Kentucky Academic Standards (KAS) for Science
Resources to Support Implementation

Kentucky Department of EDUCATION

What resources are available to build background and context for the *Kentucky Academic Standards (KAS) for Science*?

The following are in recommended order.

- Science Standards At a Glance
  This document provides a quick two-page overview of the *KAS for Science*.
- *KAS for Science* document
  It is important to spend time becoming familiar with the standards document itself, as this is the foundation for all science work in Kentucky. Additionally, the KAS for Science contains several components that are designed to support educators when implementing the standards.
- Getting to Know the KAS for Science: An Overview
  This module provides foundational knowledge of the KAS for Science. The goals of this module are to:
  - Build a shared understanding of the architecture and components of the KAS for Science.
  - Strengthen the understanding of the three dimensions of science and recognize how they work together to support highly effective science teaching and learning.
  - Identify and prioritize areas where future professional learning will be needed for successful implementation of the KAS for Science and develop a plan to address those areas.
  - In addition, at the module's completion, participants will be able to develop an argument as to how instruction for the KAS for Science is the same/different as is observed in their experiences.

  The Facilitator's Guide provides suggestions for structuring each section, recommended activities to prompt meaningful investigation of the *KAS for Science* and guidance on talking points to use with the provided slide deck.
- Getting to the Conceptual Understanding of the Science Standards
  This protocol is one way in which educators may delve more deeply into the Kentucky Academic Standards for Science. The Kentucky Academic Standards for Science maintains the vision of the Framework for K-12 Science Education. As such, instructional practices should focus on conceptual understanding of science content; not on facts and figures. This protocol/process for getting to the intent can be thought of in three parts:

  1. Coming to consensus about the conceptual understanding of a particular science concept at a given grade level
  2. Outlining a progression of understanding
  3. Analyzing each of the SEPs (Science and Engineering Practices) and CCCs (Cross Cutting Concepts) at the identified grade band

  Each "step" has an identified purpose, as well as guiding questions, to help guide the professional conversations.

What standards alignment tools are available to support evaluation and selection of instructional resources?

- Science Instructional Resource Consumer Guide
  The Science Instructional Resource Consumer Guide is designed to communicate the definition of and rationale for high quality instructional resources (HQIRs), promote the use of standards-aligned HQIRs to support implementation of the locally developed curriculum and provide guidance and tools for evaluating, selecting and implementing standards aligned HQIRs at the local level.
- Lesson Screener
  This tool provides key look for in existing lessons to determine if they meet the instructional requirements demanded by the intent of the science standards.
- Task Screening Tools
  The task prescreen and task screener are tools that can be used to determine whether assessment tasks are designed for three-dimensional science standards. The task prescreen can be used as a quick review of tasks to determine if a deeper analysis is needed. The task screener provides the guidance for a deeper dive. You may also find annotated tasks, based upon the task screener, that exemplify the components of the task screener.

What resources are available to build capacity and support implementation of the science standards?

For Leaders

- Curriculum-Based Professional Learning Guidance Document
  This guidance document is intended to support effective implementation of a local curriculum supported by high-quality instructional resources (HQIRs) through curriculum-based professional learning. Specifically, the purpose of the guide is to provide an understanding of curriculum-based professional learning and its role in supporting local curriculum implementation and overall improvement of instructional practice and the three stages of curriculum-based professional learning, including each stage's purpose, key questions to consider and key tools to support the work.

For Educators

- Selecting Anchoring Phenomena module
  This module leads professional learning communities through understanding phenomena and how to identify a phenomenon that could anchor a unit of study or a series of lessons. This module includes a Facilitator's Guide that provides suggestions for structuring each section of the module, recommended learning experiences to prompt meaningful dialogue and discovery as well as talking points to use with the provided slideshow.
- Improving Student Engagement in the Science Classroom Using a Driving Question Board (DQB)
  This module provides guidance in the successful implementation of a driving question board, supporting the three-dimensional student learning called for in the Kentucky Academic Standards (KAS) for Science. This module includes a Facilitator's Guide that provides suggestions for structuring each section of the module, recommended learning experiences to prompt meaningful dialogue and discovery as well as talking points to use with the provided slideshow.
- Using the Science and Engineering Practices
  To meet the demands and rigor required of the science standards, students should actively engage in the practices of science. The resources on this site include tools and examples to help ensure that students are provided opportunities to engage in the sciences as expected.
- Diverse Student Perspectives and Experiences
  This module is designed to help educators in identifying the range of intellectual resources students use as they make sense of phenomena. This module includes a Facilitator's Guide that

provides suggestions for structuring each section of the module, recommended learning experiences to prompt meaningful dialogue and discovery as well as talking points to use with the provided slideshow.

What resources are available to support implementation of a comprehensive balanced system of assessment in science?

- Classroom Embedded
  - Three Dimensional Task Module
    This module shows how multi-dimensional tasks may be developed as well as how the task prescreen, and task screener may be used. This module includes a Facilitator's Guide that provides suggestions for structuring each section of the module, recommended learning experiences to prompt meaning dialogue and discovery as well as talking points to use with the provided slideshow. Additional resources accompanying this module are the Module at a Glance document and Three Dimensional Task Modification Introduction. The Three-Dimensional Task Modification Introduction contains six examples of how a task, analyzed using the task screener, can be modified to meet an intended purpose. It is important to note that these are only samples of how an existing task may be modified using information from the task screener and does not imply that the modified tasks are exemplars.
  - Demonstrating Formative Assessment in the Science Classroom
    This professional learning module from KET (Kentucky Educational Television) shows the importance of multi-dimensional learning goals and their connection to classroom tasks. It includes videos and classroom developed documents.
  - Classroom Embedded Assessments
    Examples of classroom-embedded assessments developed by Kentucky teachers through Math/Science Partnership. Each task includes the learning goal, the task is providing evidence of success criteria and next instructional steps. Some tasks also include student work.
- Through-Course Tasks
  The through-course tasks, developed with guidance from and vetted by Kentucky Department of Education staff, provide examples of the level of student thinking required by science standards. Designed to be used two or three times per year, these tasks provide schools with information about student ability to appropriately use the science and engineering practices and crosscutting concepts which can inform the school's curriculum.
- Summative Assessment
  This webpage provides information regarding the Kentucky Summative Assessment.
- Balanced Assessment Professional Learning Series Modules
  This professional learning series, developed in partnership with WestEd, is designed to support educators in leveraging quality assessment practices to effectively implement the standards and support all students in achieving their learning goals. Each module contains social studies specific examples and a PowerPoint and Facilitator's Guide for a one-hour professional learning session and a one-hour teacher collaboration activity.
  - Comprehensive Balanced System of Assessment
    In this module, participants learn about the essential components of a comprehensive, balanced assessment system and how different assessments can work together to support student learning.
  - Understanding Formative Assessment
    In this module, participants build a common understanding of the assessment cycle in the

formative assessment process.

- Clarifying and Sharing Learning Goals and Success Criteria
  In this module, participants will focus on how to elicit meaningful evidence of student learning through clarification of learning progressions, learning goals and success criteria.
- Eliciting Evidence of Student Learning
  In this two-part module, participants learn about designing and eliciting evidence of student learning aligned to the standards and valid assessment practices.
- Interpreting Evidence of Student Learning
  In these content-specific modules, participants learn about strategies for interpreting student evidence, engaging students in the interpretation and analysis of their own evidence and identifying patterns in student responses to inform teacher and student learning.
- Acting on Evidence of Student Learning
  In these content-specific modules, participants learn about strategies to adjust instruction in the moment as well as to improve teacher practice over time.

What resources provide best practices in education with a focus on science?

- Evidence-based Instructional Practice (EBIPS)
  Research consistently indicates the importance of students having access to quality, standards-aligned grade level instruction. All the work to create a written guaranteed and viable curriculum, to break down the standards and create aligned assessments is necessary, but the quality of the day-to-day classroom instruction students receive has a significant impact on their overall achievement. As teachers implement their local standards-aligned curriculum, it is important that they strategically and intentionally use evidence-based instructional practices that support students in reaching the intended learning outcomes. There are six evidence based practices and each practice contains an overview document and specific content area resources:
  - EBIP 1: Establishing the Learning Environment
    - EBIP 1 Overview
    - EBIP 1 Science
  - EBIP 2: Clarifying and Sharing Clear Learning Goals
    - EBIP 2 Overview
    - EBIP 2 Science
  - EBIP 3: Explicit Teaching and Modeling
    - EBIP 3 Overview
    - EBIP 3 Science
  - EBIP 4: Discussion
    - EBIP 4 Overview
    - EBIP 4 Science
  - EBIP 5: Questioning
    - EBIP 5 Overview
    - EBIP 5 Science
- Writing Across Disciplines
  Writing Across Disciplines Foundational Document was developed by an interdisciplinary team of consultants and contains sample discipline-specific writing tasks in reading and writing, mathematics, social studies, science and visual/performing arts.

- Writing to Learn in Science

  Science teachers utilize this instructional strategy to help deepen students' understanding of the subjects they are studying, to engage students in thinking, to provide opportunities for applying, extending, and developing skills, and to help students reflect on their learning. This resource includes both an elementary and secondary task.

- Writing to Demonstrate Learning in Science

  Teachers use this type of writing to provide opportunities for students to apply and demonstrate the skills they have learned and to assess students' understanding of the subjects they are studying. This resource includes both an elementary and secondary task.

- Writing for Publication in Science

  Writing for Publication allows students to become subject matter experts who communicate their learning to the world, requiring them to make considerations for the needs of their audience in an authentic context beyond the school community. These publications require students to read and write as disciplinary experts do within their respective fields.

- Adjusting Curriculum for Acceleration

  Before planning for new learning, school and district leaders must take steps to identify learning gaps and adjust the curriculum to ensure accelerated learning. This section provides a step-by-step guide for grade-level or course content teams to:

  • Analyze their existing curriculum to make adjustments to address potential learning gaps for incoming students due to an extended period of hybrid and/or remote learning.

  • Identify areas for potential learning gaps to share in vertical conversations.

  • Draft an adjusted curriculum.

What resources are available to support parents and caregivers?

Standards Family Guides

The *Kentucky Academic Standards* (KAS) Family Guides have been developed to help families familiarize themselves with the content of each grade level's standards. Each guide contains a standards overview for Reading & Writing, Mathematics, Science and Social Studies.