MATH

Standards Alignment Toolkit

KANSAS STATE DEPARTMENT OF EDUCATION

Kansas leads the world in the success of each student.

Feb. 19, 2025

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Overview

Purpose of the Toolkit

The Standards Alignment Toolkit supports educators with aligning curriculum, instruction, and assessments with the Kansas State Standards, the first step toward ensuring all students receive a high-quality education. This toolkit is designed to reduce the time and effort required to break down or make sense of the standards, enabling teachers to focus more on preparing to deliver meaningful instruction that fosters student engagement.

This Standards Alignment Toolkit offers:

- Guidance to deeply understand and internalize the expectations of the Kansas State Standards
- Insights into the interconnectedness of the standards, including vertically (across grade levels) and horizontally (within grade levels)
- Instructional resources to support the delivery of content that is coherent, relevant, and aligned with the expectations of the standards.

By aligning standards, curriculum, and assessments, the toolkit plays a critical role in ensuring that:

- Instruction is cohesive, building logically on prior knowledge while also preparing students for future learning.
- Instructional materials are relevant and tailored to meet students' unique learning needs.
- Students are set up for success with the knowledge and skills they need to meet the expectations of grade-level learning outcomes.

The Kansas State Department of Education (KSDE) recognizes that a deep understanding of and alignment to Kansas State Standards is essential to ensuring that all students receive an excellent education.

This toolkit simplifies the process of standards alignment, equipping educators with the tools they need to enhance student success while focusing on what matters most-providing effective and meaningful instruction.

How to Use the Toolkit

Teachers might use this toolkit to:

- Engage in a guided process to internalize what their grade-level standards expect students to know and be able to do by the end of the year.
- Leverage a deeper understanding of the standards to assess the alignment of instructional materials: Are the lessons and units I'm currently using fully aligned to the depth of the standards? If not, how can or should I fill those gaps?
- Use provided resources, templates, and processes to plan for upcoming units and/or lessons.

School, **district** and **regional leaders** might use this toolkit to:

- Internalize what high-quality, grade-level instruction looks and sounds like for the content area and how standards form the basis of that vision.
- Deepen their understanding of the grade-level standards for the content areas they coach and/or support in other ways (e.g. professional development).
- Aligning on language and resources used within the content area to be better equipped to support educators with content-specific development.

Kansas State Department of Education Mathematics Team

Below is a list of the members of the KSDE Mathematics team that helped create, review, and/or provide Professional Learning of the KSDE Mathematics Toolkit and its resources.

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Erin Cole	USD 421 - Lyndon

Four Fundamentals

In Kansas, building capacity to elevate and unlock opportunities for all students and reduce limitations involves the **Four Fundamentals**[1] at the district, school building, and classroom levels:

Structured Literacy

We provide literacy instruction aligned to the science of reading and assure teachers and admin are well-trained and knowledgeable in the elements and implementation of structured literacy.

Structured Literacy refers to the explicit, systematic, diagnostic, and cumulative approach to teaching literacy that acknowledges the value of both word recognition and oral and written language comprehension as evidenced in all grades and disciplines.

Standards Alignment

We align lessons, instruction, and materials to Kansas standards and clearly identify what students must know and be able to do. This includes interpersonal, intrapersonal, and cognitive skills in pre-K-12.

Standards Alignment refers to clearly defined student learning expectations aligned to Kansas State Standards and supported with evidence-based instruction and materials. Content, lessons, instruction, and materials should support the standards.

Balanced Assessment

We assess students for risk and standards and use data to adjust instruction. We have a deep understanding of the purpose of each assessment and how to use the data to raise achievement.

A **Balanced Assessment** system refers to a collection of varying types of assessments that provide feedback regarding instruction and student learning. It utilizes assessment as a measure for learning and of learning.

Quality Instruction

We have a culture of high expectations in our classrooms and provide each student with access to grade-level standards and content through high-quality instructional materials.

Quality Instruction refers to implementation of evidence-based lesson design that reflects high expectations, meaningful student engagement, and learning activities aligned to the Kansas State Standards. A data-driven system of differentiated support is necessary to help each student meet rigorous state standards.

1 KSDE. *Fundamentals: The foundation for school improvement in Kansas Schools.* In Kansas School Improvement Model. [PDF] https://www.ksde.gov/Portals/0/TLA/Accreditation/Rue%20Docs/Updated%20SI%20Model.pdf?ver=2025-01-17-093630-683

Standards Alignment Process

Curriculum/Standards alignment involves several key steps to ensure that educational content being taught is coherent, relevant, and effectively represents what students at each grade level should know and be able to do. It involves three-way alignment between standards, curriculum, (the intentional plan and resources for guiding students to learn what is necessary to meet the standard) and assessment (an examination of to what extent the student meets the standard).

Carefully aligning curriculum to standards is a process that takes time. It also requires intentionality, communication, and a desire to closely reflect on the effectiveness of our practices and resources. It is a process that is most successful when all teachers are fully engaged. Carefully planned professional learning and support will be needed throughout the alignment of the standards. The following steps will lead educators through the process.

LEARNING OUTCOMES

- Articulate the details of the desired learning outcomes for students.
- Build educator knowledge related to the rigor and depth necessary for students to meet grade-level expectations.

VERTICAL ALIGNMENT

- Clarify content across grade levels/ grade bands (vertical alignment), recognizing the specific expectations for the level of understanding students are expected to have at the current grade level, the grade above, and the grade below.
- Identify how skills and knowledge are sequentially built from one grade to the next.

HORIZONTAL ALIGNMENT

- Identify how/when the content standards are addressed within a grade level (horizontal alignment).
- Establish if there is a district-wide scope and instructional sequence.
- Intentionally collaborate to coordinate instruction of grade-level content across subjects.
- Review standards and the assessment blueprint.

CURRICULUM ANALYSIS

- Review of the current curriculum adopted. In review, consider any required or recommended learning objectives, content, and assessments.
- Focus on the Depth of Knowledge (DOK) and text complexity for each grade level to ensure adequate rigor.
- Identify any gaps, redundancies, or outdated resources.
- Determine Tier 1 (core) curriculum aligned with the Kansas Mathematics Standards, the Effective Math Teaching Practices, and the Standards for Mathematical Practices.

ASSESSMENTS ALIGNMENT AND TIMELINE

- Align all assessments (formative, summative) with learning outcomes.
- Develop a comprehensive timeline for delivering assessments and strategically plan for the thorough analysis of the results.
- Select continuing formative assessments that will inform instruction.

CONTENT AND SKILLS MAPPING

- Align lessons to standards by analyzing existing lessons, units, and activities to ensure they correspond to the specific Kansas Mathematics Standards.
- Identify specific gaps of content or skills that may exist and identify or create supplemental materials to fill the gaps.

MONITORING AND REVISION

- Monitor student performance continuously and adjust as necessary.
- Design deliberate plans to ensure all educators are actively engaged in analyzing and interpreting data to identify and implement necessary changes.
- Regularly review and update the curriculum based on feedback and data.

Remember that curriculum alignment is an ongoing process, and collaboration among teachers, administrators, and stakeholders is crucial for its success!

Kansas Math Standards

Teacher Guidance Document

The Kansas Mathematics Teacher Guidance Document is a comprehensive resource designed to support educators in effectively teaching mathematics by combining several of the current Kansas mathematics resources listed below and cross-referencing with the coherence map from Achieve the Core. The guidance document provides a cohesive framework that guides teachers in identifying gaps, curriculum planning, instruction, and assessment.

Kansas Mathematics Standards.[2]

The Kansas Mathematics Standards provide information on what students should know and be able to do at different grade levels in Mathematics. These standards are guidelines school districts can use to develop their mathematics curriculum.

Focus Documents[3]

Grade Level Focus (GLF) documents to inform your instructional practice there could be an approximate 70-20-10 breakdown of time across the three levels, Major, Additional, and Supporting. These documents show educators the concepts and topics that should be the focus for their grade level.

Learning Progressions[4]

Learning progressions in mathematics are sequences that outline how concepts develop and connect over time, providing a clear path for students' growth and understanding.

2 https://community.ksde.gov/math/KansasMathStandardsDocuments.aspx
3 https://community.ksde.gov/math/KansasMathStandardsDocuments/GradeLevelFOCUSDocuments.aspx
4 https://community.ksde.gov/math/KansasMathStandardsDocuments/ProgressionDocumentsforMathStandards.aspx

Flips Books[5]

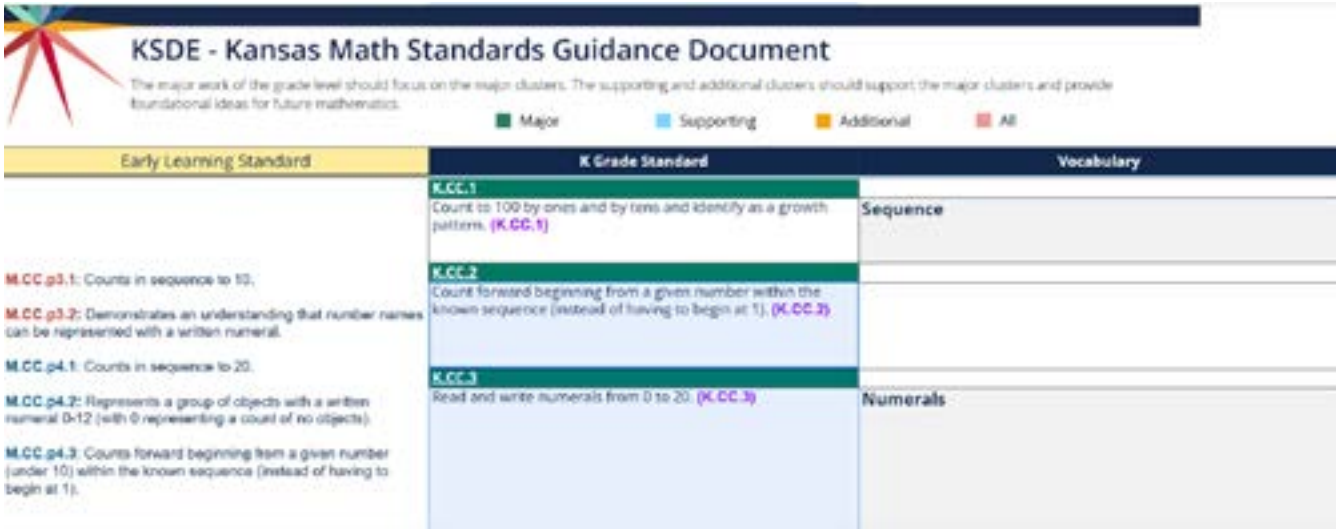
These documents serve as a starting point for teachers and administrators to engage in discussions and explore the 2017 Kansas Mathematics Standards. They are not intended to be the sole resource for implementation but rather a complementary tool. These flip books draw on a variety of reliable resources, including contributions from other state departments of education, mathematics learning progressions, and reputable organizations such as the National Council of Teachers of Mathematics and the National Council of Supervisors of Mathematics.

Student Glossary[6]

These resources outline key mathematical terms for students at various grade levels according to the Kansas Mathematics Standards. **Note:** This document does not meet the totality of mathematical vocabulary that students use. As the KSDE Math Team works to update this list, please share recommendations/changes with Jennifer Hamlet at Jennifer.Hamlet@ksde.gov.

Kansas Math Teacher Guidance Document Instructional Video[7] – Click to watch an instructional video on how to use the Kansas Math Teacher Guidance Document.

Kansas Math Teacher Guidance Document[8] – Click to download



5 https://community.ksde.gov/math/KansasMathStandardsDocuments/MathematicsFlipBooks.aspx
6 https://community.ksde.gov/math/KansasMathStandardsDocuments/StudentGlossary.aspx
7 https://drive.google.com/file/d/1P2ugH1QM3_QLGOnZPothsPs_6VZ-79-V/view
8 https://docs.google.com/spreadsheets/d/1TbrV25jszaalxt3MSpLj_qgoqR74aOxTUwL5O-d-x60/edit?gid=83082156#gid=83082156

Depth of Knowledge

The Depth of Knowledge (DOK) framework, developed by Norman Webb, categorizes the cognitive complexity required for understanding and applying content. When applied to mathematics, it helps to understand the levels of thinking needed for different tasks, from basic recall to complex problem-solving. The DOK levels for assessment questions on the Kansas State Math Summative Assessment will range from levels 1 to 3.

DOK Levels in Mathematics Graphic [9]- Infographic for concise examples of Depth of Knowledge through the mathematical lens.

Hess Cognitive Rigor Matrix [10]- Infographic.

Open Middle Math DOK Matrices[11] – Click on the link for the various grade level matrices.

DOK Level 1: Recall and Reproduction

Description: This level involves basic tasks that require recall of facts, definitions, procedures, or simple mathematical calculations.

Examples:

- Solving simple arithmetic problems (e.g., 7 + 5)
- Identifying geometric shapes
- Defining terms like “perimeter” or “radius”
- Memorizing multiplication tables

DOK Level 2: Skills and Concepts

Description: This level requires the application of skills and concepts. It involves some complexity in understanding, such as making connections between ideas, interpreting information, or performing routine procedures with more than one step.

Examples:

- Solving multi-step word problems
- Identifying patterns or relationships (e.g., even/odd numbers)
- Using formulas to solve area, volume, or perimeter problems
- Graphing linear equations

9 https://drive.google.com/file/d/1fJYGlvCWOlXtgEsXTgN79jbJup0yE_Vg/view

10 https://www.karin-hess.com/_files/ugd/5e86bd_db128ad5d1a44f549bc5cc12c15b9799.pdf

11 https://robertkaplinsky.com/open-middle-math-depth-of-knowledge-matrices/

DOK Level 3: Strategic Thinking

Description: This level requires reasoning, planning, and abstract thinking. The problems are more complex, and students are expected to apply their knowledge in new or unfamiliar situations.

Examples:

- Developing and justifying a mathematical argument or proof
- Solving multi-step problems that involve higher-order reasoning (e.g., solving systems of equations with multiple variables)
- Using algebra to solve real-world problems with multiple variables
- Explaining and applying concepts like probability or functions in non-routine ways

DOK Level 4: Extended Thinking

Description: This level involves higher-order thinking with tasks that require extensive planning, reasoning, and research. Problems are often complex and require integrating multiple concepts, strategies, and methods over time.

Examples:

- Designing a mathematical model for a real-world problem
- Investigating complex problems that require interdisciplinary thinking
- Conducting a research project that includes data collection, analysis, and interpretation
- Creating a new mathematical formula or proof through synthesis of existing knowledge

Unpacking 2017 Mathematics Standards Alignment

Unpacking a standard is essential for teaching because it allows educators to fully understand the expectations and objectives outlined in the standard. By breaking it down into specific skills, concepts, and learning outcomes, teachers can plan more targeted and effective instruction. This process ensures alignment between what is taught, how it is taught, and how students are assessed, ultimately supporting student mastery of the standard. See the steps below for guidance about how to unpack standards.

Step 1: Read the standard in its entirety

- What are the concurrent[12] standards taught?
- Is it major, supporting, or additional standard?

Step 2: Create a chart of what students need to KNOW and DO

- KNOW = content or nouns
- DO = action or verbs
- Determine how the standard is more conceptual[12], procedural[12], or application[12].

Step 3: Evaluate the alignment of the standard

- What is the horizontal alignment[12]?
- What is the vertical alignment[12]?
- Which mathematical practice best supports this standard?

Step 4: Identify the key vocabulary

- What is the key vocabulary?
- How should the key vocabulary for this standard be taught?
- What notation is introduced/used in this standard?

Step 5: Explanation of the standards

- Explain the meaning of the standard using one's own words.
- What are some misconceptions students might have?
- What are some example questions or problems that students might encounter

12 See Glossary on page 14 and 15

Unpacking Template

Download the ready to use template to assist educators in the unpacking process[13]

Below is an example of the document.

Kansas Math Standards Unpacking Template		
GRADE	DOMAIN	
CLUSTER:		
GRADE LEVEL STANDARD:		
WHAT DO THE STUDENTS NEED TO KNOW?	WHAT DO THE STUDENTS NEED TO BE ABLE TO DO?	ASPECTS OF RIGOR Conceptual Procedural Application
KEY VOCABULARY		MISCONCEPTIONS

13 https://docs.google.com/document/d/1v5UK_UEHb6tKkclgxRlU8nUB9TGYnHEP/edit#heading=h.gjdgxs

Unpacking the Standards for Mathematical Practice

The Standards for Mathematical Practice, SMP, describe aspects of proficiency that mathematics educators at all levels should develop in their students. These practices are grounded in key "processes and proficiencies" in mathematics education. The first set includes the NCTM process standards problem solving, reasoning and proof, communication, representation, and connections. The second set, from the National Research Council's Adding It Up report, includes adaptive reasoning, strategic competence, conceptual understanding, procedural fluency, and productive disposition. Together, these frameworks provide a comprehensive foundation for developing well-rounded mathematical proficiency, ensuring students not only master content but also develop the skills and mindset needed to apply mathematics effectively and meaningfully in diverse contexts.

The following document summarizes each SMP based on various grade bands: PK-2nd, 3rd-5th, 6th-8th, and 9th-12th.

Unpacking the Standards for Mathematical Practice [14]

Access the complete unpacking of the SMPs document by downloading the file. It will look similar to the sample below.

UNPACKING THE STANDARDS FOR MATHEMATICAL PRACTICE

Grades 3 - 5

1. Make sense of problems and persevere in solving them

Mathematically proficient elementary students explain to themselves and others the meaning of a problem, look for entry points to begin work on the problem, and plan and choose a solution pathway. As they work, they continually ask themselves, "Does this make sense?" When they find that their solution pathway does not make sense, they look for another pathway that does. They may also consider simpler forms of the original problem.

Example: When solving a problem involving multi-digit numbers, students might first consider similar problems that involve multiples of ten or one hundred.

2. Reason abstractly and quantitatively

Mathematically proficient elementary students make sense of quantities and their relationships in problem situations. They contextualize quantities and operations by using images or stories. They interpret symbols as having meaning, not just as directions to carry out a procedure. They can then interpret the solutions to operations in terms of the context.

Example: Students might visualize the expression 40–26 by thinking, "If I have 26 marbles and Marie has 40, how many more do I need to have as many as Marie?" Then, in that context, they may think, "4 more will get me to a total of 30, and then 10 more will get me to 40, so the answer is 14."

14 https://drive.google.com/file/d/1P93FErJxzprqABnnuNkYsQTwkaXBUAvz/view

Glossary of Terms

Alignment: The process of ensuring that educational content, assessments, and teaching practices are in harmony with established standards.

Application: The process of using knowledge, skills, or concepts learned in one context to solve problems or perform tasks in real-world or novel situations.

Assessment: A tool or method used to evaluate student learning and understanding in relation to the standards.

Cohesion: The quality of being logically connected and consistent in teaching practices, curriculum, and assessments within the educational framework.

Conceptual understanding: The comprehension of underlying principles and relationships within a subject, enabling learners to connect ideas and apply them in various contexts

Concurrent Standards: Multiple learning objectives or standards taught and assessed simultaneously, emphasizing the interconnectedness of skills and concepts across disciplines or within a subject.

Curriculum: The structured framework of standards, content, learning objectives, materials, and instructional strategies designed to guide teaching and learning in a specific subject or grade level.

Depth of Knowledge (DOK): A framework that categorizes the complexity of tasks required for understanding and applying knowledge in various contexts.

Evidence-based Instruction: Teaching methods that are supported by research and proven to be effective in improving student learning.

Formative Assessment: Assessments conducted during the learning process to monitor student understanding and inform instruction.

Gaps: Areas where student knowledge or skills are lacking in relation to curriculum expectations.

Horizontal Alignment: The coordination of content standards within the same grade level, ensuring that all subjects are interconnected and address the same learning goals.

Instruction: The methods and practices used by educators to facilitate student learning and understanding of the curriculum.

Misconception: An incorrect understanding or interpretation of a concept that can hinder student learning and progress.

Procedural fluency: The ability to accurately, efficiently, and flexibly perform mathematical or subject-specific procedures while understanding when and how to apply them.

Professional Learning: Ongoing training and development for educators to enhance their teaching skills and improve student outcomes.

Progressions: Documents describing the progression of a topic across a number of grade levels, informed both by educational research and the structure of mathematics.

Structured Literacy: A systematic approach to teaching literacy that integrates word recognition and comprehension skills.

Summative Assessment: Evaluations that occur at the end of an instructional period to measure student learning against standards.

Vertical Alignment: The connection of content and skills taught across different grade levels to ensure a coherent progression of learning.

Resources

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https://www.doe.mass.edu/frameworks/math/2017-06qrg-smp-6-8.pdf

Quick Reference Guide: Standards for Mathematical Practice High School. (2017).
https://www.doe.mass.edu/frameworks/math/2017-06qrg-smp-pk-2.pdf

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- Academic preparation,
- Cognitive preparation,
- Technical skills,
- Employability skills and
- Civic engagement

to be successful in postsecondary education, in the attainment of an industry recognized certification or in the workforce, without the need for remediation.

OUTCOMES

- Social-emotional growth
- Kindergarten readiness
- Individual Plan of Study
- Civic engagement
- Academically prepared for postsecondary
- High school graduation
- Postsecondary success

Kansans CAN

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To prepare Kansas students for lifelong success through rigorous, quality academic instruction, career training and character development according to each student's gifts and talents.

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Kansas leads the world in the success of each student.

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Kansas leads the world in the success of each student.

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