Science Unit Internalization Protocol

This unit internalization protocol provides a structure for developing teacher understanding of how unit/module performance expectations, tasks and assessments operate within the overall arc of learning. The steps and questions below support "intellectual preparation" for teaching a unit/module from a high-quality instructional resource (HQIR). By starting with unit/module internalization, teachers understand how lessons fit into the big picture prior to using the Science Lesson Internalization Protocol.

Set aside 60-90 minutes for this unit-level protocol, working in collaboration with other teachers during professional learning time. **This protocol includes more steps and questions than can be fully considered during that time; therefore, consider prioritizing those most aligned to district/school goals and professional learning focuses for the current stage of implementation (launch, early or ongoing).** For example, educators could choose to focus only on the "Understand" section of the protocol during launch and early implementation to build initial understanding of the resource. A note-catcher has been provided as a tool to capture thinking.

While this protocol can be used with any high-quality instructional resource (HQIR), check with the vendor for specific protocols for use with your district- or school-selected instructional resource.

UNDERSTAND: Internalize the Standards, Do the Science and Review Unit Structure

1. **Read any overview or narrative for the unit/module to understand the "big picture" of the learning.** Doing this as independent "prework" and then beginning with a calibrating conversation can help maximize collaborative time.

2. **Identify and understand the standards in the unit/module.**
   - **Learn more about the performance expectations.** Utilize the *Kentucky Academic Standards (KAS) for Science* to address the following areas to gain a deeper understanding of the standards for this unit.
     - **Performance Expectations:** Within the unit, identify how the performance expectations (PEs) are bundled and which are targeted for assessment.
     - **Disciplinary Core Ideas**: What are the fundamental ideas necessary for understanding in this unit?
     - **Science and Engineering Practices:** Which practices leverage grade-appropriate elements of the Science and Engineering Practices (SEPs) to deepen students' understanding of how grade-appropriate Disciplinary Core Idea(s) (DCI) are developed throughout the lesson?
     - **Crosscutting Concepts:** Which elements of the Crosscutting Concepts (CCC) support students' sense-making and reasoning as they make connections within and across scientific disciplines?
     - **Vertical Progression:** How do the PEs build off previous grade level PEs? How will they prepare students for work in future grades? Reference the NGSS Appendices to access relevant progressions.
     - **Unit Learning Progression:** How do PEs in this unit connect to each other and to the anchoring phenomena and/or engineering design problem?

3. **Do the Science: Complete the end-of-unit/-module assessment using strategies students would be expected to use. Align items to performance expectations, and then check your thinking in the teacher guide. (*This can be completed prior to the PLC meeting in preparation for discussing questions below.*)**

- What do students have to know, understand and be able to do to demonstrate mastery in this unit/module?
- What performance expectation(s) and dimensions (SEP, CCC, and/or DCI) is each item assessing?
- What strategies, representations and language will students be expected to use when making sense of the phenomenon and/or designing solutions to problems?

4. **Skim the lessons to gain an overall sense of the unit's/module's progression.**
   - Which performance expectations are addressed in each lesson?
   - How do the lessons continue to be driven by the unit's anchoring phenomenon and/or engineering design problem?
   - How do performance expectations progress within the unit to prepare students for the end-of-unit assessment?

5. **Connect instructional practices to standards.**
   - How are students introduced to skills and concepts?
   - How do key instructional practices (driving question boards, facilitating scientific discourse, eliciting and using evidence of student thinking, etc.) help students move toward mastery?
   - Referring to your district's instructional vision and curriculum document, which instructional priorities could further support/enhance learning and the student experience (elements of project-based learning, inquiry-based learning, portrait of a learner competencies, cooperative learning, cognitive strategies, standards-based grading, etc.)?

TAKE STOCK: Analyze Student Learning Data

6. **Review data, student work from instruction, or other relevant assessments, and make connections to specific lessons.**
   - What are the strengths and dispositions of different student groups (demographic, readiness levels, etc.) in your classroom you want to build on in this unit/module?
   - Anticipating the range of students' background experience, vocabulary and perceptions, what learning approaches would most effectively support student sense-making in this unit/module?
   - What potential gaps in student learning do you see? *If available, read any guidance provided by the HQIR for each relevant assessment item to understand how this might be addressed within the unit/module.* What ideas do you have about how to address those gaps?
   - What misconceptions might students have about the unit/module content? What opportunities exist to address misconceptions?

TAKE ACTION: Make Adjustments to Unit and Plan Instructional Moves

7. **Create a plan for what you will need to do to set yourself and your students up for success in this unit/module.** (*When considering an adjustment, the Adjusting High-Quality Instructional Resources Tool offers guidance to support doing so effectively.)*
   - Do further intellectual preparation by annotating the unit/module (identify key learning strategies, models of exemplary work, supports for differentiated learning, etc.). Flag lingering questions, and consider where you will go for support, if needed.

- How will you plan for opportunities for students of all backgrounds and readiness levels to engage in productive struggle as they move toward achieving mastery? Which HQIR-embedded supports will you use to ensure all students can be successful (those needing additional supports and those ready for enrichment and/or extension)? What additional supports are available as needed?
- To support the PLC process, which HQIR-embedded tasks will be used as common formatives during the unit and for collaborative analysis of student work?
- Note lessons for which you anticipate increasing and/or reducing allotted time. How many instructional days will the unit/module now take? How will you utilize "buffer time," which often occurs between units/modules, to address unmet student learning needs? How will you account for any adjustments necessary to stay within the locally determined pacing window?
- How will you gather and analyze student feedback on their learning experience?
- What materials do you need to locate or create ahead of time (manipulatives, lab equipment, anchor charts, slides, texts, etc.)?
- Where will you take opportunities to inform students and families of upcoming learning and provide feedback on students' progress?

Unit Reflection: Upon completion of the unit/module, this Science Unit Reflection Protocol can be used to guide debriefing of successes, challenges and areas of possible improvement to inform how the unit/module is taught the following year.