edTPA®

Technology and Engineering Education

Assessment Handbook

Version 06.1

edTPA stems from a twenty-five-year history of developing performance-based assessments of teaching quality and effectiveness. The Teacher Performance Assessment Consortium (Stanford and AACTE) acknowledges the National Board for Professional Teaching Standards, the Interstate Teacher Assessment and Support Consortium, and the Performance Assessment for California Teachers for their pioneering work using discipline-specific portfolio assessments to evaluate teaching quality. This version of the handbook has been developed with thoughtful input from over six hundred teachers and teacher educators representing various national design teams, national subject matter organizations (ACEI, ACTFL, AMLE, CEC, IRA, NAEYC, NAGC, NCSS, NCTE, NCTM, NSTA, SHAPE America), and content validation reviewers. All contributions are recognized and appreciated.

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SCALE

Stanford Center for Assessment, Learning, & Equity

Contents

Introduction to edTPA Technology and Engineering Education

Purpose

The purpose of edTPA Technology and Engineering Education, a nationally available performance-based assessment, is to measure novice teachers' readiness to teach technology and engineering education. The assessment is designed with a focus on student learning and principles from research and theory. It is based on findings that successful teachers

- develop knowledge of subject matter, content standards, and subject-specific pedagogy
- develop and apply knowledge of varied students' needs
- consider research and theory about how students learn
- reflect on and analyze evidence of the effects of instruction on student learning

As a performance-based assessment, edTPA is designed to engage candidates in demonstrating their understanding of teaching and student learning in authentic ways.

Overview of the Assessment

The edTPA Technology and Engineering Education assessment is composed of three tasks:

1. Planning for Instruction and Assessment
2. Instructing and Engaging Students in Learning
3. Assessing Student Learning

For this assessment, you will plan **3–5 consecutive technology and engineering education lessons** (or, if teaching within a large time block, **3–5 hours of connected instruction**) referred to as a learning segment. Your lessons will be aligned with any of the following: Standards for Technological Literacy: Content for the Study of Technology;[1] Advancing Excellence in Technological Literacy: Student Assessment, Professional Development, and Program Standards;[2] and the Next Generation Science Standards.[3] A learning segment prepared for this assessment should reflect a balanced approach to technology and engineering education. This means your segment should include learning tasks where students have opportunities to develop technology-related conceptual understanding, technical skills, and engineering design or other problem-solving strategies while completing a project.

[1] Standards for Technological Literacy: Content for the Study of Technology can be found at http://www.iteea.org/10/39197.aspx.

[2] Advancing Excellence in Technological Literacy: Student Assessment, Professional Development, and Program Standards can be found at http://www.iteea.org/10/39197.aspx.

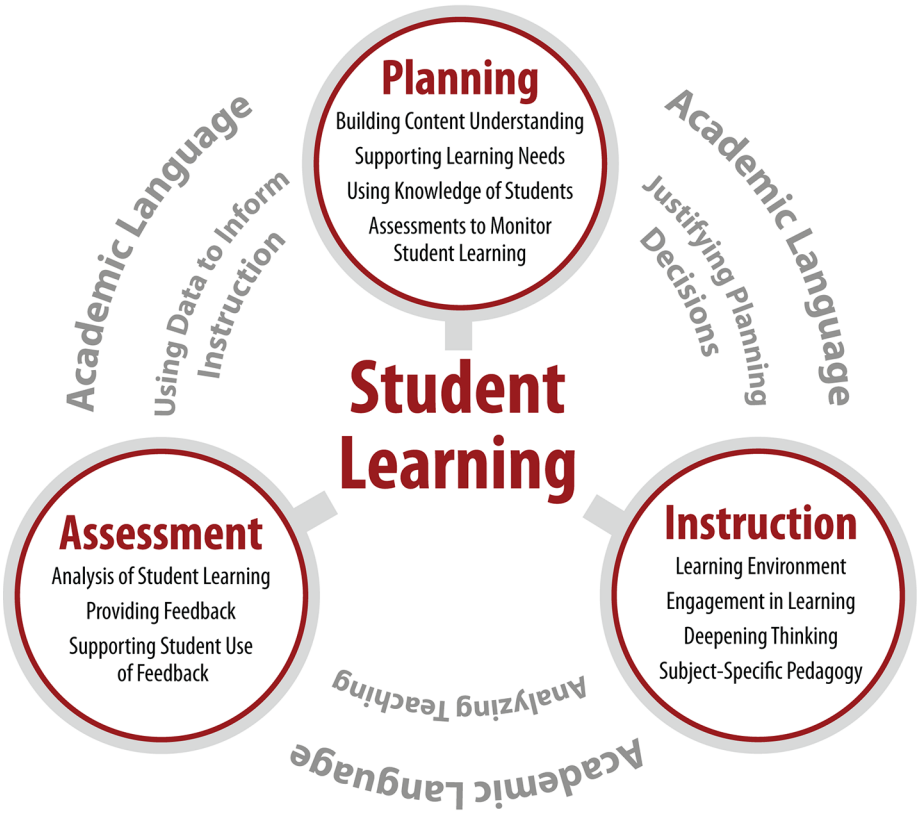
[3] The Next Generation Science Standards are available on the NGSS website at http://www.nextgenscience.org/.

If students are spending several lessons working independently on the project, then you may extend the learning segment (**no more than 10 hours**), with about **3–5 hours of instruction** and the rest spent monitoring and supporting students as they work.

You will then teach the learning segment, making a videorecording of your interactions with students during instruction. You will also assess, informally and formally, students' learning **throughout** the learning segment. Upon completion of the three tasks, you will submit artifacts from the tasks (e.g., lesson plans, clips from your videorecording, assessment materials, instructional materials, student work samples), as well as commentaries that you have written to explain and reflect on the Planning, Instruction, and Assessment components of the tasks. The artifacts and commentaries for each task will then be evaluated using rubrics especially developed for each task.

The edTPA Tasks and the Cycle of Effective Teaching

The three edTPA tasks represent a cycle of effective teaching (i.e., teaching that is focused on student learning). Planning Task 1 documents your **intended** teaching, Instruction Task 2 documents your **enacted** teaching, and Assessment Task 3 documents the **impact** of your teaching on student learning.



The three tasks and the evidence you provide for each are framed by your understandings of your students and their learning. As you develop, document, and teach your lessons, you will reflect upon the cyclical relationship among planning, instruction, and assessment with a focus on your students' learning needs.

Evidence of Teaching Practice: Artifacts and Commentaries

An essential part of edTPA is the evidence you will submit of how you planned, taught, and assessed your lessons to deepen student learning in technology and engineering education. This evidence includes both artifacts and commentaries:

- **Artifacts** represent authentic work completed by you and your students. These include lesson plans, copies of instructional and assessment materials, video clips of your teaching, and student work samples.
- **Commentaries** are your opportunity to describe your artifacts, explain the rationale behind their choice, and analyze what you have learned about your teaching practice and your students' learning. Note that although your writing ability will not be scored directly, commentaries must be clearly written and well focused.

When preparing your artifacts and commentaries, refer to the rubrics frequently to guide your thinking, planning, and writing. Refer to the Technology and Engineering Education Evidence Chart for information about how your evidence should be formatted for electronic submission.

Evaluation Criteria

The rubrics used to score your performance on edTPA are included in the handbook, following the sections describing the directions for each task. The descriptors in the five-level rubrics address a wide range of performance, beginning with the knowledge and skills of a novice not ready to teach (Level 1) and extending to the advanced practices of a highly accomplished beginner (Level 5).

Structure of the Handbook

The following pages provide specific instructions on how to complete each of the three tasks of the edTPA Technology and Engineering Education assessment. After an overview of the tasks, the handbook provides instructions for each task, organized into four sections:

1. **What Do I Need to Think About?**
   This section provides focus questions for you to think about when completing the task**.**
2. **What Do I Need to Do?**
   This section provides specific and detailed directions for completing the task.
3. **What Do I Need to Write?**
   This section tells you what you need to write, and also provides specific and detailed directions for writing the commentary for the task.
4. **How Will the Evidence of My Teaching Practice Be Assessed?**
   This section includes the rubrics that will be used to assess the evidence you provide for the task.

Additional requirements and resources are provided for you in this handbook:

- **Professional Responsibilities:** guidelines for the development of your evidence
- **Technology and Engineering Education Context for Learning Information:** prompts used to collect information about your school/classroom context
- **Technology and Engineering Education Evidence Chart**: specifications for electronic submission of evidence (artifacts and commentaries), including templates, supported file types, number of files, response length, and other important evidence specifications
- **Glossary:** definitions of key terms can be accessed by rolling your cursor over each glossary term marked with a dotted underline throughout the handbook or by referring to the **Technology and Engineering Education Glossary**.

You should review the *Making Good Choices* document prior to beginning the planning of the learning segment. If you are in a preparation program, it will have additional resources that provide guidance as you develop your evidence.

Review all instructions carefully before beginning to teach the learning segment to ensure that you are well prepared for all tasks. **Before you record your videos, pay particular attention to the specific content focus of each video clip submission; these foci are described in the What Do I Need to Do? sections in Instruction Task 2 and Assessment Task 3.** Refer to the Professional Responsibilities section of this handbook for important information about permissions, confidentiality, and other requirements.

If your program requires you to submit artifacts and commentaries for official scoring, refer to www.edTPA.com for complete and current information before beginning your work and to download templates for submitting materials. The website contains information about the registration process, submission deadlines, submission requirements, withdrawal/refund policies, and score reporting. It also provides contact information should you have questions about your registration and participation in edTPA.

Whether submitting directly to www.edTPA.com or via your program's electronic portfolio management system, follow the submission guidelines as documented in the Evidence Chart and review *edTPA Submission Requirements* to ensure that your materials conform to the required evidence specifications and requirements for scoring.

edTPA Technology and Engineering Education Tasks Overview

Planning Task 1: Planning for Instruction and Assessment

What to Do	What to Submit	Evaluation Rubrics
▶ Select **one** class as a focus for this assessment. ▶ Provide relevant context information. ▶ Identify a learning segment to plan, teach, and analyze student learning. Your learning segment should include **3–5 lessons** (or, if teaching technology and engineering education within a large time block, **about 3–5 hours of connected instruction**).[4] ▶ Determine a central focus for your learning segment. The central focus should support students' development of technology-related conceptual understanding, technical skills, **AND** engineering design or other problem-solving strategies while completing a project. ▶ Write and submit a lesson plan for each lesson in the learning segment. ▶ Select and submit key instructional materials needed to understand what you and the students will be doing. ▶ Choose **one** language function and other language demands important to understanding technology and engineering education in your learning segment. Identify a learning task where students are supported to use this language. ▶ Respond to commentary prompts **prior to teaching the learning segment**. ▶ Submit copies of all written assessments and/or clear directions for any oral or performance assessments from the learning segment.	▣ Part A: Context for Learning Information ▣ Part B: Lesson Plans for Learning Segment ▣ Part C: Instructional Materials ▣ Part D: Assessments ▣ Part E: Planning Commentary	**Planning Rubrics** Rubric 1: Planning for Technology and Engineering Understandings Rubric 2: Planning to Support Varied Student Learning Needs Rubric 3: Using Knowledge of Students to Inform Teaching and Learning Rubric 4: Identifying and Supporting Language Demands Rubric 5: Planning Assessments to Monitor and Support Student Learning

[4] If students are spending several lessons working independently on the project or product, then you may extend the learning segment (**no more than 10 hours**), with **3–5 hours** spent in instruction and the remainder of the time spent monitoring and supporting students as they work.

Instruction Task 2: Instructing and Engaging Students in Learning

What to Do	What to Submit	Evaluation Rubrics
▶ Obtain required permissions for videorecording from parents/guardians of your students and other adults appearing in the video. ▶ Identify lessons from the learning segment you planned in Planning Task 1 to be videorecorded. **You should choose lessons that show you** interacting with students to (1) introduce them to technology-related concepts and/or skills, and (2) engage them in engineering design and/or other problem-solving strategies as they carry out the project. ▶ Videorecord your teaching and **select 2 video clips (no more than 10 minutes each, but not less than 3 minutes combined)**. ▶ Analyze your teaching and your students' learning in the video clips by responding to commentary prompts.	▫ Part A: Video Clips ▫ Part B: Instruction Commentary	**Instruction Rubrics** Rubric 6: Learning Environment Rubric 7: Engaging Students in Learning Rubric 8: Deepening Student Learning Rubric 9: Subject-Specific Pedagogy: The Work Artifact(s) Rubric 10: Analyzing Teaching Effectiveness

Assessment Task 3: Assessing Student Learning

What to Do	What to Submit	Evaluation Rubrics
▶ Select **one** assessment from the learning segment that you will use to evaluate your students' developing knowledge and skills. Attach the assessment used to evaluate student performance to the end of the Assessment Commentary. ▶ Define and submit the evaluation criteria you will use to analyze student learning. ▶ Collect and analyze student work from the selected assessment to identify **quantitative and qualitative** patterns of learning within and across learners in the class. ▶ Select **3 student work samples** to illustrate your analysis of the patterns of learning within and across learners in the class. At least 1 of the samples must be from a student with specific learning needs. These 3 students will be your focus students. ▶ Summarize the learning of the whole class, referring to work samples from the 3 focus students to illustrate patterns in student understanding across the class. ▶ Submit feedback for the work samples for the 3 focus students in written, audio, or video form. ▶ Analyze evidence of students' language use from (1) the video clips from Instruction Task 2, (2) an additional video clip of one or more students using language within the learning segment, **AND/OR** (3) the student work samples from Assessment Task 3. ▶ Analyze evidence of student learning, and plan for next steps by responding to commentary prompts.	▣ Part A: Student Work Samples ▣ Part B: Evidence of Feedback ▣ Part C: Assessment Commentary ▣ Part D: Evaluation Criteria	**Assessment Rubrics** Rubric 11: Analysis of Student Learning Rubric 12: Providing Feedback to Guide Learning Rubric 13: Student Understanding and Use of Feedback Rubric 14: Analyzing Students' Language Use and Technology and Engineering Education Learning Rubric 15: Using Assessment to Inform Instruction

Planning Task 1: Planning for Instruction and Assessment

What Do I Need to Think About?

In Planning Task 1, you will describe your plans for the learning segment and explain how your instruction is appropriate for the students and the content you are teaching. As you develop your plans, you need to think about the following:

- What do your students know, what can they do, and what are they learning to do?
- What do you want your students to learn? What are the important technology-related conceptual understandings, technical skills, and engineering design or other problem-solving strategies you want students to develop within the learning segment?
- How will you use your knowledge of your students' assets to inform your plans?
- What instructional strategies, learning tasks, and assessments will you design to support student learning and language use?
- How will your learning segment support students to develop and use language that deepens content understanding?
- How is the teaching you propose supported by research and theory about how students learn?

What Do I Need to Do?

- **Select a class.** If you teach more than one class, select one focus class for this assessment. If your placement for technology and engineering education has you responsible for a group rather than a whole class, plans should describe instruction for that group (**minimum of 4 students**). That group will constitute "the whole class" for edTPA.
- **Provide context information.** The Technology and Engineering Education Context for Learning Information form is provided later in this handbook and must be submitted in a template. This form provides essential information about your students and your school/classroom. The context information you submit should be **no more than 4 pages, including the prompts**.
- **Identify a learning segment to plan, teach, and analyze.** Review the curriculum with your cooperating teacher and select a learning segment of **3–5 lessons** (if teaching technology and engineering education within a large time block, select a learning segment of **about 3–5 hours of connected instruction**).

If students are spending several lessons working independently on the project, then you may extend the learning segment (**no more than 10 hours**), with about **3–5 hours of instruction** and the rest spent monitoring and supporting students as they work.

- **Identify a central focus.** Identify the central focus along with the content standards and objectives you will address in the learning segment. The central focus should support students in developing technology-related conceptual understanding, technical skills, and engineering design or other problem-solving strategies.
- **Identify and plan to support language demands.** Select a key language function from your learning objectives. Choose a learning task that provides opportunities for students to practice using that language function. Identify additional language demands associated with that task. Plan targeted supports that address the identified language demands, including the language function.
- **Write a lesson plan** for each lesson in the learning segment. Your lesson plans should be detailed enough that a substitute or other teacher could understand them well enough to use them.
- Your lesson plans must include the following information, even if your teacher preparation program requires you to use a specific lesson plan format:
  - National or state-adopted student academic content standards that are the target of student learning (Note: Please include the **number and text** of each standard that is being addressed. If only a portion of a standard is being addressed, then only list the part or parts that are relevant.)
  - Learning objectives associated with the content standards
  - Formal and informal assessments used to monitor student learning, including type(s) of assessment and what is being assessed
  - Instructional strategies and learning tasks (including what you and the students will be doing) that support diverse student needs
  - Instructional resources and materials used to engage students in learning
- **Each lesson plan must be no more than 4 pages in length.** You will need to condense or excerpt lesson plans longer than 4 pages. Any explanations or rationale for decisions should be included in your Planning Commentary and deleted from your plans.
- **Respond to the commentary prompts** listed in the Planning Commentary section below **prior to teaching the learning segment**.
- **Submit your original lesson plans.** If you make changes while teaching the learning segment, you may offer reflection on those changes in the Instruction Task 2 and Assessment Task 3 Commentaries.
- **Select and submit key instructional materials** needed to understand what you and the students will be doing (**no more than 5 additional pages per lesson plan**). The instructional materials might include such items as class handouts, assignments, slides, and interactive whiteboard images.

- **Submit copies of all written assessments and/or directions for any oral or performance assessments.** (Submit only the blank assessment given to students; do not submit student work samples for this task.)
- **Provide citations for the source of all materials that you did not create** (e.g., published texts, websites, and material from other educators). List all citations by lesson number at the end of the Planning Commentary. Note: Citations do not count toward the commentary page limit.

See the Planning Task 1: Artifacts and Commentary Specifications in the Technology and Engineering Education Evidence Chart for instructions on electronic submission of evidence. This evidence chart identifies templates, supported file types, number of files, response length, and other important evidence specifications. Your evidence cannot contain hyperlinked content. Any web content you wish to include as part of your evidence must be submitted as a document file, which must conform to the file format and response length requirements.

What Do I Need to Write?

In Planning Task 1, you will write

- a description of your Context for Learning (see "What Do I Need to Do?" above for directions)
- lesson plans (see "What Do I Need to Do?" above for directions)
- a commentary explaining your plans (see "Planning Commentary" below for directions)

Planning Commentary

In Planning Task 1, you will write a commentary, responding to the prompts below. Your commentary should be no more than **9 single-spaced pages, including the prompts**.

1. **Central Focus**
   a. Describe the central focus and purpose of the content you will teach in the learning segment.
   b. Given the central focus, describe how the standards and learning objectives within your learning segment address technology-related
      - conceptual understanding,
      - technical skills, **AND**
      - engineering design or other problem-solving strategies.
   c. Explain how your plans build on each other to help students **make connections** between technology-related conceptual understanding, technical skills, and engineering design or other problem-solving strategies to deepen their learning of technology and engineering education.

2. Knowledge of Students to Inform Teaching

For each of the prompts below (2a–b), describe what you know about **your** students **with respect to the central focus** of the learning segment.

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, students with poor spatial skills, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students).

a. Prior academic learning and prerequisite skills related to the central focus—**Cite evidence of what students know, what they can do, and what they are still learning to do.**

b. Personal, cultural, and community assets related to the central focus—**What do you know about your students' everyday experiences, cultural and language backgrounds and practices, and interests?**

3. Supporting Students' Learning of Technology and Engineering Education

Respond to prompts 3a–c below. To support your justifications, refer to the instructional materials and lesson plans you have included as part of Planning Task 1. **In addition, use principles from research and/or theory to support your justifications.**

a. Justify how your understanding of your students' prior academic learning and personal, cultural, and community assets (from prompts 2a–b above) guided your choice or adaptation of learning tasks and materials. Be explicit about the connections between the learning tasks and students' prior academic learning, their assets, and research/theory.

b. Describe and justify why your instructional strategies and planned supports are appropriate for **the whole class, individuals, and/or groups of students with specific learning needs**.

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, students with poor spatial skills, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students).

c. Describe common preconceptions, errors, or misunderstandings within your content focus and how you will address them.

4. Supporting Development in Technology and Engineering Education Through Language

As you respond to prompts 4a–d, consider the range of students' language assets and needs—what do students already know, what are they struggling with, and/or what is new to them?

a. **Language Function.** Using information about your students' language assets and needs, identify **one** language function essential for students to engage in learning tasks related to your central focus. Listed below are some sample language functions. You may choose one of these or another more appropriate for your learning segment.

Analyze	Argue	Communicate	Compare/contrast	Describe	Draw and Model
Evaluate	Frame	Identify	Predict	Synthesize	

b. Identify a key learning task from your plans that provides students with opportunities to practice using the language function. Identify the lesson in which the learning task occurs. (Give lesson/day number.)

c. **Additional Language Demands.** Given the language function and learning task identified above, describe the following associated language demands (written or oral) students need to understand and/or use:

- Vocabulary and/or symbols
- **Plus** at least one of the following:
  - Syntax
  - Discourse
  - Visual representation (work artifact)

d. **Language Supports.** Refer to your lesson plans and instructional materials as needed in your response to the prompt below.

- Identify and describe the planned instructional supports (during and/or prior to the learning task) to help students understand, develop, and use the identified language demands (function, vocabulary and/or symbols, syntax, discourse, or visual representation).

5. Monitoring Student Learning

In response to the prompts below, refer to the assessments you will submit as part of the materials for Planning Task 1.

a. Describe how your planned formal and informal assessments will provide direct evidence of students' technology-related conceptual understanding, technical skills, **AND** engineering design or other problem-solving strategies **throughout** the learning segment.

b. Explain how the design or adaptation of your planned assessments allows students with specific needs to demonstrate their learning.

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, students with poor spatial skills, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students).

How Will the Evidence of My Teaching Practice Be Assessed?

For Planning Task 1, your evidence will be assessed using rubrics 1–5, which appear on the following pages. When preparing your artifacts and commentaries, refer to the rubrics frequently to guide your thinking, planning, and writing.

Planning Rubrics

Rubric 1: Planning for Technology and Engineering Understandings

How do the candidate's plans build students' technology-related conceptual understanding, technical skills, and engineering design or other problem-solving strategies?

Level 1[5]	Level 2	Level 3	Level 4	Level 5
Candidate's plans for instruction **focus solely on technical skills with no connections to technology-related** • **conceptual understanding** OR • **engineering design or other problem-solving strategies**. OR There are **significant content and/or technical skill inaccuracies** that will lead to student misunderstandings. OR Standards, objectives, and learning tasks and materials **are not aligned** with each other.	Candidate's plans for instruction **support student learning of technical skills with vague connections to** technology-related • conceptual understanding OR • engineering design or other problem-solving strategies.	Candidate's plans for instruction **build on each other** to support learning of technical skills with **clear connections to** technology-related • conceptual understanding OR • engineering design or other problem-solving strategies.	Candidate's plans for instruction build on each other to support learning of technical skills with clear **and consistent** connections to technology-related • conceptual understanding AND • engineering design or other problem-solving strategies.	**Level 4 plus:** Candidate **explains how s/he will use learning tasks and materials to lead students to make** clear and consistent **connections** between technology-related • technical skills, • conceptual understanding, AND • engineering design or other problem-solving strategies.

[5] Text representing key differences between adjacent score levels is shown in bold. Evidence that does not meet Level 1 criteria is scored at Level 1.

Rubric 2: Planning to Support Varied Student Learning Needs

How does the candidate use knowledge of his/her students to target support for students to develop technology-related conceptual understandings, technical skills, and engineering design or other problem-solving strategies?

Level 1	Level 2	Level 3	Level 4	Level 5
There **is no evidence of planned supports**. **OR** **Candidate does not attend to ANY INSTRUCTIONAL requirements in IEPs and 504 plans.**	Planned supports are **loosely tied to learning objectives or the central focus of the learning segment**.	Planned supports are **tied to** learning objectives and the central focus **with attention to the characteristics of the class as a whole**.	Planned supports are tied to learning objectives and the central focus. **Supports address the needs of specific individuals or groups with similar needs.**	**Level 4 plus:** **Supports include specific strategies to identify and respond to preconceptions, common errors, and misunderstandings.**

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

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

Level 1	Level 2	Level 3	Level 4	Level 5
Candidate's justification of learning tasks is either **missing OR represents a deficit view** of students and their backgrounds.	Candidate justifies learning tasks with **limited attention** to students' • **prior academic learning OR** • **personal, cultural, or community assets**.	Candidate **justifies** why learning tasks (or their adaptations) **are appropriate using examples of students'** • prior academic learning **OR** • personal, cultural, or community assets. **Candidate makes superficial connections to research and/or theory.**	Candidate justifies why learning tasks (or their adaptations) are appropriate using examples of students' • prior academic learning **AND** • personal, cultural, or community assets. Candidate makes **connections** to research and/or theory.	**Level 4 plus:** Candidate's justification is **supported by principles from** research and/or theory.

Rubric 4: Identifying and Supporting Language Demands

How does the candidate identify and support language demands associated with a key technology and engineering education learning task?

Level 1	Level 2	Level 3	Level 4	Level 5
Language demands[6] identified by the candidate are **not consistent with the selected language function**[7] **OR task**. **OR** Language supports are missing or are not aligned with the language demand(s) for the learning task.	**Language supports primarily address one language demand** (vocabulary and/or symbols, function, syntax, discourse, visual representation).	**General language supports address use of two or more language demands** (vocabulary and/or symbols, function, syntax, discourse, visual representation).	**Targeted language supports** address use of • **vocabulary and/or symbols,** • **language function, AND** • **one or more additional language demands** (syntax, discourse, visual representation).	**Level 4 plus:** Language supports are **designed to meet the needs of students with different levels of language learning**.

[6] Language demands include: language function, vocabulary and/or symbols, syntax, and discourse (organizational structures, text structure, etc.), and visual representation (work artifacts).

[7] Language function refers to the learning outcome (verb) selected in Planning Commentary Prompt 4a (e.g., analyze, identify, synthesize).

Rubric 5: Planning Assessments to Monitor and Support Student Learning

How are the formal and informal assessments selected or designed to monitor students' technology-related conceptual understanding, technical skills, and engineering design or other problem-solving strategies?

Level 1	Level 2	Level 3	Level 4	Level 5
The assessments **only provide evidence** of students' technical skills. **OR** **Candidate does not attend to ANY ASSESSMENT requirements in IEPs and 504 plans.**	The assessments **provide limited evidence to monitor students' technology-related** • **conceptual understanding,** • **technical skills, AND/OR** • **engineering design or other problem-solving strategies** during the learning segment.	The assessments **provide evidence** to monitor students' technology-related • conceptual understanding, • technical skills, **AND** • engineering design or other problem-solving strategies **during the learning segment.**	The assessments provide **multiple forms of evidence** to monitor students' technology-related • conceptual understanding, • technical skills, **AND** • engineering design or other problem-solving strategies **throughout** the learning segment.	**Level 4 plus:** **The assessments are strategically designed to allow individuals or groups with specific needs to demonstrate their learning.**

Instruction Task 2: Instructing and Engaging Students in Learning

What Do I Need to Think About?

In Instruction Task 2, you will demonstrate how you support and engage students in learning. Before you begin your instruction, you need to think about the following:

- What kind of learning environment do you want to develop in order to establish respect and rapport, and to support students' engagement in learning?
- What kinds of learning tasks actively engage students in the central focus of the learning segment?
- How will you elicit and build on student responses in ways that develop and deepen content understanding?
- In what ways will you connect new content to your students' prior academic learning and personal, cultural, or community assets during your instruction?
- How will you use evidence from your instruction to examine and change your teaching practices to more effectively meet a variety of student learning needs?

What Do I Need to Do?

- **Obtain required permissions for videorecording.** Before you record your video, ensure that you have the appropriate permission from the parents/guardians of your students and from adults who appear in the video. Adjust the camera angle to exclude individuals for whom you do not have permission to film.
- **Examine your plans for the learning segment** and identify challenging learning tasks in which you and students are actively engaged. The video clips you select for submission should provide a sample of how you interact with students to develop technology-related conceptual understanding, technical skills, and engineering design or other problem-solving strategies.
- **Identify lessons to videorecord.**
- **Provide 2 video clips (each no more than 10 minutes in length, but not less than 3 minutes combined)** that demonstrate how you interact with students in a positive learning environment to develop technology-related conceptual understanding, technical skills, and engineering design or other problem-solving strategies related to engineering design.
  - The **first clip** should illustrate how you introduced students to technology-related concepts and relevant technical skills or strategies related to engineering design or problem solving.
  - The **second clip** should illustrate how you actively engaged students in engineering design or other problem-solving strategies as they worked on a project.

- The video clips can feature either the whole class or a targeted group of students (**minimum of 4 students**) within the class.

- **(Optional) Provide evidence of students' language use.** You may provide evidence of language use from your video clips from Instruction Task 2, an additional video clip of one or more students using language within the learning segment (**no more than 5 minutes in length**), **AND/OR** through the student work samples analyzed in Assessment Task 3.
- **Videorecord your classroom teaching.** Ensure that your instruction and the work being done by students are clearly visible. Other tips for videorecording your class are available from your teacher preparation program.
- **Select video clips to submit** and verify that the clips meet the following requirements:
  - Check the video and sound quality to ensure that you and your students can be **seen** and **heard** on the video clips you submit. If most of the audio in a clip cannot be understood by a scorer, **submit another clip**. If there are occasional audio portions of a clip that cannot be understood that are relevant to your commentary responses, do one of the following: 1) provide a transcript with time stamps of the inaudible portion and refer to the transcript in your response; 2) embed quotes with time-stamp references in the commentary response; or 3) insert captions in the video (captions for this purpose will be considered permissible editing).
  - A video clip must be continuous and unedited, with no interruption in the events.
  - If you have inadvertently included individuals for whom you do not have permission to film in the video clips you plan to submit, you may use software to blur the faces of these individuals. This is not considered editing. Other portions of the submitted video clips, including the classroom, your face, and the faces of individuals for whom you have obtained permission to film, should remain unblurred.
  - Do not include the name of the state, school, or district in your video. Use first names only for all individuals appearing in the video.
- **Respond to the commentary prompts** listed in the Instruction Commentary section below **after teaching the learning segment**.
- **Determine if additional information is needed to understand what you and the students are doing in the video clips.** For example, if there are graphics, texts, or images that are not clearly visible in the video, or comments that are not clearly heard, you may insert digital copies or transcriptions at the end of the Instruction Commentary (**no more than 2 pages in addition to the responses to commentary prompts**).

See the Instruction Task 2: Artifacts and Commentary Specifications in the Technology and Engineering Education Evidence Chart for instructions on electronic submission of evidence. This evidence chart identifies templates, supported file types, number of files, response length, and other important evidence specifications. Your evidence cannot contain hyperlinked content. Any web content you wish to include as part of your evidence must be submitted as a document file, which must conform to the file format and response length requirements.

What Do I Need to Write?

Instruction Commentary

In Instruction Task 2, you will write a commentary, responding to the prompts below. Your commentary should be no more than **6 single-spaced pages, including the prompts**. If needed, insert no more than 2 additional pages of supporting documentation for the videorecordings at the end of the commentary (e.g., digital copies of indiscernible materials or transcriptions of inaudible comments). These additional pages do not count toward the commentary page limit noted above.

1. Which lesson or lessons are shown in the video clips? Identify the lesson(s) by lesson plan number.
2. **Promoting a Safe and Positive Learning Environment**

   Refer to scenes in the video clips where you provided a positive learning environment.

   a. How did you demonstrate mutual respect for, rapport with, and responsiveness to students with varied needs and backgrounds, and challenge students to engage in learning?

   b. How did you address safety in your lessons or parts of your lessons shown within the video clips?
3. **Engaging Students in Learning**

   Refer to examples from the video clips in your responses to the prompts.

   a. Explain how your instruction engaged students in developing technology-related
      - conceptual understanding,
      - technical skills, **AND**
      - engineering design or other problem-solving strategies.

   b. Describe how your instruction linked students' prior academic learning and personal, cultural, and community assets with new learning.
4. **Deepening Student Learning during Instruction**

   Refer to examples from the video clips in your explanations.

   a. Explain how you **elicited and built on student responses** to promote thinking and develop technology-related conceptual understanding, technical skills, **AND** engineering design or other problem-solving strategies.

   b. Explain how you and your students used the work artifact(s) to support students' understanding and use of the engineering design or other problem-solving process.

5. Analyzing Teaching

Refer to examples from the video clips in your responses to the prompts.

a. What changes would you make to your instruction—for the whole class and/or for students who need greater support or challenge—to better support student learning of the central focus (e.g., missed opportunities)?

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, students with poor spatial skills, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students).

b. Why do you think these changes would improve student learning? Support your explanation with evidence of student learning **AND** principles from theory and/or research.

How Will the Evidence of My Teaching Practice Be Assessed?

For Instruction Task 2, your evidence will be assessed using rubrics 6–10, which appear on the following pages. When preparing your artifacts and commentaries, refer to the rubrics frequently to guide your thinking, instruction, and writing.

Instruction Rubrics

Rubric 6: Learning Environment

How does the candidate demonstrate a safe, positive learning environment that supports students' engagement in learning?

Level 1	Level 2	Level 3	Level 4	Level 5
The clips reveal evidence of **disrespectful interactions** between teacher and students or between students. **OR** Candidate **allows disruptive behavior to interfere** with student learning.	The candidate demonstrates **respect for** students. **AND** Candidate **provides a learning environment that serves primarily to control student behavior**, and minimally supports the learning goals.	The candidate demonstrates **rapport with** and respect for students. **AND** **Candidate provides a positive, low-risk learning environment that reveals mutual respect among students.**	The candidate demonstrates rapport with and respect for students. **AND** Candidate provides a **challenging learning environment that promotes** mutual respect among students.	The candidate demonstrates rapport with and respect for students. **AND** Candidate provides a challenging learning environment that **provides opportunities to express varied perspectives** and promotes mutual respect among students.
Candidate provides an environment that is **unsafe** or students do not understand safety procedures.	Candidate provides an environment **that is safe** or **students understand** safety procedures.	Candidate provides an environment that is safe **AND** students understand safety procedures.	Candidate provides an environment that is safe **AND** students **display** safety procedures.	Candidate provides an environment that is safe **AND** students display safety procedures.

Rubric 7: Engaging Students in Learning

How does the candidate actively engage students in developing technology-related conceptual understanding, technical skills, and engineering design or other problem-solving strategies?

Level 1	Level 2	Level 3	Level 4	Level 5
Students are participating in tasks or behaviors that are **vaguely or superficially related** to technology-related • conceptual understanding, • technical skills, **AND** • engineering design or other problem-solving strategies.	Students are **participating** in learning tasks **primarily focused on technical skills with little attention to** technology-related • conceptual understanding **AND** • engineering design or other problem-solving strategies.	**Students are engaged** in learning tasks **that address** technology-related • conceptual understanding, • technical skills, **AND** • engineering design or other problem-solving strategies.	Students are engaged in learning tasks that **develop** technology-related • conceptual understanding, • technical skills, **AND** • engineering design or other problem-solving strategies.	Students are engaged in learning tasks that **deepen and extend** their technology-related • conceptual understanding, • technical skills, **AND** • engineering design or other problem-solving strategies.
There is little or **no evidence that the candidate links** students' prior academic learning or personal, cultural, or community assets with new learning.	Candidate makes vague or superficial links between **prior academic learning and new learning**.	Candidate links **prior academic learning to new learning**.	Candidate links prior academic learning **AND personal, cultural, or community assets** to new learning.	Candidate **prompts students to link** prior academic learning **AND** personal, cultural, or community assets to new learning.

Rubric 8: Deepening Student Learning

How does the candidate elicit student responses to promote thinking and develop technology-related conceptual understanding, technical skills, and engineering design or other problem-solving strategies?

Level 1	Level 2	Level 3	Level 4	Level 5
Candidate does most of the talking, and students provide few responses. **OR** Candidate responses include **significant content inaccuracies** that will lead to student misunderstandings.	Candidate **primarily asks surface-level questions and** evaluates student responses as **correct or incorrect**.	Candidate **elicits student responses related to understanding technology-related** • concepts, • technical skills, **OR** • engineering design or other problem-solving strategies.	Candidate **elicits and builds on students' responses to develop understanding of** technology-related • concepts, • technical skills, **AND** • engineering design or other problem-solving strategies.	**Level 4 plus:** **Candidate facilitates interactions among students so they can evaluate their own abilities to use** technology-related • concepts, • technical skills, **AND** • engineering design or other problem-solving strategies.

Rubric 9: Subject-Specific Pedagogy: The Work Artifact(s)

How does the candidate guide student production and/or use of work artifact(s) to support the engineering design and/or problem-solving process?

Level 1	Level 2	Level 3	Level 4	Level 5
Candidate **does not relate the work artifact(s) to students' understanding and use of the engineering design or other problem-solving process**. **OR** Materials used in the clips include **significant content inaccuracies** that will lead to student misunderstandings.	Candidate makes **vague or superficial use of the work artifact(s)** to promote understanding and use of the engineering design or other problem-solving process.	Candidate **uses the work artifact(s) in ways that help students understand and use** the engineering design or other problem-solving process.	Candidate uses the work artifact(s) **in ways that deepen student understanding and use** of the engineering design or other problem-solving process.	Candidate uses the work artifact(s) **in ways that allow students to** deepen **and extend understanding and develop strategic use** of the engineering design or other problem-solving process.

Rubric 10: Analyzing Teaching Effectiveness

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

Level 1	Level 2	Level 3	Level 4	Level 5
Candidate suggests changes **unrelated to evidence of student learning**.	Candidate **proposes changes to teacher practice that are superficially related to student learning needs** (e.g., task management, pacing, improving directions).	Candidate proposes changes that address **students' collective learning needs related to the central focus**. **Candidate makes superficial connections to research and/or theory.**	Candidate proposes changes that address **individual and collective learning needs** related to the central focus. Candidate makes **connections** to research and/or theory.	**Level 4 plus:** Candidate **justifies changes using principles from** research and/or theory.

Assessment Task 3: Assessing Student Learning

What Do I Need to Think About?

In Assessment Task 3, you will analyze both student learning and student use of language. Before you begin the analysis, you need to think about the following:

- How will you gather evidence and make sense of what students have learned?
- How will you provide meaningful feedback to your students?
- How will you use evidence of what students know and are able to do to plan next steps in instruction?
- How will you identify evidence of and explain students' use of language that demonstrates the development of content understanding?

What Do I Need to Do?

- **Select one assessment from your learning segment you will use** to evaluate your students' developing knowledge and skills. It should be an assessment to be completed by the whole class featured in the learning segment. (If you are teaching only a group within the class for the learning segment, that group will be "the whole class.") The assessment should reflect the work of individuals, not groups, but may be individual work from a group task. The assessment should provide opportunities for students to demonstrate technology-related
  - conceptual understanding,
  - technical skills, **AND**
  - engineering design or other problem-solving strategies.
- **Define and submit the evaluation criteria** you will use to analyze student learning related to the technical and engineering understandings described above.
- **Collect and analyze student work** from your selected assessment to identify **quantitative and qualitative** patterns of learning within and across learners in the class. You may submit text files with scanned student work, a video or audio file of a student's oral work, **OR** a student-created video or multimedia file. For each focus student, a video or audio work sample must be no more than 5 minutes in total running time.
- **Select 3 student work samples** that represent the patterns of learning (i.e., what individuals or groups generally understood and what a number of students were still struggling to understand) you identified in your assessment analysis. These students will be your focus students for this task. **At least one of the focus students must have specific learning needs**, for example, a student with an IEP (Individualized Education Program) or 504 plan, an English language learner, a struggling reader, a student with poor spatial skills, an underperforming student or a student with gaps in academic

knowledge, and/or a gifted student needing greater challenge. Note: California candidates must include one focus student who is an English language learner.[8]

- **Document the feedback** you gave to each of the **3 focus students** on the work sample itself, as an audio clip, or as a video clip. You must submit evidence of the actual feedback provided to each focus student, and not a description of the feedback.
- If you submit a student work sample or feedback as a video or audio clip and comments made by you or your focus student(s) cannot be clearly heard, do one of the following: 1) attach a transcription of the inaudible comments (**no more than 2 additional pages**) to the end of the Assessment Commentary; 2) embed quotes with time-stamp references in the commentary response; or 3) insert captions in the video (captions for this purpose will be considered permissible editing).
- If you submit a student work sample or feedback as a video or audio clip and additional students are present, clearly identify which students are your focus students in the relevant prompts (1d and 2a) of the Assessment Commentary (**in no more than 2 sentences**).
- **Respond to the commentary prompts** listed in the Assessment Commentary section below **after analyzing student work from the selected assessment**.
- **Include and submit the chosen assessment, including directions/prompts provided to students.** Attach the assessment (**no more than 5 additional pages**) to the end of the Assessment Commentary.
- **Provide evidence of students' understanding and use of the targeted academic language function and other language demands.** You may choose evidence from video clips submitted in Instruction Task 2, an additional video clip of one or more students using language within the learning segment (**no more than 5 minutes in length**), **AND/OR** student work samples submitted in Assessment Task 3.

See the Assessment Task 3: Artifacts and Commentary Specifications in the Technology and Engineering Education Evidence Chart for instructions on electronic submission of evidence. This evidence chart identifies templates, supported file types, number of files, response length, and other important evidence specifications. Your evidence cannot contain hyperlinked content. Any web content you wish to include as part of your evidence must be submitted as a document file, which must conform to the file format and response length requirements.

What Do I Need to Write?

Assessment Commentary

In Assessment Task 3, you will write a commentary, responding to the prompts below. Your commentary should be **no more than 10 single-spaced pages, including the prompts**. Attach the assessment used to evaluate student performance (**no more than 5 additional pages**) and, if necessary, a transcription of inaudible portions of a video or audio clip of

[8] California candidates—If you do not have any English language learners, select a student who is challenged by academic English.

feedback or a student work sample (**no more than 2 additional pages**) to the end of the Assessment Commentary. These additional pages do not count toward the commentary page limit noted above.

1. **Analyzing Student Learning**
   a. Identify the specific learning objectives measured by the assessment you chose for analysis.
   b. Provide a graphic (table or chart) or narrative that summarizes student learning for your whole class. Be sure to summarize student learning for all evaluation criteria submitted in Assessment Task 3, Part D.
   c. Use evidence found in the **3 student work samples and the whole class summary** to analyze the patterns of learning **for the whole class** and differences for groups or individual learners relative to technology-related
      - conceptual understanding,
      - technical skills, **AND**
      - engineering design or other problem-solving strategies.

      Consider what students understand and do well, and where they continue to struggle (e.g., common errors, confusions, need for greater challenge).
   d. If a video or audio work sample occurs in a group context (e.g., discussion), provide the name of the clip and clearly describe how the scorer can identify the focus student(s) (e.g., position, physical description) whose work is portrayed.
2. **Feedback to Guide Further Learning**

   Refer to specific evidence of submitted feedback to support your explanations.

   a. Identify the format in which you submitted your evidence of feedback for the 3 focus students. Choose one of the following:
      - Written directly on work samples or in separate documents that were provided to the focus students
      - In audio files
      - In video clips from Instruction Task 2 (provide a time-stamp reference) or in separate video clips

      If a video or audio clip of feedback occurs in a group context (e.g., discussion), clearly describe how the scorer can identify the focus student (e.g., position, physical description) who is being given feedback.
   b. Explain how feedback provided to the 3 focus students addresses their individual strengths and needs relative to the learning objectives measured.
   c. Describe how you will support each focus student to understand and use this feedback to further their learning related to learning objectives, either within the learning segment or at a later time.

3. Evidence of Language Understanding and Use

When responding to the prompt below, use concrete examples from the clip(s) and/or student work samples as evidence. Evidence from the clip(s) may focus on one or more students.

You may provide evidence of students' language use **from ONE, TWO, OR ALL THREE of the following sources:**

1. Use video clip(s) from Instruction Task 2 and provide time-stamp references for evidence of language use.
2. Submit an additional video file named "Language Use" of no more than 5 minutes in length and cite language use (this can be footage of one or more students' language use). Submit the clip in Assessment Task 3, Part B.
3. Use the student work samples analyzed in Assessment Task 3 and cite language use.

a. Explain and provide concrete examples for the extent to which your students were able to use or struggled to use the

- selected language function,
- vocabulary and/or symbols, **AND**
- syntax, discourse, or visual representation

to develop content understandings.

4. Using Assessment to Inform Instruction

a. Based on your analysis of student learning presented in prompts 1b–c, describe next steps for instruction to impact student learning:

- For the whole class
- For the 3 focus students and other individuals/groups with specific needs

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, struggling readers, students with poor spatial skills, underperforming students or those with gaps in academic knowledge, and/or gifted students).

b. Explain how these next steps follow from your analysis of student learning. Support your explanation with principles from research and/or theory.

How Will the Evidence of My Teaching Practice Be Assessed?

For Assessment Task 3, your evidence will be assessed using rubrics 11–15, which appear on the following pages. When preparing your artifacts and commentaries, refer to the rubrics frequently to guide your thinking, planning, instruction, assessment, and writing.

Assessment Rubrics

Rubric 11: Analysis of Student Learning

How does the candidate analyze evidence of student learning related to conceptual understanding, technical skills, and engineering design or other problem-solving strategies?

Level 1	Level 2	Level 3	Level 4	Level 5
The analysis is **superficial or not supported** by either student **work samples or the summary of student learning**. **OR** The evaluation criteria, learning objectives, and/or analysis **are not aligned** with each other.	The analysis focuses on what students did **right OR wrong**.	The analysis focuses on what students did **right AND wrong**. **AND** **Analysis includes some differences in whole class learning.**	Analysis **uses specific examples from work samples to demonstrate patterns of learning** consistent with the summary. **AND** **Patterns of learning are described for whole class.**	Analysis uses **specific evidence from work samples to demonstrate the connections between quantitative and qualitative patterns of learning for individuals or groups**.

Assessment Rubrics continued

Rubric 12: Providing Feedback to Guide Learning

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

Level 1	Level 2	Level 3	Level 4	Level 5
Feedback is unrelated to the learning objectives OR is developmentally inappropriate. **OR** **Feedback contains significant content inaccuracies.** **OR** **No feedback is provided to one or more focus students.**	Feedback is **general** and **addresses needs AND/OR strengths related to the learning objectives**.	Feedback is **specific and addresses either** needs **OR** strengths **related** to the learning objectives.	Feedback is specific and **addresses both strengths AND needs** related to the learning objectives.	**Level 4 plus:** **Feedback for one or more focus students** • **provides a strategy to address an individual learning need OR** • **makes connections to prior academic learning or experience to improve learning.**

Rubric 13: Student Understanding and Use of Feedback

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

Level 1	Level 2	Level 3	Level 4	Level 5
Opportunities for understanding or using feedback are not described. **OR** Candidate **provides limited or no feedback to inform student learning**.	Candidate **provides vague description of how focus students will understand or use feedback**.	Candidate **describes** how focus students will understand or use feedback **related to the learning objectives**.	Candidate describes how **s/he will support** focus students to understand **and** use feedback **on their strengths OR weaknesses** related to the learning objectives.	Candidate describes how s/he will support focus students to understand and use feedback on their strengths **AND** weaknesses related to the learning objectives.

Assessment Rubrics continued

Rubric 14: Analyzing Students' Language Use and Technology and Engineering Education Learning

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

Level 1	Level 2	Level 3	Level 4	Level 5
Candidate identifies student language use that is superficially related or unrelated to the language demands (function,[9] vocabulary and/or symbols, and additional demands). **OR** **Candidate's description or explanation of language use is not consistent with the evidence submitted.**	**Candidate describes how students use only one language demand (vocabulary and/or symbols, function, syntax, discourse, visual representation).**	Candidate **explains and provides evidence** of students' use of • **the language function AND** • **one or more additional language demands** (vocabulary and/or symbols, syntax, discourse, visual representation).[10]	Candidate explains and provides evidence of students' use of • the language function, • **vocabulary and/or symbols, AND** • additional language demands (syntax, discourse, visual representation) **in ways that develop content understandings**.	**Level 4 plus:** **Candidate explains and provides evidence of language use and content learning for students with varied needs.**

[9] Previous footnote is now obsolete and has been deleted.

[10] Previous footnote is now obsolete and has been deleted.

Rubric 15: Using Assessment to Inform Instruction

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

Level 1	Level 2	Level 3	Level 4	Level 5
Next steps **do not follow** from the analysis. **OR** Next steps are **not relevant to the learning objectives** assessed. **OR** Next steps are **not described in sufficient detail** to understand them.	Next steps primarily **focus on changes to teaching practice that are superficially related to student learning needs,** for example, repeating instruction, pacing, or classroom management issues.	Next steps **propose general support that improves student technology learning related to assessed learning objectives**. **Next steps are loosely connected with research and/or theory.**	Next steps **provide targeted support to individuals or groups to improve their** technology **learning relative to technology-related** • **conceptual understanding,** • **technical skills, OR** • **engineering design or other problem-solving strategies**. Next steps are **connected** with research and/or theory.	Next steps provide targeted support to individuals **AND** groups to improve their technology learning relative to technology-related • conceptual understanding, • technical skills, **AND** • engineering design or other problem-solving strategies. Next steps are **justified with principles from** research and/or theory.

Professional Responsibilities

Refer to the following table for an overview of your professional responsibilities in developing evidence for edTPA. If you are submitting artifacts and commentaries for official scoring, refer to www.edTPA.com for complete and current information before beginning your work. Included here are important information and policies such as submission requirements and deadlines, registration agreements, attestations, permissions, and confidentiality. Whether or not you are submitting for official scoring, you should fulfill the professional responsibilities described below.

Responsibility	Description
Protect confidentiality	To protect confidentiality, please remove your name and use pseudonyms or general references (e.g., "the district") for your state, school, district, and cooperating teacher. Mask or remove all names on any typed or written material (e.g., commentaries, lesson plans, student work samples) that could identify individuals or institutions. During videorecording, use students' first names only. To ensure confidentiality of your students and yourself, do not share your video on any publicly accessible platforms or websites (YouTube, Facebook, etc.).
Acquire permissions	Before you record your classroom instruction, ensure that you have the appropriate permission from the parents/guardians of your students and from adults who appear in the videorecording. Your program will provide you with procedures and necessary forms to obtain these permissions, according to agreements with the school or district in which you are student teaching or completing your internship. If your program does not provide the necessary forms, you may refer to the sample forms found on www.edTPA.com. The release forms are not to be submitted with your materials, but you should follow your campus policy for retaining them.
Cite sources	Provide citations for the source of all materials that you did not create (e.g., published texts, websites, material from other educators). List all citations by lesson number at the end of the Planning Commentary. Note: Citations do not count toward the commentary page limit.
Align instruction with state standards	As part of the assessment, you will document the alignment of your lesson plans with state-adopted academic content standards that are the target of student learning. Refer to the education agency website for your state to obtain copies of relevant standards for this assessment.
Follow the guidelines for candidate support at www.edTPA.com	Follow the guidelines for candidate support found at www.edTPA.com as you develop your evidence for edTPA. Although you may seek and receive appropriate support from your university supervisors, cooperating/master teachers, university instructors, or peers during this process, the ultimate responsibility for completing this assessment lies with you. **Therefore, when you submit your completed work, you must be able to confirm your adherence with certain statements, such as the following:** ■ I have primary responsibility for teaching the students/class during the learning segment profiled in this assessment. ■ I have not previously taught this learning segment to the students/class. ■ The video clips submitted are unedited (continuous) and show me teaching the students/class profiled in the evidence submitted. ■ The student work included in the documentation is that of my students, completed during the learning segment documented in this assessment. ■ I am author of the commentaries and other written responses to prompts in this assessment. ■ Appropriate citations have been made for all materials in the assessment whose sources are from published text, the Internet, or other educators.

Technology and Engineering Education Context for Learning Information

Use the Context for Learning Information to supply information about your school/classroom context.

About the School Where You Are Teaching

1. In what type of school do you teach? (Type an "X" next to the appropriate description; if "other" applies, provide a brief description.)

   Elementary school: _____
   Middle school: _____
   High school: _____
   Other (please describe): _____

2. Where is the school where you are teaching located? (Type an "X" next to the appropriate description.)[11]

   City: _____
   Suburb: _____
   Town: _____
   Rural: _____

3. List any special features of your school or classroom setting (e.g., charter, co-teaching, themed magnet, classroom aide, bilingual, team taught with a special education teacher) that will affect your teaching in this learning segment.

4. Describe any district, school, or cooperating teacher requirements or expectations that might affect your planning or delivery of instruction, such as required curricula, pacing plan, use of specific instructional strategies, or standardized tests.

About the Class Featured in this Learning Segment

1. If a course:
   a. What is the name of this course?
   b. What is the length of the course? (Type an "X" next to the appropriate description; if "other" applies, provide a brief description.)

      One semester: _____
      One year: _____
      Other (please describe): _____

2. Is there any ability grouping or tracking in technology and engineering education? If so, please describe how it affects your class.

3. Identify any textbook or instructional program you primarily use for instruction. If a textbook, please provide the title, publisher, and date of publication.

[11] If you need guidance when making a selection, reference the NCES locale category definitions (https://nces.ed.gov/surveys/ruraled/definitions.asp) or consult with your placement school administrator.

4. List other resources (e.g., electronic whiteboard, hands-on materials, online resources) you use for instruction in this class.

About the Students in the Class Featured in this Learning Segment

1. Grade level(s):_____
2. Number of
   - students in the class: _____
   - males: _____ females: _____
3. Complete the charts below to summarize required or needed supports, accommodations, or modifications for your students that will affect your instruction in this learning segment. As needed, consult with your cooperating teacher to complete the charts. Some rows have been completed in italics as examples. Use as many rows as you need.

> Consider the variety of learners in your class who may require different strategies/supports or accommodations/modifications to instruction or assessment: For example, students
>
> - With Individualized Education Programs (IEPs) or 504 plans
> - With specific language needs
> - Needing greater challenge or support
> - Who struggle with reading
> - Who are underperforming students or have gaps in academic knowledge
>
> For Assessment Task 3, you will choose work samples from 3 focus students. At least one of these students must have a specified learning need. Note: California candidates must include one focus student who is an English language learner.[12]

[12] California candidates—If you do not have any English language learners, select a student who is challenged by academic English.

Students with IEPs/504 Plans		
IEPs/504 Plans: Classifications/Needs	**Number of Students**	**Supports, Accommodations, Modifications, Pertinent IEP Goals**
Example: Poor spatial skills	*2*	*Close monitoring, modeling blocks*

Students with Specific Language Needs		
Language Needs	**Number of Students**	**Supports, Accommodations, Modifications**
Example: English language learners with only a few words of English	*2*	*Pre-teach key words and phrases through examples and graphic organizers (e.g., word cluster, manipulatives, visuals)* *Have students use pre-taught key words and graphic organizers to complete sentence starters*
Example: Students who speak a variety of English other than that used in textbooks	*5*	*Make connections between the language students bring and the language used in the textbook*

Students with Other Learning Needs		
Other Learning Needs	**Number of Students**	**Supports, Accommodations, Modifications**
Example: Struggling readers	*5*	*Provide oral explanations for directions and pictures as appropriate*

Technology and Engineering Education Evidence Chart

Your evidence must be submitted to the electronic portfolio management system used by your teacher preparation program. Your submission must conform to the artifact and commentary specifications for each task. This section provides instructions for all evidence types as well as a description of supported file types for evidence submission, number of files, response lengths, and other information regarding format specifications. Note that your evidence cannot contain hyperlinked content. Any web content you wish to include as part of your evidence must be submitted as a document file, which must conform to the file format and response length requirements. If you have materials that must be translated into English as per the *edTPA Submission Requirements*, those translations should be added to the original materials as part of the same file or, if applicable, to the end of the commentary template. There is no page limit for required translations into English.

Planning Task 1: Artifacts and Commentary Specifications

What to Submit	Supported File Types	Number of Files		Response Length	Additional Information
		Min	Max		
Part A: Context for Learning Information (template provided)	.doc; .docx; .odt; .pdf	1	1	**No more than 4 pages,** including prompts	■ Use Arial 11-point type. ■ Single space with 1" margins on all sides.
Part B: Lesson Plans for Learning Segment	.doc; .docx; .odt; .pdf	1	1	No more than **4 pages per lesson**	■ Submit 3–5 lesson plans in 1 file. ■ Within the file, label each lesson plan (Lesson 1, Lesson 2, etc.). ■ All rationale or explanation for plans should be written in the Planning Commentary and removed from lesson plans.
Part C: Instructional Materials	.doc; .docx; .odt; .pdf	1	1	**No more than 5 pages** of **KEY** instructional materials per lesson plan	■ Submit all materials in 1 file. ■ Within the file, label materials by corresponding lesson (Lesson 1 Instructional Materials, Lesson 2 Instructional Materials, etc.). ■ Order materials as they are used in the learning segment.
Part D: Assessments	.doc; .docx; .odt; .pdf	1	1	No limit	■ Submit assessments in 1 file. ■ Within the file, label assessments by corresponding lesson (Lesson 1 Assessments, Lesson 2 Assessments, etc.). ■ Order assessments as they are used in the learning segment.
Part E: Planning Commentary (template provided)	.doc; .docx; .odt; .pdf	1	1	**No more than 9 pages** of commentary, including prompts	■ Use Arial 11-point type. ■ Single space with 1" margins on all sides. ■ Respond to prompts before teaching the learning segment.

Instruction Task 2: Artifacts and Commentary Specifications

What to Submit	Supported File Types	Number of Files		Response Length	Additional Information
		Min	Max		
Part A: Video Clips[13]	flv, asf, qt, mov, mpg, mpeg, avi, wmv, mp4, m4v	2	2	Running time **no more than 10 minutes each** (but not less than 3 minutes combined)	■ Before you record your video, obtain permission from the parents/guardians of your students and from adults who appear on the video. ■ Refer to Instruction Task 2, What Do I Need to Do? for video clip content and requirements. ■ When naming each clip file, include the number of the lesson shown in the video clip.

Part B: Instruction Commentary (template provided)	.doc; .docx; .odt; .pdf	1	1	**No more than 6 pages** of commentary, including prompts
				If needed, **no more than 2 additional pages** of supporting documentation
					■ Use Arial 11-point type.
					■ Single space with 1" margins on all sides.
					
					IMPORTANT:
					■ Insert documentation at the end of the commentary file if
					  ■ you or the students are using graphics, texts, or images that are not clearly visible in the video
					  ■ you chose to submit a transcript for occasionally inaudible portions of the video
					■ If submitting documentation, include the video clip number, lesson number, and explanatory text (e.g., "Clip 1, lesson 2, text from a whiteboard that is not visible in the video," "Clip 2, lesson 4, transcription of a student response that is inaudible").

[13] **Video file size requirements:** The target file size is 200–300 MB or less. The Pearson ePortfolio System file size limit is 500 MB. Please note that each integrated platform provider portfolio system may have additional constraints or requirements regarding video formats and file sizes. You may need to use video tools to compress or transcode your video into smaller file sizes to facilitate uploading of the video. Refer to Recommended Video Formats and Settings on www.edtpa.com for the current requirements.

Assessment Task 3: Artifacts and Commentary Specifications

What to Submit	Supported File Types	Number of Files		Response Length	Additional Information
		Min	Max		
Part A: Student Work Samples[14]	**For written work samples:** .doc; .docx; .odt; .pdf **For audio work samples:** flv, asf, wmv, qt, mov, mpg, avi, mp3, wav, mp4, wma **For video work samples:** flv, asf, qt, mov, mpg, mpeg, avi, wmv, mp4, m4v	3	3	No page limit for written work samples **No more than 5 minutes per focus student** for video or audio student work samples	▪ Use correction fluid, tape, or a felt-tip marker to **mask or remove students' names, your name, and the name of the school before copying/scanning any work samples**. If your students' writing is illegible, write a transcription directly on the work sample. ▪ On each work sample, indicate the student number (Student 1 Work Sample, Student 2 Work Sample, or Student 3 Work Sample). If more than one focus student appears in a video or audio work sample, upload the same work sample separately for each focus student who is seen/heard and label appropriately. Describe how to recognize each of the focus students in the clip and provide the label associated with the clip in prompt 1d of the Assessment Commentary. ▪ When naming each work sample file, include the student number. ▪ If you submit a student work sample or feedback as a video or audio clip and comments made by you or your focus student(s) cannot be clearly heard, do one of the following: 1) attach a transcription of the inaudible comments (**no more than 2 additional pages**) to the end of the Assessment Commentary; 2) embed quotes with time-stamp references in the commentary response; or 3) insert captions in the video (captions for this purpose will be considered permissible editing).

(Continued on next page)

[14] **Video file size requirements:** The target file size is 200–300 MB or less. The Pearson ePortfolio System file size limit is 500 MB. Please note that each integrated platform provider portfolio system may have additional constraints or requirements regarding video formats and file sizes. You may need to use video tools to compress or transcode your video into smaller file sizes to facilitate uploading of the video. Refer to Recommended Video Formats and Settings on www.edtpa.com for the current requirements.

Assessment Task 3: Artifacts and Commentary Specifications (continued)

What to Submit	Supported File Types	Number of Files		Response Length	Additional Information
		Min	Max		
Part B: Evidence of Feedback[15] And, if included, video evidence of academic language use	**For written feedback not written on the work samples:** .doc; .docx; .odt; .pdf **For audio feedback:** flv, asf, wmv, qt, mov, mpg, avi, mp3, wav, mp4, wma **For video clips (feedback and/or language use):** flv, asf, qt, mov, mpg, mpeg, avi, wmv, mp4, m4v	0	4	No page limit for written feedback **No more than 3 minutes per focus student** for video or audio feedback **No more than 5 minutes** for video evidence of student language use	■ Document the location of your evidence of feedback in the Assessment Commentary. ■ If feedback is not included as part of the student work samples or recorded on the video clip(s) from Instruction Task 2, submit only **1** file for each focus student—a document, video file, **OR** audio file—and label the file with the corresponding student number (Student 1 Feedback, Student 2 Feedback, or Student 3 Feedback). ■ If more than one focus student appears in a video or audio clip of feedback, upload the same clip separately for each focus student who is seen/heard and label appropriately. ■ When naming each feedback file, include the student number. ■ If you submit a student work sample or feedback as a video or audio clip and comments made by you or your focus student(s) cannot be clearly heard, do one of the following: 1) attach a transcription of the inaudible comments (**no more than 2 additional pages**) to the end of the Assessment Commentary; 2) embed quotes with time-stamp references in the commentary response; or 3) insert captions in the video (captions for this purpose will be considered permissible editing). ■ **For Academic Language**—If you choose to submit a video clip of student language use, it should be **no more than 5 minutes**. You may identify a portion of a clip provided for Instruction Task 2 or submit an entirely new clip.

(Continued on next page)

[15] **Video file size requirements:** The target file size is 200–300 MB or less. The Pearson ePortfolio System file size limit is 500 MB. Please note that each integrated platform provider portfolio system may have additional constraints or requirements regarding video formats and file sizes. You may need to use video tools to compress or transcode your video into smaller file sizes to facilitate uploading of the video. Refer to Recommended Video Formats and Settings on www.edtpa.com for the current requirements.

Assessment Task 3: Artifacts and Commentary Specifications (continued)

What to Submit	Supported File Types	Number of Files		Response Length	Additional Information
		Min	Max		
Part C: Assessment Commentary (template provided)	.doc; .docx; .odt; .pdf	1	1	**No more than 10 pages** of commentary, including prompts Plus ■ **no more than 5 additional pages** for the chosen assessment ■ if necessary, no more than **2 additional total pages** of transcription of video/audio evidence for a work sample and feedback, and/or video evidence of language use	■ Use Arial 11-point type. ■ Single space with 1" margins on all sides. **IMPORTANT:** Insert a blank copy of the chosen assessment, including directions/prompts provided to students.
Part D: Evaluation Criteria	.doc; .docx; .odt; .pdf	1	1	No limit	

Technology and Engineering Education Glossary

Source citations for glossary entries are provided as footnotes in this section.

academic language: Oral and written language used for academic purposes. Academic language is the means by which students develop and express content understandings. Academic language represents the language of the discipline that students need to learn and use to participate and engage in the content area in meaningful ways. There are **language demands** that teachers need to consider as they plan to support student learning of content. These **language demands** include **language functions, vocabulary and/or symbols**, **discourse, syntax, and visual representation**.[16]

- **language demands:**[17] Specific ways that academic language (vocabulary and/or symbols, functions, syntax, discourse, visual representation) is used by students to participate in learning tasks through reading, writing, listening, and/or speaking to demonstrate their disciplinary understanding.
- **language functions:** The content and language focus of the learning task represented by the active verbs within the learning outcomes. Common language functions in technology and engineering education include **describing** components of a design such as the keystone of a bridge, **predicting** from models and data, **comparing** based on common attributes, **summarizing** the results of trials, **justifying** conclusions, **evaluating data**, **classifying** based on attributes, **explaining** designs and results of trials, **critiquing** a design based on concepts and/or data, **representing** information mathematically, and so on.
- **vocabulary:** Includes 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., shear, product, ruler); (2) general academic vocabulary used across disciplines (e.g., compare, analyze, evaluate); and (3) subject-specific words defined for use in the discipline (e.g., simplification, logic gates, orthographic).[18]

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[16] Examples for glossary terms in the Technology and Engineering Education Handbook will represent content areas, such as mathematics or science, instead of technologies, due to the fact that technology and engineering are the tools through which content area understandings are achieved.

[17] O'Hara, S., Pritchard, R., & Zwiers, J. (2012). Identifying academic language demands in support of the common core standards. *ASCD Express, 7*(17). Retrieved from http://www.ascd.org/ascd-express/vol7/717-ohara.aspx

[18] Quinn, H., Lee, O., & Valdés, G. (2012). Language demands and opportunities in relation to next generation science standards for English language learners: What teachers need to know. Retrieved from http://ell.stanford.edu/sites/default/files/pdf/academic-papers/03-Quinn%20Lee%20Valdes%20Language%20and%20Opportunities%20in%20Science%20FINAL.pdf

- **discourse:** Discourse includes the structures of written and oral language, as well as how members of the discipline talk, write, and participate in knowledge construction. Discipline-specific discourse has distinctive features or ways of structuring oral or written language (text structures) that provide useful ways for the content to be communicated.[19] In technology and engineering, language structures include symbolic representations (including schematics, drawings, and physical models) and narrative (e.g., to describe or compare). If the language function is to assess a design or problem solution, it should include options considered, rationale for choices made, and how well the design or problem solution meets the established criteria.
- **syntax:** The set of conventions for organizing symbols, words, and phrases together into structures (e.g., sentences, graphs, tables, schematics).[20]
- **language supports:** The scaffolds, representations, and pedagogical strategies teachers provide to help learners understand, use, and practice the concepts and language they need to learn within disciplines (Santos, Darling-Hammond, Cheuk, 2012).[21] 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, discourse, or visual representation) to deepen content understandings.

Advancing Excellence in Technological Literacy: Student Assessment, Professional Development, and Program Standards: Advancing Excellence in Technological Literacy: Student Assessment, Professional Development, and Program Standards (AETL) is a companion document to the Standards for Technological Literacy (STL). Specifically, it presents standards and enabling guidelines for student assessment, professional development of teachers, and the program infrastructure associated with the study of technology in grades K–12. AETL identifies the means for the implementation of STL in K–12 laboratory-classrooms. AETL contains three separate, but interrelated, sets of standards: student assessment practices to be used by teachers, professional development to assure effective and continuous in-service, pre-service education for teachers of technology, and detailed program standards that delineate educational requirements used to promote the development of technological literacy.

aligned: Consistently addressing the same/similar learning outcomes for students.

artifact: In the context of completing the edTPA, artifacts are submitted as part of your evidence of authentic work completed by you and your students, including lesson plans, copies of instructional and assessment materials, video clips of your teaching, and student work samples.

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 teaching and learning activities."[22] Assessments provide evidence of students' prior

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[19] Quinn, H., Lee, O., & Valdés, G. (2012). Language demands and opportunities in relation to next generation science standards for English language learners: What teachers need to know. Retrieved from http://ell.stanford.edu/sites/default/files/pdf/academic-papers/03-Quinn%20Lee%20Valdes%20Language%20and%20Opportunities%20in%20Science%20FINAL.pdf

[20] Zwiers, J. (2008). *Building academic language: Essential practices for content classrooms.* San Francisco: Jossey-Bass.

[21] Santos, M., Darling-Hammond, L., & Cheuk, T. (2012). Teacher development to support English language learners in the context of common core state standards. Stanford University Understanding Language. Available at http://ell.stanford.edu/sites/default/files/pdf/academic-papers/10-Santos%20LDH%20Teacher%20Development%20FINAL.pdf

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

academic knowledge, thinking, or learning in order to evaluate what students understand and how they are thinking. Informal assessments may include such things as student questions and responses during instruction and teacher observations of students as they work or perform. Formal assessments may include such things as quizzes, homework assignments, journals, projects and performance tasks.

assets (knowledge of students):

- **personal:** Refers to specific background information that students bring to the learning environment. Students may bring interests, knowledge, everyday experiences, family backgrounds, and so on, which a teacher can draw upon to support learning.
- **cultural:** Refers to the cultural backgrounds and practices that students bring to the learning environment, such as traditions, languages and dialects, worldviews, literature, art, and so on, that a teacher can draw upon to support learning.
- **community:** Refers to common backgrounds and experiences that students bring from the community where they live, such as resources, local landmarks, community events, practices, and so on, that a teacher can draw upon to support learning.

central focus: A description of the important understandings and core concepts that you want students to develop within the learning segment. The central focus should go beyond a list of facts and skills, align with content standards and learning objectives, and address the subject-specific components in the learning segment. For example, the subject-specific components for technology and engineering education are: technology-related conceptual understanding, technical skills, and engineering design or other problem-solving strategies. A central focus for a learning segment might be designing toy cars that can go fast around a circular track. The learning segment would focus on friction and angular velocity, how to collect and record data on multiple trials of a design, and the associated procedural understandings and reasoning/problem-solving skills to efficiently select improvements to the design.

commentary: Submitted as part of each task, and along with artifacts, make up your evidence. The commentaries should be written to explain the rationale behind your teaching decisions and to analyze and reflect on what you have learned about your teaching practice and your students' learning.

design brief: As part of the engineering design or technological design process, the design brief is a written statement that details exactly what the designer intends to do. The design brief provides direction for the work of the designer and specifies the requirements of the solution. The specifications describe the limitations and requirements of the project's solution. Typical specifications set limits on time, capital, or materials and clarify questions.[23]

engaging students in learning: Using instructional and motivational strategies that promote students' active involvement in learning tasks that increase their knowledge, skills, and abilities related to specific learning objectives. Engagement in learning contrasts with student participation in learning tasks that are not well designed and/or implemented and do not increase student learning.

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[23] International Technology Education Association. (2007). *Standards for technological literacy: Content for the study of technology.* Reston, VA: Author. Retrieved from http://www.iteea.org/10/39197.aspx

engineering design: The process of devising a system, component, or process to meet desired needs. Design is the approach engineers use to solve engineering problems—generally, to determine the best way to make a device or process that serves a particular purpose. Engineering design has a number of characteristic attributes. First, it is purposeful: a designer begins with an explicit goal that is clearly understood; thus, design can be pictured as a journey with a particular destination, rather than a sightseeing trip. Second, designs are shaped by specifications and constraints. Specifications spell out what the design must contend with, such as costs, size requirements, or the physical limitations of the materials used. In addition, the design process is systematic and iterative. Engineering design is a highly social and collaborative enterprise. Engineers engaged in design activities often work in teams, and communication with clients and others who have a stake in the project is crucial. Design is not a linear, step-by-step process. It is generally iterative, thus each new version of the design is tested and then modified based on what has been learned up to that point. Finally, there is never just one correct solution and choosing among them inevitably involves personal as well as technical considerations. Engineering design, also referred to as technological design, demands critical thinking, the application of technical knowledge, creativity, and an appreciation of the effects of a design on society and the environment.[24]

engineering design process/technological design process: At its infancy, the process includes identifying a problem, looking for ideas, developing solutions, and sharing the solution with others. Although there is no "right" process, common items in this iterative approach are: (a) Identifying the problem; (b) Defining the working criteria/goals; (c) Researching and gathering data; (d) Brainstorming/generating creative ideas; (e) Analyzing potential solutions; (f) Developing and testing models; (g) Making the decision; (h) Communicating and specifying; (i) Implementing and commercializing; and (j) Performing post-implementation review and assessment. It is important in any design process, however, that students perform the necessary analysis, mathematical and scientific predictions, and optimization needed to solve the problem.[25]

evaluation criteria: Performance indicators or dimensions that are used to assess evidence of student learning. They indicate the qualities by which levels of performance can be differentiated and that anchor judgments about the learner's degree of success on an assessment. Evaluation criteria can be represented in various ways, such as a rubric, a point system for different levels of performance, or rules for awarding full versus partial credit. Evaluation criteria may examine correctness/accuracy, cognitive complexity, sophistication or elaboration of responses, or quality of explanations.

evidence: Consists of **artifacts** that document how you planned and implemented instruction **AND commentaries** that explain your plans and what is seen in the videorecordings or examine what you learned about your teaching practice and your students' learning. Evidence should demonstrate your ability to design lesson plans with instructional supports that deepen student learning, use knowledge of your students to inform instruction, foster a positive learning environment that promotes student learning, monitor and assess student progress toward learning objectives, and analyze your teaching

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[24] (1) Katehi, L., Pearson, G., & Feder, M. (Eds.). (2009). *Engineering in K–12 education: Understanding the status and improving the prospects.* Washington, DC: National Academy of Engineering and National Research Council; (2) Accreditation Board for Engineering; and (3) International Technology Education Association. (2007). *Standards for technological literacy: Content for the study of technology.* Reston, VA: Author. Retrieved from http://www.iteea.org/10/39197.aspx

[25] International Technology Education Association. (2007). *Standards for technological literacy: Content for the study of technology.* Reston, VA: Author. Retrieved from http://www.iteea.org/10/39197.aspx

effectiveness. Your evidence must be submitted electronically using the electronic portfolio management system used by your teacher preparation program.

learning environment: The designed physical and emotional context, established and maintained throughout the learning segment to support a positive and productive learning experience for students.

learning objectives: Student learning outcomes to be achieved by the end of the lesson or learning segment.

learning segment: A set of 3–5 lessons that build one upon another toward a central focus, with a clearly defined beginning and end.

learning task: Includes activities, discussions, or other modes of participation that engage students to develop, practice, and apply skills and knowledge related to a specific learning goal. Learning tasks may be scaffolded to connect prior knowledge to new knowledge and often include formative assessment.

patterns of learning: Includes **both** quantitative and qualitative patterns (or consistencies) for different groups of students or individuals. Quantitative patterns indicate in a numerical way the information understood from the assessment (e.g., 10 out of 15 students or 20% of the students). Qualitative patterns include descriptions of understandings, misunderstandings, and/or partial understandings that could explain the quantitative patterns (e.g., "given that most students were able to . . . it seems that they understand").

planned supports: Instructional strategies, learning tasks and materials, and other resources deliberately designed to facilitate student learning of the central focus.

prior academic learning and prerequisite skills: Includes students' content knowledge and skills as well as academic experiences developed prior to the learning segment.

rapport: A close and harmonious relationship in which the people or groups understand each other's feelings or ideas and communicate well with each other.

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.

rubrics: Subject-specific evaluation criteria used to score your performance on edTPA. These rubrics are included in the handbook, following the directions for each task. The descriptors in the five-level rubrics address a wide range of performance representing the knowledge and skills of a novice not ready to teach (Level 1) to the advanced practices of a highly accomplished beginner (Level 5).

safety: Safety of students and the teacher is essential. Safety is more than a body of content that is taught as a prerequisite to performing in technology and engineering education. Safety is an attitude, a level of consciousness that should exist. Safety is a perception that hazards are present throughout our environment and that these hazards must be controlled to minimize human suffering. Safety can be broken down into several areas:

- The **learning environment** defines the physical facilities that students will occupy while participating in technology and engineering education. The learning environment can be separated into multiple areas: lighting, sound control, temperature, safety zones and color coding, storage, fire prevention and control, housekeeping, first aid requirements, and ergonomics.
- The **developmental level** of the student ultimately determines the safety climate of the classroom. Students must have knowledge of safety rules and procedures (cognitive) and possess the attitudes and values necessary to apply their knowledge of safety (affective). The skill level of students regulates the activities that can be performed safely (psychomotor).[26]
- Students must learn how to properly and safely use the myriad of **tools and equipment** available in technology and engineering education.
- Students must learn the **processes** of tool and equipment usage when constructing artifacts.
- **Material(s)** handling, storage, and disposal are important concepts that must be learned in technology and engineering education.
- The planning and maintaining of the learning environment requires *feedback* from the students and the teacher on how to better maintain and approach safety in technology and engineering education.

Standards for Technological Literacy: Content for the Study of Technology: The Standards for Technological Literacy (STL) define what students should know and be able to do in order to be technologically literate. The STL was created by the International Technology Education Association and articulates what needs to be taught in K–12 laboratory-classrooms to enable all students to develop technological literacy. The goal is to meet all of the standards through the developmentally and grade-level appropriate benchmarks which are included in the document. The standards were first published in 2000 and developed through many years of research, debate, and field review. Including all stages of development, over 4,000 people were involved in creating the standards.

The standards are organized in five major groupings: the nature of technology, technology and society, design, abilities for a technological world, and the designed world. More specifically, the standards address appropriate levels of understanding of technology, how members of society interact with technology, how to use the design process, the types of skills needed to use and maintain technical systems, and specific content related to energy and power, transportation, manufacturing, construction, medical, agricultural, and biotechnologies.

technical skills: Acquired abilities to choose, use, and maintain tools and processes to complete a task.

technological literacy: In the most fundamental sense, technological literacy is a general understanding of technology. This understanding may not be comprehensive, but it must be developed enough so that a person can function effectively in a technology-dependent society where rapid technological change is the norm. People are not expected to be experts but are expected to be comfortable enough to, say, read and understand a

[26] Deluca, V. W., & Haynie, W. J. (Eds.). (2006). *Safety system design for technology education* (3rd ed.). Reston, VA: International Technology Education Association/International Technology and Engineering Educators Association.

newspaper article that includes information about that field or apply that knowledge in some aspect to daily life—for example, knowing that a car requires regular maintenance. The goal of technological literacy is to provide people with the tools they need to participate intelligently and thoughtfully in the world around them.

Technological literacy is the ability to use, manage, assess, and understand technology. A technologically literate person understands, in increasingly sophisticated ways that evolve over time, what technology is; how it is created; and how it shapes society and, in turn, is shaped by society.[27]

technology and engineering education: Technology and Engineering Education (T&EE) is a program that resides at the P–12 school levels for all students and at post-secondary institutions for those students interested in teaching or obtaining employment in the technology/engineering fields. Technology and engineering education is primarily taught by technology and engineering teachers, with a focus on engineering design. T&EE may be considered a stand-alone discipline or part of a larger discipline in science, technology, engineering, and mathematics (STEM). Regardless of the approach, T&EE focuses on technological literacy and engineering design; engineering design is the verb tense of engineering.

At the P–12 grade levels, the goal is for students to develop technological and engineering literacy, regardless of career aspirations, through hands-on, contextual applications of technological and engineering concepts. T&EE students use a hands-on approach to solve technological problems using problem solving and creativity, while working under constraints, which involves the use of optimization and predictive analysis. At the P–5 grade levels, technology and engineering concepts are integrated into existing coursework such as reading, mathematics, science, and social studies. Typical courses students would take at the 6–12 grade levels in a T&EE program would consist of (a) information and communication technologies, including computer-aided drafting and design; (b) engineering design; (c) construction technology; (d) manufacturing technology; (e) energy, power, and transportation technology; and (f) medical, agricultural, and related biotechnologies. Within these courses, students would utilize troubleshooting, research and development, invention and innovation, and problem solving. The focus of T&EE at the P–12 levels is not to prepare future engineering majors/students, but to provide an education for all students.[28]

technology-related conceptual understanding: Students demonstrate conceptual understanding in technology and engineering when they recognize and can integrate the core concepts, systems, resources, requirements, optimization and trade-offs, processes, and controls.[29] This is often done through design activities that also involve analysis to model systems and predict outcomes, concern for human values (both individual and societal), and the communication of design ideas.

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[27] (1) Garmire, E., & Pearson, G. (Eds.). (2006). *Tech tally: Approaches to assessing technological literacy*. Washington, DC: National Academy of Engineering and National Research Council. (2) International Technology Education Association. (2007). *Standards for technological literacy: Content for the study of technology.* Reston, VA: Author. Retrieved from http://www.iteea.org/10/39197.aspx

[28] Merrill, C. (n.d.). Technology and engineering education description. This definition was sent to World Book Encyclopedia in March of 2012 for inclusion as the definition of technology and engineering education.

[29] International Technology Education Association. (2007). *Standards for technological literacy: Content for the study of technology.* Reston, VA: Author. Retrieved from http://www.iteea.org/10/39197.aspx

variety of learners: Students in your class who may require different strategies or support. These students include but are not limited to students with IEPs or 504 plans, English language learners, struggling readers, students with poor spatial skills, underperforming students or those with gaps in academic knowledge, and/or gifted students.

work artifact: Sometimes thought of as a project that students would complete as part of a lesson or unit of instruction, a work artifact is considered the physical evidence and/or visual representation that students submit to their teacher that would allow the teacher to properly assess student knowledge and skill. Work artifacts in technology and engineering education could be in many forms. Examples of work artifacts could include, but are not limited to, CAD models and drawings, portfolios, written work, engineering design notebooks, prototypes, or other physical components that are common to technology and engineering education content.