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 **Instructional Resources Alignment Rubric:**

***Kentucky Academic Standards for Mathematics***

**Rationale**

Curriculum design and review is a continuous process. Flexibility when determining the detail of the design and shape of the curriculum is given to each school in Kentucky so the teaching and learning is meaningful and beneficial to the particular communities of learners. The design of each district/school’s curriculum allows teachers to make interpretations in response to the particular needs, interests and talents of individuals and groups of students. While Kentucky’s Academic Standards define the minimum content that must be taught, the standards are not a regimented curriculum.

In Kentucky, traditionally, districts have created a range of curriculum resources and components, ranging from pacing guides and maps to very detailed plans outlining specific instructional resources (books, articles, manipulatives) as well as specific common assessments for units and courses.

While the standards do define the content (or the WHAT), they do not prescribe HOW to teach or assess them. Instead, that is the function of the curriculum. Likewise, what is published on the KDE webpage as Kentucky’s Academic Standards define the WHAT. Local districts need to define the HOW.

Since the standards are incorporated into state regulation, all standards must be addressed in an aligned curriculum.

**Purpose of this rubric**

The Instructional Resources Alignment Rubric is meant to guide districts and schools in assessing existing or purchasing new instructional resources to determine what revisions may be needed to ensure alignment to the current *Kentucky Academic Standards (KAS) for Mathematics*.

Prior to conducting this review the evaluator or evaluating team should assemble all of the resources necessary for the review. It is essential for evaluators to have resources for all courses covered by the program in question, as some criteria cannot be rated without having access to each course. In addition, each evaluator should have a reference copy of the Kentucky Academic Standards for Mathematics.

Before conducting the review, it is important to develop a protocol for process. The protocol should include having evaluators study the Instructional Resources Alignment Rubric. Additionally, it will also be helpful for evaluators to get a sense of the overall program before beginning the process.

**Information Provided by the Publisher**

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# Overall Recommendation (based on specific evidence from pages 4-13)

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| **Overall Strengths:** | **Overall Weaknesses** | **Comments** |
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**Recommended?** \_\_\_\_\_ YES \_\_\_\_\_ NO

**Criteria for Evaluation**

These are the criteria on which the instructional resource will be evaluated:

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| **Part A: Non-Negotiable (NN)** | **Part B: Alignment Criterion (AC)** |
| * **NN 1: Focus on Grade-Level Content**
 | * **AC 1: Target of the Standard and Cognitive Complexity**

**AC 2: Standards for Mathematical Practice****AC 3: Access to Standards for All Learners**  |

| **Part A:** **Non-Negotiables (NN)** |
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| **Non-Negotiable 1: Focus on Grade-Level Content**Instructional resources must focus coherently on the content standards in a way that is consistent with the *KAS for Mathematics.*  |

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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
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| **NN 1A: In any single grade/course, instructional time is spent on grade-level standards.** |

Familiarize yourself with the grade level standards. Evaluate the table of contents and any pacing guides. Do not stop there; also evaluate units, chapters, lessons, assignments and assessments. Evaluate both student and teacher resources. | For example:* Symmetry of shapes, including line/reflection symmetry, rotational symmetry. (Introduced in the KAS in grade 4)
* Statistical distributions, including center, variation, clumping, outliers, mean, median, mode, range, quartiles; and statistical association or trends, including two-way tables, bivariate measurement data, scatter plots, trend line, line of best fit, correlation. (Introduced in the KAS in grade 6)
* Probability, including chance, likely outcomes, probability models. (Introduced in the KAS in grade 7)
* Coordinate transformations or formal definition of congruence or similarity. (Introduced in the KAS in grade 8)
* In a Geometry course, student work should involve significant work with applications, modeling and/or problems that require the use of algebra skills, such as algebraic geometry problems in a coordinate setting or problems of measurement involving unknown quantities.
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
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| **NN 1B: Instructional resources follow a progression consistent with that outlined within the *KAS for Mathematics*. Content from previous or future grades does not unduly interfere with on-grade-level content.** |

Evaluate the table of contents and any pacing guides. Evaluate units, chapters and lessons in student and teacher resources to ensure that the content progressions in the resources follow the Coherence/Vertical Alignment within the *KAS for Mathematics*. Consider how off-grade-level content, if present, is addressed.Check to see that every cluster in the grade-level standards is reflected in the resources. If any grade-level clusters are absent for the grade being evaluated, then NN 1B is Not Met.Any purposeful discrepancies should enhance the required learning in each grade, not interfere with or displace grade-level content. Check whether these lessons are identified as such. | Examples might include: * Reviewing K-5 resources to determine whether data displays are treated as an occasion for solving grade-level word problems using the four operations.
* Reviewing Grade 7 resources to determine whether opportunities to use probability to support ratios, proportions and percentages are taken advantage of.
* In high school courses, determining if there are problems at a level of sophistication appropriate to high school (beyond mere review of middle school topics) that involve the application of topics from grades 6–8, such as basic function concepts (e.g., by interpreting the features of a graph in the context of an applied problem).
* Does the instructional resource provide opportunities for project based learning or performance based activities?

For high school courses, check to see that all the appropriate standards are represented in the resource. (See the [High School Mathematics Matrix Standards by Courses 2019-2020 and Beyond](https://education.ky.gov/curriculum/conpro/Math/Documents/HS_Mathematics_Matrix_Standards_by_Course_19-20_and_Beyond.pdf.) for support with this.) This resource illustrates the standards covered in Algebra 1 and Geometry and the additional standards which then would need to be covered in the third and/or fourth courses. |  |

| **Scoring NN 1A:** □ Strong Evidence □ Moderate Evidence □ Little or No Evidence □ NA**Scoring NN 1B:** □ Strong Evidence □ Moderate Evidence □ Little or No Evidence □ NA |
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**\*Note:** These criteria represent the minimum non-negotiables related to providing Kentucky students with high quality instructional resources. If Non-Negotiable 1 is not met, reviewers should consider whether there is value in proceeding through the remaining elements of the rubric.

| **Part B:** **Alignment Criterion (AC)** |
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| **Alignment Criterion 1: Target of the Standard and Cognitive Complexity** Instructional resources must reflect the balance among conceptual understanding, procedural skill/fluency and application within mathematics to help students meet the expectations of the *KAS for Mathematics*. |
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
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| **AC 1A: Instructional** resources support the development of students’ conceptual understanding, especially where called for in specific content standards or cluster headings. |

From [page 7 of the *KAS for Mathematics*](https://education.ky.gov/curriculum/standards/kyacadstand/Documents/Kentucky_Academic_Standards_Mathematics.pdf#page=7), **conceptual understanding** refers to understanding mathematical concepts, operations and relations. **Conceptual understanding** is more than knowing isolated facts and methods; students should be able to make sense of why a mathematical idea is important and the kinds of contexts in which it is useful. **Conceptual understanding** allows students to connect prior knowledge to new ideas and concepts.Identify standards for the grade/course being evaluated that relate specifically to conceptual understanding.  | Examples might include determining, * Where the standards explicitly require students to understand concepts, do the assignments that students work on build that understanding, and do assessment tasks reveal whether students understand the mathematics in question?
* Do the instructional resources feature high-quality conceptual problems and conceptual discussion questions?
* Do the instructional resources feature opportunities to identify correspondences across mathematical representations (including but not limited to charts, graphs, diagrams, number lines, and other illustrations, etc.)? When manipulatives are used, are they faithful representations of the mathematical objects they represent? Are manipulatives connected to written methods?
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
| Evaluate lessons, assignments and assessments, paying attention to work aligned to standards that explicitly call for understanding or interpreting. Examine instructional resources to ensure learning experiences offer a balance across the levels of [cognitive complexity](https://www.achieve.org/files/Mathematics%20Cognitive%20Complexity%20Framework_Final_92619.pdf#page=6) within conceptual understanding. |  |  |
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| **AC 1B**: **Instructional** resources are designed so that students attain the procedural skills and fluencies required by the *KAS for Mathematics*. |

From [page 7 of the *KAS for Mathematics*](https://education.ky.gov/curriculum/standards/kyacadstand/Documents/Kentucky_Academic_Standards_Mathematics.pdf#page=7), p**rocedural skill and fluency** is the ability to apply procedures accurately, efficiently, flexibly and appropriately. It requires speed and accuracy in calculation while giving students opportunities to practice basic skills. Students’ ability to solve more complex application and modeling tasks is dependent on **procedural skill and fluency** (National Council Teachers of Mathematics, 2014). Identify standards for the grade/course being evaluated that relate specifically to procedural skill and fluency.Evaluate lessons, assignments and assessments for indicators of the development of  | For additional support, see [Fluency in Mathematics](https://education.ky.gov/curriculum/standards/kyacadstand/Documents/Kentucky_Academic_Standards_Mathematics.pdf#page=8) and [Table 6: Fluency Standards across All Grade Levels](https://education.ky.gov/curriculum/standards/kyacadstand/Documents/Kentucky_Academic_Standards_Mathematics.pdf#page=258) in the *KAS for Mathematics*.Examples might include determining: * Is progress toward procedural skill and fluency interwoven with students’ developing conceptual understanding of the operations in question?
* Do the resources in provide repeated practice toward attainment of fluency standards?
* Do assessment tasks reveal whether students have the fluencies the standards require?
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
| procedural skill and fluency is supported by conceptual understanding. Examine instructional resources to ensure learning experiences offer a balance across the levels of [cognitive complexity](https://www.achieve.org/files/Mathematics%20Cognitive%20Complexity%20Framework_Final_92619.pdf#page=6) within procedural skill/fluency. |  |  |
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| AC 1C: Instructional resources are designed so that students apply mathematics in relevant and meaningful ways as required by the *KAS for Mathematics*. |

From [page 7 of the *KAS for Mathematics*](https://education.ky.gov/curriculum/standards/kyacadstand/Documents/Kentucky_Academic_Standards_Mathematics.pdf#page=7), A**pplication** provides a valuable context for learning and the opportunity to solve problems in a relevant and a meaningful way. It is through real-world **application** that students learn to select an efficient method to find a solution, determine whether the solution(s) makes sense by reasoning and develop critical thinking skills.Identify standards from within domains and clusters for the grade/course being evaluated that relate specifically to application.Evaluate lessons, assignments and assessments for opportunities to apply learned concepts in an authentic way.  | Examples might include determining: * Are there single- and multi-step contextual problems that develop the mathematics of the grade/course, afford opportunities for practice, and engage students in problem solving?
	+ For example: In grades K-5, utilize [Appendix A](https://education.ky.gov/curriculum/standards/kyacadstand/Documents/Kentucky_Academic_Standards_Mathematics.pdf#page=254) in the *KAS for Mathematics* to ensure that each type of application problem is addressed.
* Do application problems particularly stress applying the domains and clusters of the grade/course?
* Are there ample opportunities for students to engage in modeling? Do resources require students to use both individual parts of the modeling cycle as well as the full modeling cycle? (See [The Modeling Process](https://education.ky.gov/curriculum/standards/kyacadstand/Documents/Kentucky_Academic_Standards_Mathematics.pdf#page=8) in the *KAS for Mathematics).*
	+ Does modeling build slowly across K–8, with applications that are relatively simple in earlier grades and when students are encountering new content?
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
| Examine instructional resources to ensure learning experiences offer a balance across the levels of [cognitive complexity](https://www.achieve.org/files/Mathematics%20Cognitive%20Complexity%20Framework_Final_92619.pdf#page=6) within application. | * + In grades 6–8, do the problems begin to provide opportunities for students to make their own assumptions or simplifications in order to model a situation mathematically?
	+ In high school, do materials require students to use both individual parts of the modeling cycle as well as the full modeling cycle?
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| **Scoring AC 1A:** □ Strong Evidence □ Moderate Evidence □ Little or No Evidence □ NA**Scoring AC 1B:** □ Strong Evidence □ Moderate Evidence □ Little or No Evidence □ NA**Scoring AC 1C:** □ Strong Evidence □ Moderate Evidence □ Little or No Evidence □ NA |
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| **Alignment Criterion 2: Standards for Mathematical Practice** Instructional resources must demonstrate authentic connections between content standards and practice standards. |
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
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| **AC 2A: Instructional r**esources address the practice standards in such a way as to enrich the content of the grade/course; practice standards strengthen learning around the content standards instead of detracting from it, in both teacher and student resources. |

Descriptions of each Standard for Mathematical Practice can be found on [pages 12-15 of the *KAS for Mathematics.*](https://education.ky.gov/curriculum/standards/kyacadstand/Documents/Kentucky_Academic_Standards_Mathematics.pdf#page=12) | Examples might include determining if, * in grades K–5, students using the instructional resources are supported to look for and express regularity in repeated reasoning about the addition table, the multiplication table, the properties of operations, the relationship between addition and subtraction or multiplication and division and the place value system;
* in grades 6–8, students using the resources are supported to look for and express
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
| See [Engaging the SMPs: Look Fors & Questions Stems](https://education.ky.gov/curriculum/standards/kyacadstand/Documents/SMP_Look_Fors_and_Question_Stems.pdf) for additional support as the resource provides guidance on ways teachers can design instruction to allow students to engage in the standards for mathematical practices, including Student Look-fors, Teacher Look-fors and potential Question Stems for each of the eight mathematical practices.Evaluate teacher and student instructional resources for explicit support embedded to make connections between the practice standards and the content standards. | regularity in repeated reasoning about proportional relationships and linear functions.* In high school, students use regularity in repeated reasoning to illuminate formal algebra as well as functions, particularly recursive definitions of functions.
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| **AC 2B:** Tasks and assessments of student learning are designed to provide evidence of students’ proficiency in the Standards for Mathematical Practice. |

Evaluate the variety of tasks and assessments provided (e.g., observation checklists, portfolio recommendations, performance tasks, tests and quizzes) to see whether students have opportunities to demonstrate proficiency with each of the Standards for Mathematical Practice over the course of the year. | Examples might include determining* Do the instructional resources support students in constructing viable arguments and critiquing the arguments of others concerning grade-level mathematics that is detailed in the content standards? (Read [Standard for Mathematical Practice 3](https://education.ky.gov/curriculum/standards/kyacadstand/Documents/Kentucky_Academic_Standards_Mathematics.pdf#page=13).)
* Do the instructional resources support students in producing not only answers and solutions, but also, in a grade-appropriate way, arguments, explanations, diagrams, mathematical models, etc.?
* Do the instructional resources explicitly attend to the specialized language of mathematics? Is the language of argument, problem solving, and mathematical explanations taught rather than assumed?
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
|  | * + For example, are students supported in basing arguments on definitions using the method of providing a counterexample or recognizing that examples alone do not establish a general statement?
* Do the instructional resources contain embedded activities (or extensions) that emphasize use of technology for problem solving?
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| **Scoring AC 2A:** □ Strong Evidence □ Moderate Evidence □ Little or No Evidence □ NA**Scoring AC 2B:** □ Strong Evidence □ Moderate Evidence □ Little or No Evidence □ NA |
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| **Alignment Criterion 3: Access to Standards for All Learners** Instructional resources must provide supports to help ensure equitable access across all student populations.  |
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
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| **AC 3A:** **Support for multilingual learners and other special populations is thoughtful and helps those students meet the same standards as all other students. The language in which problems are posed is carefully considered**. |

Evaluate teacher and student resources, paying attention to supports offered for special populations. Supports provided should ensure that all students are engaging with grade-level standards.  | * For example, do supports for multilingual learners include attention to and analysis of the language of mathematical problems?
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
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| **AC 3B:** Design of lessons attends to the needs of a variety of learners. Instructional r**esources provide appropriate level and type of scaffolding, differentiation, intervention and support for a broad range of learners with gradual removal of supports, when needed, to allow students to demonstrate their mathematical understanding independently.** |

Evaluate teacher resources, noting instructional approaches suggested for whole class and differentiated lessons and activities. Evaluate teacher and student resources, paying attention to whether the instructional resources provide strategies for differentiation that will lead all learners to engage with on-grade-level content.  | * Examples might include using multiple representations, deconstructing/reconstructing the language of problems, providing suggestions for addressing common student difficulties. (NOTE: These examples are not all required and there may be different approaches across different developers.)
* For example, do resources offer suggestions for distinguishing between difficulties in conceptual understanding versus developing English proficiency, along with suggestions for supporting learners in both circumstances?
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| **AC 3C: The instructional resources embeds to connections to literacy, supporting all learners in accessing the content.** |

Evaluate how well teacher and student resources provide opportunities to integrate literacy. | Examples might include determining whether the instructional resources: * Employ a variety of reading levels and is grade/level appropriate.
* Provide opportunities for summarizing, reviewing, and reinforcing vocabulary skills and concepts at multiple levels of difficulty for a variety of learning styles.
* Provide opportunity to integrate reading and writing.
* Use vocabulary that is age and content appropriate.
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| **How to find the evidence:** | **Sample Considerations** | **Evidence** |
|  | * Focus on critical vocabulary vs. extensive lists.
* Identify key vocabulary through definitions in both text and glossary.
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| **Scoring AC 3A:** □ Strong Evidence □ Moderate Evidence □ Little or No Evidence □ NA**Scoring AC 3B:** □ Strong Evidence □ Moderate Evidence □ Little or No Evidence □ NA**Scoring AC 3C:** □ Strong Evidence □ Moderate Evidence □ Little or No Evidence □ NA |
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\*Parts A and B of the Evaluation Tool for Basal Instructional Resources was adapted from the Instructional Resources Evaluation Tool (IMET) from Student Achievement Partners. [**IMET for K-12 Mathematics**](https://achievethecore.org/page/1946/instructional-materials-evaluation-tool)