STANDARD INDICATOR 2.2

PEDAGOGICAL CONTENT KNOWLEDGE

The teacher creates learning experiences that make the discipline accessible and meaningful for students to ensure mastery of the content.

Teachers require pedagogical insight to communicate their subject knowledge effectively and impact students significantly. Accomplished educators use a specialized set of technical skills and abilities to convey instructional content and facilitate learning so students can develop bodies of knowledge and advance their systems of thinking. Pedagogical expertise incorporates wisdom related to the teaching and learning processes, as well as the dynamic between student needs and content demands. Accomplished teachers use their knowledge of the most appropriate ways to present subject matter through strategies and techniques such as demonstrations, experiments, analogies and metaphors, interactive learning, and appropriate uses of technology.

Pedagogical experience yields a repertoire of instructional techniques that allow teachers to share their subject matter knowledge with students Teachers draw on pedagogical and subject matter understandings to respond to common misconceptions within content areas; address challenging aspects of learning acquisition; and accommodate prior knowledge, experience, and skills that students at different developmental levels typically bring to the classroom. For example, science teachers anticipate that some students may have misunderstandings about gravity that can influence their learning, whereas fine arts and physical education teachers are prepared for young children to enter school at various stages of maturity with respect to hand-eye coordination. Balancing the insights of pedagogical and subject matter expertise helps teachers evaluate and resolve daily issues—decisions that include which aspects of subject matter to emphasize and how to pace instruction. Accomplished educators use a comprehensive awareness of their students, their subjects, and their practice to structure teaching that promotes learning in their schools.

To remain as effective as possible in the classroom, accomplished educators also demonstrate a strong commitment to learning about new curricular resources, such as textbook series, primary texts, classroom manipulatives, or research materials available through professional organizations. Educators keep abreast of technological developments that have implications for their subject areas and their teaching, utilizing digital tools employed within their disciplines. Teachers understand that maintaining familiarity with the technology used by practitioners helps them remain current in their fields. In addition, they explore the influence that technology has on their subject areas because they know that it frequently affects the structure and process of thinking within disciplines. Importantly, accomplished teachers position themselves as critical users of technology, ensuring that it is employed to enhance student understanding. By modeling that stance, teachers help their students navigate the relationship between technology and learning, empowering them to use digital tools in authentic ways that advance their knowledge. Educators continually evaluate the usefulness of all curricular materials and pedagogical methods they adopt in the classroom, basing that evaluation on their professional judgment.

Adapted from NBPTS, *What Teachers Should Know and Be Able to Do,* 2nd ed. (2016, pp. 20–21).

Key Elements of Teacher Practice Related to Standard Indicator 2.2

- Knowledge of available curricular resources and effort to keep current with the growing body of curricular materials and instructional tools and technologies;
- Knowledge of which aspects of the subject matter to emphasize and the most appropriate strategies and approaches for delivering the subject matter to students;
- Understanding that both teacher-directed and student-directed learning have value;
- Use of questioning strategies such as open-ended probing, redirection, or reinforcement to extend student thinking beyond the knowledge and comprehension levels and promote student discourse; and
- Awareness of common misconceptions and instructional strategies/approaches for addressing them.

Questions for Reflection and Planning

- Am I keeping current with new technologies, tools, strategies, and resources related to the content I am teaching?
- Have I considered the appropriateness of the selected resources and how they will provide access to the learning for students with different needs?
- Am I incorporating a variety of strategies and approaches that are appropriate for the content I am teaching and that are engaging and **relevant** for students?
- Do I incorporate both teacher-directed and student-directed learning opportunities in my lessons?
- Am I using questioning strategies that will extend student thinking beyond the knowledge and comprehension levels and promote student discourse?
- Have I thought about common misconceptions about the content and how I will prepare for that?

2.2 LEVEL 1

Standard Indicator 2.2. Pedagogical Content Knowledge. The teacher creates learning experiences that make the discipline accessible and meaningful for students to ensure mastery of the content.

Level 1, Ineffective

Performance-Level Descriptors	*The teacher does not select or use content-appropriate resources, representations, or technologies, or only the most basic ones, that make the content accessible to few to no learners.* *The teacher implements primarily teacher-directed instructional strategies that do not result in student acquisition of knowledge and skills related to the content of focus.* *The teacher's use of questioning strategies does not extend student thinking beyond the knowledge and comprehension levels.* *Student misconceptions that arise during instruction go unnoticed or unaddressed by the teacher.*
Critical Attributes	■ The teacher's use of instructional resources is limited to basic tools, such as textbooks and worksheets, even when more varied or current resources are available to benefit student learning. ■ The teacher uses strategies for the discipline that do not facilitate student learning. ■ The teacher's questioning strategies do not extend student learning beyond the knowledge and comprehension levels. ■ Students respond in ways that highlight misconceptions, but the teacher does not acknowledge or address these instances.
Possible Examples	■ During instructional time, the U.S. history teacher routinely assigns students to read a chapter in the textbook and answer the end-of-section questions independently. ■ The resource used for the science lesson contains facts that are no longer considered to be accurate as part of the discipline. ■ For a discussion on the different kinds of apples, the preschool teacher brings photos of apples instead of bringing real fruit to show the children. ■ The physical education teacher lectures students about proper throwing technique for most of the class period, leaving only a few minutes for students to practice the skill. ■ During the read-aloud, the teacher limits the discussion to the recalling of details with questions such as "What is the rabbit's name?" "Where is he going?" "What did his mom ask him to do?" ■ Although almost half of the students reply "10" to the problem "5 squared" on the mathematics quiz, the teacher does not address this misconception in her instruction.
Implications for Professional Learning (adapted from InTASC Learning Progressions 1.0)	*Develop the ability to*: Identify and adapt curriculum materials and instructional strategies to connect with learner needs and support learners in understanding and applying the content.

Core Proposition 2: Teachers know the subjects they teach and how to teach those subjects to students.

Teaching practice is advanced through professional learning that will, for example:

Expand skill in creating and adapting learning experiences.

- Observe classrooms or videos of classrooms that model appropriate strategies for addressing the content and **higher order thinking** skills and debrief practice with colleagues.
- Engage in a structured course or workshop to thoroughly understand the appropriate content-specific instructional strategies for the grade and subject level.

Strengthen analysis and reflection on the plan and design of content-specific learning experiences.

- Identify personal content-related strengths and weaknesses and work with content area colleagues or specialists to create and implement a professional development plan.
- Work with a coach or colleague to develop lesson plans and curriculum units to build understanding of appropriate content-specific strategies and resources.

2.2 LEVEL 2	
Standard Indicator 2.2. Pedagogical Content Knowledge. The teacher creates learning experiences that make the discipline accessible and meaningful for students to ensure mastery of the content.	
Level 2, Developing	
Performance-Level Descriptors	*The teacher selects and uses content-appropriate resources, representations, or technologies that make the content accessible to some learners.* *The teacher implements a limited range of primarily teacher-directed instructional strategies that result in the acquisition of knowledge and skills related to the content of focus by only some students.* *The teacher uses questioning strategies such as open-ended probing, redirection, or reinforcement to support some student thinking beyond the knowledge and comprehension levels.* *Student misconceptions that arise during instruction either may not be noticed by the teacher or may not be addressed in a timely and appropriate manner.*
Critical Attributes	■ The teacher uses provided instructional resources and occasionally seeks out additional resources and technologies to support student learning. ■ The teacher uses a limited range of primarily teacher directed strategies to facilitate student learning. ■ The teacher questioning results in minimal opportunities to extend student learning beyond the knowledge and comprehension levels or engage them in applying **critical thinking** skills. ■ The teacher notices and attempts to address misconceptions but may not be successful in clarifying the misconception.
Possible Examples	■ For a vocabulary lesson on food, the French teacher shares with students a menu from a French restaurant he found online. ■ A science teacher uses the hands-on resources that are part of the provided program to supplement her teacher-directed instruction. ■ In the unit on substance abuse, the teacher focuses on the health effects and statistics but does not question students to expand their thinking to consider social aspects, such as the impact of substance abuse on families, communities, and health care resources. ■ While adding fractions, students add the numerators and the denominators and the teacher explains the procedure but does not clarify the misconception for students.
Implications for Professional Learning (adapted from InTASC Learning Progressions 1.0)	*Develop the ability to:* Identify and adapt curriculum materials and instructional strategies to connect with learner needs and support learners in understanding and applying the content.

Core Proposition 2: Teachers know the subjects they teach and how to teach those subjects to students.

Teaching practice is advanced through professional learning that will, for example:

Expand skill in creating and adapting learning experiences.

- Observe classrooms or videos of classrooms that model appropriate strategies for addressing the content and **higher order thinking** skills and debrief practice with colleagues.
- Engage in a structured course or workshop to thoroughly understand the appropriate content-specific instructional strategies for your grade and subject level.
- Work with teams within and across grade levels to compare representations of content and evaluate their effectiveness for learners.

Strengthen analysis and reflection on the plan and design of content-specific learning experiences.

- Identify personal content-related strengths and weaknesses and work with content area colleagues or specialists to create and implement a professional development plan.
- Co-plan and co-teach with a specialist or experienced teacher to learn new strategies for developing and implementing rigorous and **relevant** learning experiences.

Strengthen analysis and reflection on the use of strategies and resources.

- Use feedback and reflection on learner performance to evaluate effectiveness of materials and strategies.

Expand knowledge of resources to support teaching and learning in the content area.

- Access and apply content resources and instructional strategies from multiple sources (e.g., books, journals, Internet) to build meaningful representations and address learner misconceptions.

2.2 LEVEL 3

Standard Indicator 2.2. Pedagogical Content Knowledge. The teacher creates learning experiences that make the discipline accessible and meaningful for students to ensure mastery of the content.

Level 3, Effective

Performance-Level Descriptors	*The teacher selects and uses current, content-appropriate resources, representations, and technologies that make the content accessible to most learners.* *The teacher implements a variety of teacher-, and sometimes student-, directed instructional strategies that result in the acquisition of knowledge and skills related to the content of focus by most students.* *The teacher uses questioning strategies such as open-ended probing, redirection, or reinforcement to extend student thinking beyond the knowledge and comprehension levels and promote student discourse.* *The teacher addresses student misconceptions that arise during instruction in a timely and appropriate manner.*
Critical Attributes	■ The teacher uses a variety of current, appropriately challenging, content-specific strategies and resources that benefit students and enhance instruction and include some opportunities for student directed learning. ■ The teacher engages students in critical thinking and problem solving using questioning and strategies such as analogies, metaphors, experiments, demonstrations, and illustrations. ■ The teacher anticipates, and is alert for, misconceptions and areas of content that students typically find difficult and intentionally addresses them throughout instruction.
Possible Examples	■ In their study of modern art, the teacher arranges for a virtual field trip through New York's Metropolitan Museum of Art. ■ In a study of habitats, students work in groups to illustrate a food web and then act out or explain the impact that the removal or addition of a specific element might have on the sustainability of the web. ■ To begin a unit on the Great Depression, a teacher shows a variety of photographs, reads a personal account from a diary, and shares several newspaper headlines from the time period and then asks the students to reflect on what they see as similar to and different from life today. ■ In a unit on colors, an early childhood teacher uses narratives, informational text, and pictures of other real-world objects along with exploration using artistic materials such as paint and crayons to expose children to the wide variety of colors in the world. ■ To introduce the concept of what to do with remainders in division, the fourth-grade teacher begins the lesson by asking students in groups of four to determine how they could share five brownies and then facilitates a student discussion of the responses and the thinking that led to their solution. ■ In anticipation of student misconceptions about the properties of air, the teacher holds up a drinking glass and asks, "What do you think will happen when I submerge this upside-down in the fish tank?"
Implications for Professional Learning (adapted from InTASC Learning Progressions 1.0)	*Develop the ability to:* Expand and refine purposeful and deliberate creation and adaptation of materials and strategies to meet various learner needs and promote independent learner inquiry.

Core Proposition 2: Teachers know the subjects they teach and how to teach those subjects to students.

Teaching practice is advanced through professional learning that will, for example:

Expand skill in creating and adapting learning experiences.

- Work with colleagues to identify resources and research to support high-level learning for all learners.
- Seek out and use feedback (from colleagues and students) on the use of strategies to scaffold learners' independent use of content area knowledge and processes.

Strengthen analysis and reflection on the plan and design of content-specific learning experiences.

- Co-plan or co-teach with a specialist or experienced teacher to learn new strategies for developing and implementing rigorous and **relevant** learning experiences.

Strengthen analysis and reflection on the use of strategies and resources.

- Use feedback and reflection on learner performance to evaluate effectiveness of materials and strategies.

Expand knowledge of resources to support teaching and learning in the content area.

- Access and apply content resources and instructional strategies from multiple sources (e.g., books, journals, Internet) to build meaningful representations and address learner misconceptions.
- Integrate new resources into instruction from various sources that illustrate new developments in the field or applications in the content.

2.2 LEVEL 4

Standard Indicator 2.2. Pedagogical Content Knowledge. The teacher creates learning experiences that make the discipline accessible and meaningful for students to ensure mastery of the content.

Level 4, Distinguished

Performance-Level Descriptors	*The teacher selects and uses current, content-appropriate resources, representations, and technologies that make the content accessible to nearly all learners.* *The teacher implements a balance of teacher- and student-directed instructional strategies to deepen nearly all students' understanding and application of knowledge and skills related to the content of focus.* *The teacher uses questioning strategies such as open-ended probing, redirection, or reinforcement to extend student thinking beyond the knowledge and comprehension levels and improve the quality of student responses. The teacher encourages and supports students to use questioning and elaboration to drive discourse with their peers.* *The teacher proactively and intentionally uses common student misconceptions to drive instruction and addresses those that arise during instruction in a timely and appropriate manner.*
Critical Attributes	■ The teacher actively seeks out a variety of current, appropriately challenging, content-specific strategies and resources as well as contributes to the design of new resources that benefit students and enhance complex learning experiences. ■ The teacher uses problems or questions to facilitate students' independent use of methods of **inquiry** and guide them in critiquing processes and conclusions using evidence appropriate to the discipline. ■ The teacher provides topics, resources, and activities that require students to formulate and share personal perspectives and question one another to deepen their understanding and improve their ability to engage in meaningful discourse. ■ The teacher anticipates, and is alert for, misconceptions and areas of content that students typically find difficult and incorporates them intentionally into instruction to deepen student understanding.
Possible Examples	■ As part of their study of urban gentrification, the geography teacher engages students in a series of lessons involving fieldwork and in-class analysis through a project where students worked in groups to gather data through interviews with residents and business owners in a particular neighborhood and combine their findings with research, photographs, and other media and present their findings through a multimedia presentation. ■ The fourth-grade teacher encourages students to use multiple approaches to solve the mathematics problem, and uses these different approaches to facilitate a discussion in which the connections between and among the approaches is made explicit and students are asked to consider why one method might be more efficient than another. ■ Working in teams, students in the history class are assigned one of the Supreme Court justices, asked to make a prediction about how the justice would vote on an upcoming decision, and justify that decision using citing evidence from previous decisions in the career of the justice and other factors drawn from a variety of sources.

	■ Recognizing the challenges her seventh graders often have in organizing their ideas in expository writing pieces, the teacher provides three pieces of writing representing varied levels of organization and clarity and asks students to identify the aspects of the writing that make it more or less clear to the reader.
Implications for Professional Learning (adapted from InTASC Learning Progressions 1.0) Develop the ability to	Expand and refine purposeful and deliberate creation and adaptation of materials and strategies to meet various learner needs and promote independent learner inquiry.

Teaching practice is advanced through professional learning that will, for example:

Expand skill in creating and adapting learning experiences.

- Access and process media and multimedia resources that demonstrate varied, complex, and applied approaches to learning (e.g., **problem-based**, **inquiry-based**, **project-based**), observe classrooms and videos that model these approaches, and debrief with colleagues**.**

Strengthen analysis and reflection on the plan and design of content-specific learning experiences.

- Co-plan and co-teach with a specialist or colleague to use innovative approaches and strategies for developing and implementing rigorous and **relevant** learning experiences.

Strengthen analysis and reflection on the use of strategies and resources.

- Evaluate the impact of strategies and resources on student learning and identify possible improvements through examining student work and eliciting feedback from students and critical friends.

Expand knowledge of resources to support teaching and learning in the content area.

- Access and apply content resources and instructional strategies from multiple sources (e.g., books, journals, Internet) to build meaningful representations and address learner misconceptions.
- Integrate new resources into instruction from a variety of sources that illustrate new developments in the field or applications in the content.