STATE SPOTLIGHT: KENTUCKY'S STATE-LED SCIENCE ASSESSMENT SYSTEM

These resources are part of a series of reports about challenges facing statewide science assessments and innovative solutions states are enacting to meet those challenges.

*Transforming Science Assessment: Systems for Innovation is a series of resources designed to provide state education leaders with 1) information about **how states are currently pursuing statewide assessment systems in science**; 2) **analyses of what features influence different approaches**, with an eye to supporting state leaders as they make their own decisions regarding science assessment systems; 3) **detailed state profiles** that highlight how and why some states have made decisions regarding designing and enacting different examples of systems of assessment; and 4) **a how-to guide for policymakers** looking to enact systems of assessment in science. Some readers may find that it is helpful to review all the resources in this series; others might be particularly interested in a specific component of this report.*

The suite of resources is organized in the following sections:
- *A high-level introduction to science standards and assessment, the need for systems of assessments in science, and two major styles of approaches that are emerging from state efforts to turn the vision for a system of assessments in science into a reality*
- *Deep dive into state-led assessment systems in science*
- *Deep dive into distributed assessment systems in science*
- *State Spotlights on systems of assessment in Nebraska, Kentucky **(you are here)**, and Michigan*
- *A guide for policymakers to help consider how to develop and implement assessment systems*

Introduction

Kentucky was one of the first states to formally and publicly pursue a system of assessments in science following their adoption of the NGSS (Kentucky Academic Standards in Science). Kentucky's system of assessments includes federally-required on-demand statewide summative assessments in grades 4, 7, and high school; classroom-based through-course tasks administered multiple times each year in every classroom throughout the state; and ongoing, formative assessment processes in the classroom. The lynchpin of Kentucky's system is their **through-course task model**—a component that balances incentive structures with limited accountability implications, and dedicated support for classroom teachers with intentional coherence throughout the system.
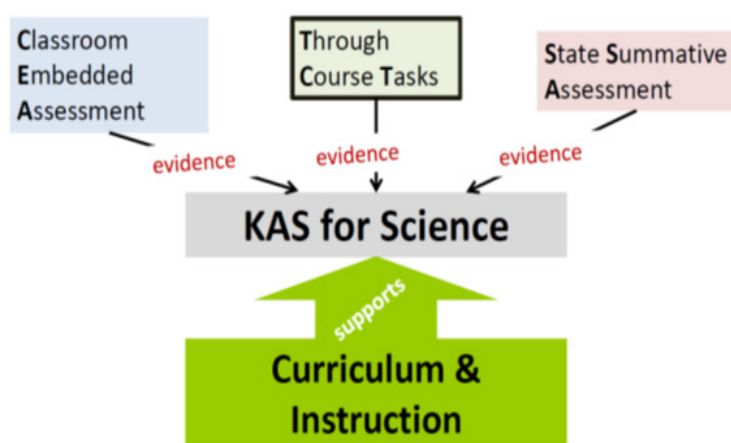

Figure 1: Kentucky's Science Assessment System
Kentucky's assessment system comprises classroom-embedded assessments (CEAs), through-course tasks (TCTs), and statewide summative assessments (SSAs). Together, these assessments are intended to provide multiple pieces of evidence stakeholders can use together to monitor student progress toward science goals.

Kentucky's System of Assessments At A Glance
- State-coordinated interim and summative assessment components
- Yearly expectation of through-course task administration (K-12) for all students
- Statewide summative assessments in grade 4, grade 7, and high school
- Interim component is incentivized by requiring district-level submissions of student work
- Emphasis on supporting educators in more effective science teaching and learning
- Central messages associated with the system:
  - Assessments are about gathering information to best support students and teachers
  - Three-dimensional learning requires three-dimensional assessment to support student learning and teachers' process
  - Three-dimensional assessment requires multiple sources of evidence of student performance at different times and a range of purposes, especially classroom-based performances that can most easily demonstrate how student thinking is evolving. Through-course tasks act as a connector to evidence collected via other parts of the system, and allow calibration throughout the system.
  - All assessments should be grounded in the core innovations of new science standards, including a focus on making sense of phenomena and problems, and sense-making using the three dimensions

Why the State-Led Approach?

When Kentucky adopted their new science standards in 2013, it was clear to the State Education Agency (SEA) science leadership that:

1) Determining whether students were meeting standards like the NGSS was going to require completely rethinking the evidence needed to show students' progress—and as a result, **conceptualizations about what assessments look like would have to change in the state;**

2) Because of the nature of the expectations, **assessments administered close to the classroom**—that could take advantage of extended time and peer and teacher interactions—**were going to be the most informative indicators of students' progress;**

3) The SEA needed to be able to **balance the type and quality of evidence** that could be collected at the individual classroom level with the need for indicators of student performance across schools and districts throughout the state **to ensure all students were being supported in science**; and

4) While classroom-based evidence for student progress was critical, its **success depended on classroom teachers being well supported in understanding and implementing three-dimensional teaching and learning**.

The SEA recognized that science assessment could be a powerful lever to support systemic change and state-wide improvement in science for all students—if the state could use the assessment system design and implementation to both:
- Support classroom-level teaching, learning and assessment across the state; and
- Emphasize evidence from classroom-based assessment as an integral part of the formal vision for how students' learning and performance would be monitored in all classrooms, schools, and districts state-wide.

Like other states, the SEA has limited influence on instructional decisions in districts across states, but assessments are a lever that the SEA can use to support change, professional learning, and provide examples of student performance. As a result, Kentucky is pursuing a state-led system that includes classroom-based assessments as a formal expectation for all students in the state.

Important State Contextual Factors
- Buy-in and commitment from science specialists, academic officers, assessment directors, and the state commissioner for the system of assessments in science
- Limited influence over other levers that had classroom-level implications, such as instructional materials adoption and implementation or ongoing professional learning opportunities for teachers
- In 2013, the instructional materials landscape was even more barren, and educators needed materials that they could use to illustrate the shifts required by new standards
- Legislative oversight over the federally-mandated assessments meant that the once-per-grade-band assessments could be swayed as political mores shift

Hallmarks of Kentucky's Approach

Based on KDE guidance documents

System Component	What's it all about in Kentucky's system?	What is the SEA's role in this component?
Classroom-Embedded Assessments	• Day-to-day, minute-to-minute checks for understanding in every K-12 science classroom • Instructionally-relevant assessments that support daily teaching and learning in the classroom • Explicitly connected to instructional materials, plans, and teacher-student interactions in individual classrooms • Comprise the largest and most important body of evidence students and teachers have to ensure students are progressing toward science achievement goals • Require careful curricular decisions and educator capacity for science teaching and assessment	**Communication:** The SEA consistently messages that this component of the system is a vital and required component to ensure student success. **Professional learning:** The SEA provides professional learning opportunities connected to formative assessment and 3D teaching and learning that can support classroom-embedded assessments.
Through-Course Tasks	• Periodic tasks that are selected by educators from a common bank of vetted performance tasks • Administered in the classroom at appropriate, teacher-determined points throughout the year • Expected to be administered in every K-12 classroom • Designed to provide feedback on learning that students have, or have not, experienced that would inform curricular decisions while simultaneously calibrating classroom expectations around the SEPs and CCCs so that teachers and students understand the types of performances expected on the grade band summative assessments • Tasks foreground aspects of sense-making using the science and engineering practices and crosscutting concepts	**Development:** The SEA coordinates the development of through-course tasks, including educator training for task development, evaluation and vetting, dissemination of tasks, and collection of student work[1]. **Implementation:** The SEA provides support for educators to implement these tasks, including direction about how to decide which tasks to use, when to use them, and how to use student work to monitor progress. **Professional learning:** The through-course task model emphasizes and requires local professional learning communities to form around task selection, use, and interpretation. The SEA establishes and supports these expectations. **Feedback to system:** The SEA uses collected student work examples to calibrate across tasks and inform other assessment and professional learning efforts.
Statewide Summative Assessment	• Standardized assessments that are administered once per grade band to meet federal requirements • Comprised of short tasks that can be completed in a single sitting through a combination of selected response and constructed response questions • Focus on a sample of standards with an emphasis on supporting program-level (school, district, state) inferences	**Development, administration, reporting:** The SEA coordinates all aspects of developing, administering, and scoring the statewide summative assessments.

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[1] KDE's requirement for student work submission has been suspended for the 2018-19 school year.

The Lynchpin: Incentivized Through-Course Tasks in Kentucky's System

One of the most innovative aspects of Kentucky's approach to systems of assessment in science is their model for the interim component of the system—through-course tasks that are grounded in classroom-based assessments that can provide educators with common, periodic opportunities to elicit student progress toward science standards.

What are the through-course tasks?

In Kentucky, through-course tasks are common, vetted, formative tasks that teachers can use in their classrooms at appropriate points throughout the school year. The task bank includes performance tasks at every grade level K-12 that provide a common illustration of expected student performances for all K-12 science teachers in Kentucky. The through-course tasks straddle support for both classroom-embedded and statewide summative assessments:

- While the tasks are curriculum-independent, they provide teachers and students with formative feedback about strengths and opportunities for improvement relative to end-of-instruction goals; and
- They reflect the kinds of thinking students will be expected to be able to demonstrate to successfully complete the statewide summative assessments.

All K-12 science teachers are expected to administer through-course tasks each year to all of their students, using the planning, implementation, and interpretation of student responses as part of professional learning with colleagues in their districts.

What makes the through-course tasks different?

While neither performance assessments nor interim assessments[2] are new ideas, Kentucky's approach is unique for a few reasons:

1. Emphasis on complementary, not mirrored or predictive, evidence of student progress. The SEA designed the through-course task component to be an important piece of the puzzle in its own right, not simply a formative support or predictor of the statewide summative assessment. In Kentucky, through-course tasks:
- Emphasize sense-making using the science and engineering practices and crosscutting concepts. Foregrounding these aspects of the standards helps signal major shifts (from memorized content to sense-making with the three dimensions) and provide additional support for aspects of the standards that might be newer to many educators.
- Untether science and engineering practices, crosscutting concepts, and disciplinary core ideas from the combinations described in the standards, providing formal signaling of the kinds of performances expected of students, and eliciting evidence of student performance beyond those described by performance expectations.
- Elicit evidence of student performance through periodic performance tasks—this provides:
  - More expansive evidence than possible on the statewide summative assessment;
  - More comparable evidence than classroom-specific activities; and
  - An opportunity to ensure that students can transfer curriculum-embedded learning to novel tasks and contexts.
- Can target competencies and performances that are integral to the standards but difficult to assess on large-scale, on-demand assessments.

2. Intentional calibration point. Kentucky's through-course tasks emphasize formative assessment processes to support classroom-level teaching and learning while providing teachers with calibration points around the expectations of student performance connected to the science and engineering practices and crosscutting concepts—the newest elements of the standards. By providing these vetted, common tasks, Kentucky meets the educator need to better understand what students will be expected to be able to do on the summative assessment without simply providing interim assessments

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[2] In this suite of resources, the term "interim assessment" is used in the most general sense, to describe assessments that fall between formative and summative assessment. Interim assessments are designed to inform decisions at both the classroom level as well as beyond the classroom (e.g., school, district). They are distinguished from true formative assessments because they can be aggregated across groups of students at the classroom, school, or district level; they are distinct from statewide summative assessments because they happen during the course of instruction rather than at the end, and are intended to provide information that is relevant to individual classrooms, teachers, and students.

that mirror the statewide summative assessment. Instead, through-course tasks provide the necessary common metric for student performance while emphasizing that deep and rich student sense-making—the kind most easily elicited and observed close to the classroom—is expected by Kentucky's new standards.
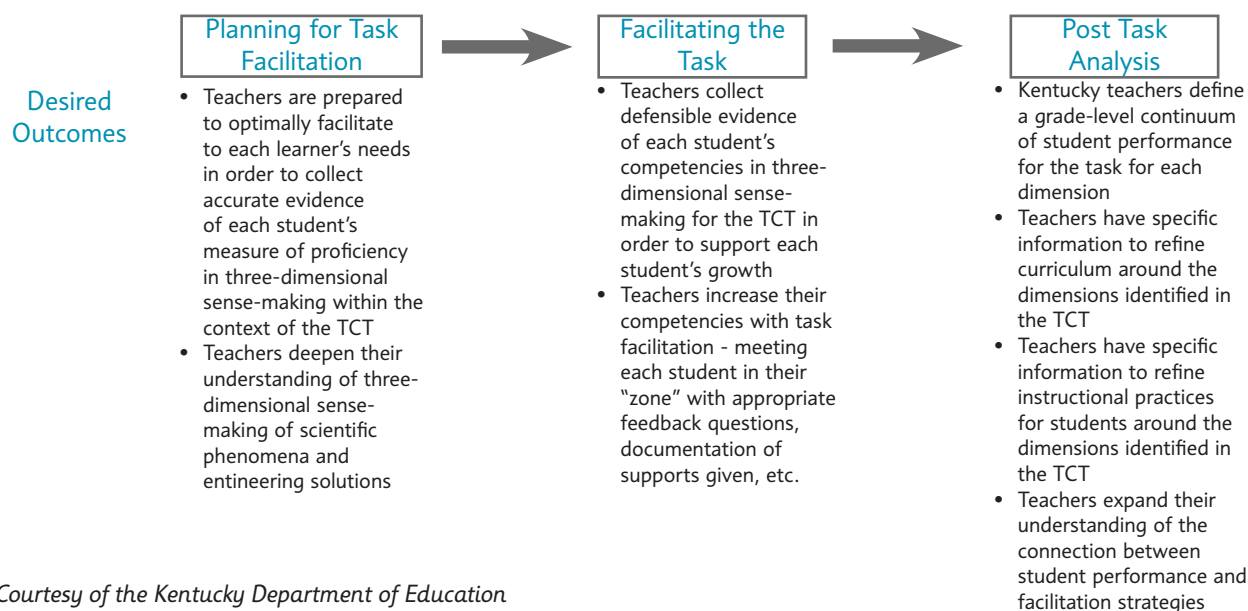
3. Statewide support, signaling, and incentives for assessments with primarily formative applications. Kentucky has been very clear: the primary purpose of the through-course tasks is to provide additional support to teachers and students in the form of a) common examples of the kinds of student thinking required by the standards, and b) state-vetted tasks that can be used to provide feedback about student progress that can be used to inform classroom instruction and curricular decisions. This is in contrast to many alternative conceptions of interim tasks, such as tasks that are intended to mirror or predict the summative—and therefore inadvertently over-value the content of the summative assessment as the most important metric of student performance. By including these formative through-course tasks as an integral component of the system of assessments, Kentucky is emphasizing the value of classroom- and locally-based sources of evidence of student progress.

4. Leveraging a component of the assessment system to drive locally-based, ongoing professional learning for educators. The SEA knew that building educator capacity in three-dimensional teaching and learning would be critical for moving student achievement in science. The through-course tasks represent one way the SEA can influence local, ongoing professional learning through a lever (assessment) that the SEA can easily use. The through-course tasks are presented as more than tasks for students, but as a collaborative process teachers engage in to be able to effectively use these tasks. The SEA intentionally provides relatively little guidance about 1) which tasks to use, 2) how to implement them in the classroom, and 3) how to interpret student responses. Instead, the SEA established an expected process that requires teachers to form local professional learning communities to collaboratively select tasks, discuss how to implement them within their specific contexts, and consider student work and subsequent interpretation and next steps (Figure 2 below).

Figure 2: The Through-Course Task Facilitation model.
In local professional learning communities, teachers are expected to collaboratively consider this process.

Through-Course Task (TCT) Facilitation: *A collaborative process for calibrating and refining teaching and learning around rich tasks at every grade level*

Desired Outcomes	Planning for Task Facilitation	Facilitating the Task	Post Task Analysis
	• Teachers are prepared to optimally facilitate to each learner's needs in order to collect accurate evidence of each student's measure of proficiency in three-dimensional sense-making within the context of the TCT • Teachers deepen their understanding of three-dimensional sense-making of scientific phenomena and entineering solutions	• Teachers collect defensible evidence of each student's competencies in three-dimensional sense-making for the TCT in order to support each student's growth • Teachers increase their competencies with task facilitation - meeting each student in their "zone" with appropriate feedback questions, documentation of supports given, etc.	• Kentucky teachers define a grade-level continuum of student performance for the task for each dimension • Teachers have specific information to refine curriculum around the dimensions identified in the TCT • Teachers have specific information to refine instructional practices for students around the dimensions identified in the TCT • Teachers expand their understanding of the connection between student performance and facilitation strategies

Courtesy of the Kentucky Department of Education

5. Creating incentive structures without using formal accountability measures. One challenge Kentucky had to navigate was how to incentivize using the through-course tasks. The SEA wanted to maintain a focus on supporting classroom-level implementation and evidence of student progress—this meant trying to avoid attaching too many teacher or student stakes to the tasks, while still creating a context in which teachers, schools, and districts would be compelled to use them. Kentucky's solution was to 1) communicate a requirement for all K-12 science teachers to use these tasks, and 2) require districts to submit a very small sample of student work (two pieces per grade level). This shielded teachers and students from additional accountability measures, but provided enough of a reason for district and school administrators, as well as teachers, to administer and use these tasks.

Keys to Success for the Kentucky System of Assessments in Science

While Kentucky is still in the early stages of implementing their system, there are some emerging highlights that set their system up to be successful.

Key to Success #1: Strong State Commitment to Science

In Kentucky, science is a priority across SEA leadership. When designing and implementing the science assessment system, Kentucky built on existing relationships between the teaching and learning division and the assessment division to figure out how to operationalize national recommendations for systems of assessment to support their new science standards. Buy-in from both science and assessment leads as well as the associate commissioners, and the commissioner of education were critical to launching and maintaining the system of assessments because it allowed them to 1) focus internal capacity and resources across multiple departments on this goal, 2) to have consistent messaging and communication about the importance and rationale for this approach, and 3) weather pushback from stakeholders more effectively. This included:

- Cross-departmental buy-in from teaching and learning as well as assessment divisions
- Support for the system of assessments as a mechanism for improving science education at various levels of leadership, including science leads, assessment leads, associate commissioner, and the commissioner of education
- Dedicated staffing and capacity to accomplish their vision: the SEA employed four dedicated science specialists to tackle various components of science standards implementation and support, including the three components of the assessment system

Key to Success #2: Communication

The SEA science leadership has prioritized clear and consistent communication about systems of assessment. Starting well before the system was fully conceptualized or implemented, the SEA intentionally and routinely talked about how the new standards were different, what this would mean for assessments and student expectations, how teachers could best prepare their students, and how the new approaches to assessment were designed to support teachers and students first and foremost. Specifically, the Kentucky SEA used the following strategies to build awareness and buy-in early and often:

- Clear and publicly available language and resources, including dedicated website space, one-pagers describing the system, and available presentations
- Regular communication from the commissioner to a wide range of stakeholders—including educators, district leadership, parents, state board members, etc.—about the system of assessments and how this would support students
- Consistent messaging—through direct outreach, public presentations, and direct support—to LEAs and state partners about the rationale and implications of Kentucky's systems approach. This included convening and facilitating science leadership networks throughout the state.

Key to Success #3: Focus on Local Support

For most states, transitioning to a system of assessments, especially in science, means adding assessments of some sort. Unsurprisingly, this can create significant pushback from educators who want to avoid both 1) sacrificing instructional time for assessments that have little influence over day-to-day classroom instruction, and 2) having to fit another requirement into an already full school year that they will be accountable for. By focusing the lion's share of the system (and communication about the system) on directly supporting classroom efforts and connecting the system to teachers' vision of success for their students, Kentucky has helped make the system of assessments something educators want to be part of, rather than an onerous additional thing they need to add to their plate.

Moreover, the specific ways in which Kentucky has designed their system—and particularly the through-course tasks— leverages local control to support better science education for all students throughout the state. The SEA knew that simply decreeing that through-course tasks needed to be administered would fail to have the impact they wanted; instead, by gently requiring these tasks to be administered, providing the tasks themselves and guidance for their use, and leaving

decisions about when and how to utilize them up to teachers, schools, and districts, Kentucky is able to catalyze effective local professional learning and classroom implementation without taking an entirely top-down approach. This is a tricky balance to strike; some specific ways Kentucky has managed to achieve this balance include:

- **Balancing local development with state-wide consistency** by centrally coordinating the development of the task library, but using teacher-developed tasks that are vetted by the state
- **Balancing state-wide implementation with locally-made decisions** by requiring the use of through-course tasks but intentionally creating a process that requires local professional learning communities to make decisions about which tasks to use and how to use them, how to interpret student work, and how this might be worked into local data-driven decisionmaking
- **Balancing state and local capacity** by creating a system in which the state forms a common vision establishes the infrastructure for its success, but intentionally builds local capacity into that infrastructure—in Kentucky's case, by making local decisions about task use part of the expected system