Look-for Tool: Science

Supports walkthroughs and feedback on subject-specific instructional strategies

Purpose:

This tool is intended to help leaders **provide feedback on practices associated with strengthening a teacher's content knowledge as they shift to align with more rigorous standards and curriculum**. It is based on the descriptors in the Teacher Content Knowledge indicator (noted below) within the NIET Teaching and Learning Standards Rubric and includes aligned, concrete "look-fors" for science.

The second descriptor in the Teacher Content Knowledge indicator defines look-fors in more detail in three subcategories – *focus, questioning,* and *student work* – that point to the primary shifts that occur as teachers align to the depth required by college and career readiness standards.

- ***Focus*** defines the overarching practices a leader should see for this subject.
- ***Questioning*** details what a leader should hear in classroom discussion to better ensure that specific-subject depth is achieved.
- ***Student work*** describes the tasks that should be utilized as teachers shift to more rigorous expectations.

The look-fors provide suggestions of potential evidence; however, the lists in this tool are not exhaustive, and coaches should use their own context and understanding to consider other ways a teacher may demonstrate his or her content knowledge in practice. Additionally, there is a glossary at the end of the tool to help define science-specific terminology. Observers are encouraged to review this glossary to better understand key terms, which are highlighted throughout the document.

How to use this tool:

This tool can be used by school leaders and coaches during walkthroughs or observations to identify evidence of practices associated with strengthening teacher's content knowledge as they shift to align with more rigorous standards and curriculum. It is intended to provide feedback to teachers as they work to deepen student learning. The tool provides a developmental continuum for the observer to provide an assessment of the teacher's content knowledge as demonstrated in practice. Coaches and teachers are also encouraged to discuss the evidence from walkthroughs, observations, and analysis of student work in pre- and post-conference sessions and in professional learning communities as appropriate.

This tool uses the following descriptors from level 5 – exemplary practice – on the NIET Teaching and Learning Standards Rubric:

NIET Teaching and Learning Standards Rubric – Instruction Domain	
	Level 5 – Exemplary *Consistent Evidence of Student-Centered Learning/Student Ownership of Learning – Teacher and Students Facilitate the Learning*
Teacher Content Knowledge	1. Teacher **displays extensive content knowledge and understanding** of both **state standards and instructional materials**, including their curriculum, for all the subjects they teach. 2. Teacher consistently **implements a variety of subject-specific instructional strategies** to enhance student content knowledge. 3. Teacher consistently **highlights key concepts and ideas and uses them as the basis to connect other powerful ideas**.

Key context from the descriptor	Look-fors: Examples of evidence	Observation
1. **Displays extensive content knowledge and understanding of state standards and instructional materials, including curriculum**	Teacher engages students in resources and activities that are aligned with the rigor of the standard(s) and objective(s) and are anchored in explaining scientific phenomena.	Yes Some Not Yet
	Students demonstrate understanding of the lesson's purpose throughout the lesson and connect purpose to each element of the lesson.	Yes Some Not Yet
	Teacher shares why and how lesson objective(s) connect to everyday lives, future learning in near term (tomorrow/next week), and long term (for the year) learning, with attention to the spiral nature of science instruction from year-to-year.	Yes Some Not Yet
	Teacher introduces new learning by providing clues and focus questions around a scientific phenomenon so that students can engage in the new learning as a scientist.	Yes Some Not Yet
	Comments:	
2. **Implements a variety of subject-specific instructional strategies**	**Focus in Science**	
	Majority of the lesson is focused on students observing, using evidence, and creating explanations for the focus question(s) around a scientific phenomenon.	Yes Some Not Yet
	Students engage in science and engineering practices in order to make sense of new learning and make connections to scientific phenomena.	Yes Some Not Yet
	Teacher sequences the lesson to help students to make a claim, support with evidence, provide reasoning, and make rebuttals to counterclaims regarding scientific phenomena within a lesson or unit.	Yes Some Not Yet
	Students are applying crosscutting concepts to connect what they are learning to other scientific ideas.	Yes Some Not Yet
	Questioning in Science	
	Teacher sequences questioning strategies to elicit, support, and challenge scientific thinking.	Yes Some Not Yet
	Teacher scaffolds questioning to assist student understanding of scientific vocabulary with just-in-time support within the lesson or unit.	Yes

Key context from the descriptor	Look-fors: Examples of evidence	Observation
		Some Not Yet
	Students engage in inquiry, share findings, and make connections to scientific data or phenomena as they work collaboratively.	Yes Some Not Yet
	Student Work in Science	
	Student work supports inquiry, self-monitoring of learning, seeking out next steps, and using feedback to construct scientific explanations and develop sensemaking individually or with a team.	Yes Some Not Yet
	Students are actively engaged in work that reflects what scientists do: reading, writing, and drawing; doing hands-on and/or digital investigations; modeling; and discussing findings.	Yes Some Not Yet
	Students engage in evaluating scientific data, text, or questions to develop sensemaking, leading them to explain scientific phenomena.	Yes Some Not Yet
	Comments:	
3. Highlights key concepts and ideas and uses them as the basis to connect other powerful ideas	Teacher connects lesson ideas to key concepts within a unit to help students transfer knowledge to other related concepts/ideas and explain new phenomena.	Yes Some Not Yet
	Students make connections to essential ideas within and across disciplinary core ideas as appropriate.	Yes Some Not Yet
	Student learning is connected to crosscutting concepts to build knowledge of themes across disciplines of science and connect learning.	Yes Some Not Yet
	Comments:	

Glossary:

Crosscutting concepts: application across all domains of science and linking science domains together. These could include patterns; cause and effect; scale, proportion, and quantity; systems and system models; energy and matter; structure and function; and stability and change.

Disciplinary core ideas: fundamental scientific ideas grouped in four domains: physical science; life science; earth and space science; and engineering, technology, and applications of science. To be considered core, and the ideas must meet at least two of the following criteria:

- Have broad importance across multiple sciences or engineering disciplines or be a key organizing concept of a single discipline
- Provide a key tool for understanding or investigating more complex ideas and solving problems
- Relate to the interests and life experiences of students or be connected to societal or personal concerns that require scientific or technological knowledge
- Be teachable and learnable over multiple grades at increasing levels of depth and sophistication

Science and engineering practices:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using math and computational thinking
6. Constructing an explanation (for science) and designing a solution (for engineering)
7. Engaging in an argument stemming from evidence
8. Obtaining, evaluating, and communicating information

Scientific phenomenon *(plural: phenomena):* observable fact or event that occurs in the universe and that we can use our science knowledge to explain or predict

Sensemaking: the process of making sense of or giving meaning to something, especially new ideas