in preparation for an upcoming quiz on this lesson, or that "The students will use the feedback on their next assignment," or, e.g., the description discusses whole class understanding or use of feedback without explicit attention to feedback given to one or more focus students.
- The use of feedback is not clearly related to the assessed learning objectives.

What distinguishes a Level 1 from a Level 2: At Level 1,

- Opportunities for understanding or using feedback are not described **OR**
- There is **NO** evidence of feedback for two or more focus students.

Above 3

Evidence that demonstrates performance above 3:

- Support for the focus students to understand **AND** use feedback is described in enough detail to understand how the focus students will develop in areas identified for growth and/or continue to deepen areas of strength.

What distinguishes a Level 4 from a Level 3: At Level 4,

- The candidate describes planned or implemented support for the focus students to understand and use feedback on their strengths **OR** weaknesses to further develop their learning in relation to the learning objectives. For example, a candidate may work with focus students in a small group and reteach several concepts they struggled with on their assessment (as noted by feedback given), using a graphic organizer to further develop understanding of each concept (such as a T-chart or concept map). Next, students would be given an opportunity to revise their responses involving those concepts, using the graphic organizer to support their revisions. This example shows how a candidate can help focus students understand their feedback in relation to misunderstandings and support them in using that feedback to enhance learning in relation to objectives assessed. This type of planned support could take place with the whole class as long as explicit attention to one or more of the focus student's strengths or weaknesses is addressed in relation to the feedback given.

What distinguishes a Level 5 from a Level 4: At Level 5,

- The candidate describes planned or implemented support for the focus students to understand and use feedback on their strengths **AND** weaknesses related to the learning objectives. For example, the candidate would state, "Students are to review feedback when I return homework sheets, and are to look for the steps given to solve the empirical formula problems in their notes. Student A represents the group of students who mastered setting up the conversions from grams to moles, but who will need to practice adding up molecular masses for molecules that have parentheses in the formula, i.e., $(\text{NH}_4)_2\text{SO}_4$. And so I will write five similar formulas on the Smart Board so student can copy the formulas and can master the concept of molecular masses prior to moving back to the empirical formula problems, which Student A was able to set up correctly, except for the molecular masses. As students work on the formula problems, I will monitor them so I can see if they are still having trouble and intervene with questions based on what they already know to help them identify and correct any errors."

Assessment Rubric 14: Analyzing Students' Language Use and Science Learning

SCI14: How does the candidate analyze students' use of language to develop content understanding?

The Guiding Question

The Guiding Question addresses how the candidate explains students' use of the identified language demands and how that use demonstrates and develops science understanding.

Key Concepts of Rubric:

Use the definitions below and the subject-specific Academic Language handout to further clarify concepts on Rubric 14.

- **language demands**—Specific ways that academic language (vocabulary, functions, discourse, syntax) is used by students to participate in learning tasks through reading, writing, listening, and/or speaking to demonstrate their disciplinary understanding.
- **language functions**—Purpose for which language is used. The content and language focus of the learning task, often represented by the active verbs within the learning outcomes. Common language functions in science include **analyzing** scientific data; **interpreting** written investigative procedures, diagrams, figures, tables, graphs, and dense authoritative text; **explaining** models of scientific phenomena; **predicting** from models and data from scientific inquiries; **justifying** conclusions with scientific evidence; and so on.
- **vocabulary**—Words and phrases that are used within disciplines including: (1) words and phrases with subject-specific meanings that differ from meanings used in everyday life (e.g., table, control, variable, alcohol, cell); (2) general academic vocabulary used across disciplines (e.g., compare, explain, analyze, evaluate, discuss); and (3) subject-specific words and/or symbols defined for use in the discipline.
- **discourse**—How members of the discipline talk, write, and participate in knowledge construction, using the structures of written and oral language. Discipline-specific discourse has distinctive features or ways of structuring oral or written language (text structures) or representing knowledge visually that provide useful ways for the content to be communicated. In science, language structures include graphic and tabular representations (which are shorthand language for complex sets of data), lists (e.g., materials lists), and narratives (e.g., analysis and conclusions sections in a lab report). If the function is to draw conclusions, then appropriate structures could include charts of investigative results or sentence starters to structure an analysis such as "The results of the investigation show...", "This data suggests that....", "The design called for the control of..."
- **syntax**—The rules for organizing words or symbols together into phrases, clauses, sentences or visual representations. One of the main functions of syntax is to organize language in order to convey meaning.

- **language supports**—The scaffolds, representations, and pedagogical strategies teachers intentionally provide to help learners understand and use the concepts and language they need to learn within disciplines. The language supports planned within the lessons in edTPA should directly support learners to understand and use identified language demands (vocabulary and/or symbols, language function, and syntax or discourse) to deepen content understandings.

Primary Sources of Evidence:

Assessment Commentary **Prompt 3**

Evidence of Student Language Use (student work samples and/or video evidence)

Scoring Decision Rules

▶ Multiple Criteria	■ N/A for this rubric
▶ AUTOMATIC 1	■ None

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- The candidate explains and identifies evidence that the students used or attempted to use the language function AND one additional language demand (vocabulary and/or symbols, syntax, or discourse). Note: The language demands discussed in the Assessment Commentary do not have to be the same as those discussed in Task 1.
- It is not sufficient for the candidate to reference an artifact and make a general statement that, for example, "As seen in the work samples, the students used the vocabulary as they analyzed data." The candidate must explain how the students used the identified language and reference or identify an example of that use from the artifact, e.g., "Students 1 and 2 used the vocabulary and also explicitly incorporated both data and science concepts (the two components of analysis identified) in their analyses. Student 3 used a mixture of vocabulary and everyday language in the analysis."

Below 3

Evidence that demonstrates performance below 3:

- The candidate's identification of student's language use is not aligned with the language demands or limited to one language demand.

What distinguishes a Level 2 from a Level 3: At Level 2,

- The candidate's description and/or evidence of students' language use is limited to only one language demand (vocabulary and/or symbols, function, syntax, or discourse). For example, the candidate would state, "As seen in Student B's lab sheet, he correctly used the symbols to transcribe the RNA with C T A and G in the right spots to represent cytosine, thiamine, adenine and guanine."

What distinguishes a Level 1 from a Level 2: At Level 1,

- The candidate identifies language use that is unrelated or not clearly related to the language demands (function, vocabulary and/or symbols, syntax, discourse) addressed in the Assessment commentary.

- The candidate's description or explanation of language use is not consistent with the evidence provided.

Above 3

Evidence that demonstrates performance above 3:

- Candidate identifies specific evidence of student use of the language function and vocabulary (and/or symbols) along with at least one other language demand (syntax or discourse).
- Candidate explains how evidence of student language represents their development of content understandings, which may include growth and/or struggles with both understanding and expressing content understandings.
- Candidate explains and provides evidence of language use and content learning for students with distinct language needs.

What distinguishes a Level 4 from a Level 3: At Level 4,

- The candidate identifies and explains evidence that students are able to use the language function, vocabulary and/or symbols AND associated language demands (syntax and/or discourse). The explanation uses specific evidence from the video and/or work samples.
- The candidate's analysis includes how evidence of student language use demonstrates growth and/or struggles in developing content understandings. For example, the candidate notes that, "All students could give a complete explanation of parts of a wave using some commonly used vocabulary words, like crests and troughs. Most of the students could produce detailed explanations (the language function) in terms of general concepts and procedures for determining the difference between longitudinal and transverse waves. However, other students' explanations were incomplete. As seen in video clip 2, (time 3:42), Student X was showing how the slinky would be manipulated for a transverse or compressional wave, but could not put the actions into words, suggesting that some students still need support to develop in the area of explaining the characteristics of waves in laboratory-based activities."

What distinguishes a Level 5 from a Level 4: At Level 5, the candidate meets Level 4 AND

- Explains and provides evidence that students with distinct language needs are using the language for content learning. For example, the candidate would state, "The three ELL students mastered the difference between a food chain and a food web as evidenced in the work sample labeled Student A, who represents that group of students. Student A provides a succinctly written and labeled food chain showing first a producer (cabbage plant), a primary consumer (a slug), a secondary consumer (a robin), and a tertiary consumer (a hawk) with each connected correctly, showing the flow of energy from the producer to the primary consumer with an arrow pointing to the consumer. Student A expanded that same food web to create a food web while including another producer (kale) which was also connected to the slug, but then included another secondary consumer (a blue jay) that is similarly connected, as the robin is, to the hawk. Student A also explained (language function) that the amount of energy at each level of the food chain and food web would be less, resulting in fewer hawks than cabbage plants."

Assessment Rubric 15: Using Assessment to Inform Instruction

SCI15: How does the candidate use the analysis of what students know and are able to do to plan next steps in instruction?

The Guiding Question

The Guiding Question addresses how the candidate uses conclusions from the analysis of student work and research and/or theory to propose the next steps of instruction. Next steps should be related to the standards/objectives assessed and based on the assessment that was analyzed. The next steps should also address the whole class, groups with similar needs, and/or individual students.

Key Concepts of Rubric:

- N/A

Primary Sources of Evidence:

Assessment Commentary **Prompts 1 and 4**

Scoring Decision Rules

<p>▶ Multiple Criteria</p>	<ul style="list-style-type: none"> ▪ Criterion 1 (primary): Next steps for instruction ▪ Criterion 2: Connections to research/theory ▪ Place greater weight or consideration on criterion 1 (next steps for instruction).
<p>▶ AUTOMATIC 1</p>	<ul style="list-style-type: none"> ▪ None

Unpacking Rubric Levels

Level 3

Evidence that demonstrates performance at Level 3:

- *Primary Criterion:* The next steps focus on support for student learning needs, as identified in the analysis of student work that is general for the whole class, not specifically targeted for individual students. The support addresses learning related to the learning objectives that were assessed.
- *Secondary Criterion:* The candidate refers to research or theory when describing the next steps. The connections between the research/theory and the next steps are vague/not clearly made.
- If evidence meets the primary criterion at Level 3, the rubric is scored at Level 3 **regardless of the evidence for the secondary criterion.**
- If evidence meets the primary criterion at Level 4, and candidate has NO connection to research/theory, the rubric is scored at Level 3.

Below 3

Evidence that demonstrates performance below 3:

- The next steps are not directly focused on student learning needs that were identified in the analysis of the assessment.
- Candidate does not explain how next steps are related to student learning.

What distinguishes Level 2 from Level 3: At Level 2,

- The next steps are related to the analysis of student learning and the standards and learning objectives assessed. For example, the candidate would state, "As seen in the submitted student work samples (comparison worksheet and lab reports), the students have mastered the difference between meiosis and mitosis and so the next logical step would be a quiz over these concepts."
- The next steps address improvements in teaching practice that mainly focus on how the candidate structures or organizes learning tasks, with a superficial connection to student learning. There is little detail on the changes in relation to the assessed student learning. Examples include repeating instruction or focusing on improving conditions for learning such as pacing or classroom management, with no clear connections to how changes address the student learning needs identified.

What distinguishes Level 1 from Level 2: There are **three different ways** that evidence is scored at Level 1:

1. Next steps **do not follow from** the analysis.
2. Next steps are **unrelated to the standards and learning objectives** assessed.
3. Next steps are **not described in sufficient detail** to understand them, e.g., "more practice" or "go over the test."

Above 3

Evidence that demonstrates performance above 3:

- Next steps are based on the assessment results and provide scaffolded or structured support that is directly focused on specific student learning needs related to conceptual understanding, use of scientific practices during inquiry, and evidence-based argument about a scientific phenomenon.
- Next steps are supported by research and/or theory.

What distinguishes Level 4 from Level 3: At Level 4,

- The next steps are clearly aimed at supporting specific student needs for either individuals (2 or more students) or groups with similar needs related to one or more of the three areas of science learning (conceptual understanding, use of scientific practices during inquiry, AND/OR evidence-based explanations of or reasonable predictions about a real-world phenomenon). Candidate should be explicit about how next steps will strategically support individuals or groups and explain how that support will address each individual or group's needs in relation to the area of science learning (conceptual understanding, use of scientific practices during inquiry, AND evidence-based explanation of or reasonable prediction about a real-world phenomenon).

- The candidate discusses how the research and/or theory is related to the next steps in ways that make some level of sense given the students and central focus. They may cite the research or theory in their discussion, or they may refer to the ideas from the research. Either is acceptable, as long as they clearly connect the research/theory to their next steps. For example, the candidate would state, "The five students who have mastered lighting the Bunsen burner will use this skill to demonstrate for their classmates a study of convection currents in our geology class. The students will heat water in a beaker, add pepper flakes, and all will record the motion that the pepper flakes follow (rising with the less dense, heated water from the bottom of the beaker, close to the heat source to the top of the beaker where the water cools and becomes more dense, and sinking, again, along with the more dense water) thus applying the theory of active learning (Bonwell, 1991). This bonus activity will support the students' lab proficiency and will reinforce the skill that the others will need to master as we move into the follow unit that is more chemistry-based and will definitely use more lab equipment."
- Scoring decision rules: To score at Level 4, the candidate must meet the primary criterion at Level 4 and make at least a fleeting, relevant reference to research and/or theory (meet the second criterion at least at Level 3).

What distinguishes Level 5 from Level 4: At Level 5,

- The next steps are clearly aimed at supporting specific student needs for individuals AND groups with similar needs related to one or more of the three areas of science learning (conceptual understanding, use of scientific practices during inquiry AND evidence-based explanations of or reasonable predictions about a real-world phenomenon). Candidate should be explicit about how next steps will strategically support individuals AND groups and explain how that support will address each individual's AND group's needs in relation to the areas of science learning.
- The candidate explains how principles of research and/or theory support the proposed changes, with clear connections between the principles and the next steps. The explanations are explicit, well-articulated, and demonstrate a thorough understanding of the research or theoretical principles involved. For example, a candidate would write, "For the four gifted students who have mastered balancing equations with coefficients, I will review balancing chemical equations and then introduce the five types of reactions while modeling the use of the types of reactions to predict the products in reactions. For example, once the students understand that a synthesis reaction will always be a combination of two small reactants into one product, the students can then use the generic form of a synthesis reaction, along with the previously learned oxidation numbers, to combine the elements into real compounds with the correct molecular formula, thus writing the completed reaction. Vgotsky's Zone of Proximal Development (ZPD) describes the area between a child's level of independent performance (what he/she can do alone) and the child's level of assisted performance (what he/she can do with support). Skills and understandings contained within a child's ZPD are the ones that have not yet emerged but could emerge if the child engaged in interactions with knowledgeable others (peers and adults) or in other supportive contexts. The small group of students who have mastered balancing the equations, along with recognizing the types of reactions, will be able to work cooperatively to predict products in reactions where the reactants only are provided within their ZPD, while I continue to challenge the others who have not completely mastered balancing chemical equations."