FY23 MAF Awarded Application.
KDE provides samples of previously awarded applications to assist writers. However, no application is perfect and all samples contain errors or some areas of weakness.
Please note that the RFA has changed slightly for FY24.

MAF Mini Grant RFA Application Cover Page

DISTRICT NAME	Harrison County	
DISTRICT ADDRESS	308 Webster Avenue Cynthiana, KY 41031	
SCHOOL NAME	Northside Elementary School	
SCHOOL ADDRESS	2415 US HWY 27 North Cynthiana, KY 41031	
PRINCIPAL NAME	Joshua Powers	Phone: 859-234-7114 Email: josh.powers@harrison.kyschools.us
SUPERINTENDENT	Harry Burchett	Phone:859-234-7110 Email: harry.burchett@harrison.kyschools.us
DISTRICT LEVEL PERSONNEL (Supervisor/Director of Curriculum/Instruction)	Jenny Lynn Hatter	Phone: 859-234-7110 Email:jennylynn.hatter@harrison.kyschools.us
GRANT CONTACT/WRITER	Andrea Pope	Phone: 859-234-7115 Email: andrea.pope@harrison.kyschools.us

I assure the attached application contains accurate information. I understand grant applications with incorrect or falsified information will not be considered for review or will be revoked once awarded. I assure the application has been reviewed and approved for implementation by all shareholders and the district and school will comply with all requirements, both technical and programmatic, pertaining to the grant. Failure to continuously meet compliance requirements and deadlines could result in partial or complete loss of funding of grant and may impact future funding.

Assurance of Commitment from the Superintendent, District Level Personnel and Principal

Harry S Burchett — Superintendent — Date: 10-7-2022

Jenny Lynn Varner Hatter — District Level Personnel — Date: 10-7-22

Principal — Date: 10-7-2022

Table of Contents

Question 1: KPREP Data and Needs Assessment

KPREP data indicates that an alarming number of students in our school scored in the novice and apprentice range, showing **students are not responding to tier one instruction**. The table below demonstrates that this trend was true in 2021, as well as 2018 and 2019, prior to hybrid learning models. The high number of students not reaching proficiency in mathematics further illustrates our **tier one core instruction has not been effective.**

Mathematics KPREP/KSA* Data: % Novice, Apprentice, and Combined									
	2018 KPREP			2019 KPREP			2021 KSA		
	Novice	Apprentice	Total	Novice	Apprentice	Total	Novice	Apprentice	Total
Grade 3	26%	46%	**72%**	28%	31%	**59%**	**Data Suppressed****		
Grade 4	34%	28%	**62%**	30%	24%	**54%**	47**%**	30%	**77%**
Grade 5	5%	32%	**37%**	26%	39%	**65%**	**Data Suppressed****		

*Assessment not administered in 2020 **See MAP score correlations below

The **percentage of students who reached proficiency in mathematics is critically low**. In 2021, only 23% of fourth grade students met this goal. The number of students who reached proficiency in third and fifth grades was so few that the data has been suppressed, meaning the data cannot be reported. The following table displays results from our universal screener, NWEA MAP (Measures of Academic Progress), which validates the suppressed data. The majority of students scored **below the 60th percentile**, with few to no students scoring above the 80th percentile. These points clearly demonstrate that **modifications must be made to our tier one instruction**.

Mathematics MAP Data: Spring 2021					
	1st-20th Percentile	21st-40th Percentile	41st-60th Percentile	61st-80th Percentile	>80th Percentile
Grade 3	34%	29%	17%	17%	3%
Grade 4	52%	19%	19%	5%	5%
Grade 5	47%	16%	25%	13%	0%

Our youngest learners are also **struggling to respond to tier 1 core instruction**, as evidenced by MAP results. The table below shows high percentages of students **scoring in the lowest percentiles** in the spring of 2021. This further exemplifies the **need for improvement in tier one core instruction in all grades, kindergarten through fifth grade**.

Mathematics MAP Data: Spring 2021					
	1st-20th Percentile	21st-40th Percentile	41st-60th Percentile	61st-80th Percentile	>80th Percentile
Kindergarten	47%	25%	9%	15%	4%
Grade 1	21%	47%	15%	9%	9%
Grade 2	42%	27%	16%	11%	4%

To **address the mathematics needs of our students**, implementation of new, high-quality instructional resources for tier one core instruction is warranted. Our current program, *Envision 2.0*, received the lowest ratings possible from EdReports.org. Furthermore, as our KPREP/KSA and MAP data explicitly display, our students have not responded appropriately to this program over eight years of implementation. Funding from the Mathematics Achievement Fund Mini Grant will enable our school to

incorporate high-quality instructional resources to strengthen tier one core instruction.

Illustrative Mathematics will provide all students with rich, engaging, equitable learning experiences that deepen understanding of mathematical concepts, build fluency alongside conceptual understanding, and develop new understandings of mathematical concepts through a problem-based approach. The professional development associated with *Illustrative Mathematics* will be key for successful implementation, providing teachers with the understandings, tools, and strategies necessary to elevate student proficiency and implement best practices for mathematics instruction. This professional learning, combined with strong, high-quality instructional resources, will **allow our school to build a robust framework for tier one instruction,** thus increasing student achievement in mathematics.

Question 2: Shared Vision for Mathematics Instruction

At Northside Elementary School, we believe that all students deserve equitable learning experiences aligned with the *Kentucky Academic Standards for Mathematics*. We strive to provide the strongest mathematics teaching and learning possible for all tiers of instruction, addressing each aspect of rigor with equal intensity: conceptual understanding, procedural skills and fluency, and application. Teachers demonstrate understanding of the importance of engaging students in mathematical thinking by providing learning experiences that target engagement in the eight *Standards for Mathematical Practice* alongside content standards. We equip students with content knowledge, critical thinking skills, and problem-solving tools that prepare all students for the demands of both college and career, and facilitate their ability to apply mathematics in real world settings.

At Northside Elementary School, we incorporate an evidence-based, student-centered approach to instruction, providing learning experiences that elicit development of students' own understandings and reasonings about mathematics through rich, problem-based tasks. Van de Walle (2006) states, "*The single most important principle for improving the teaching of mathematics is to allow the subject of mathematics to be problematic for students. When students engage in well-chosen problem-based tasks and focus on the solution methods, what results is new understanding of the mathematics embedded in the task."* Additional research supports implementation of a problem-based approach to mathematics instruction. *"Students learn mathematics as a result of solving problems. Mathematical ideas are outcomes of the problem-solving experience, rather than the elements that must be*

taught before problem solving " (Heibert et al., 1996). Through a problem-based approach, students make sense of the *Kentucky Academic Standards for Mathematics* and engage in the *Standards for Mathematical Practices* as teachers simultaneously implement *Mathematics Teaching Practices* (Kentucky Mathematics Innovation Practice Profile). Students develop new understandings as they productively struggle with problems and interact with peers through positive mathematics discourse.

At Northside Elementary School, we strive to create classroom environments that foster productive mathematics learning. We believe that all students are mathematicians, capable of deep understanding of mathematics. We hold high expectations for our students, and convey confidence in each student as a "doer of math." Every classroom in our school is a safe place for mathematics learning where all students are valued members of the learning community. We promote a culture of mathematics learning where mistakes are valued, challenges are embraced, and students continually reflect on their growth as mathematicians. We encourage positive student dispositions about mathematics by making mathematical experiences relevant, meaningful, and enjoyable. In our classrooms,all students understand and appreciate mathematics.

At Northside Elementary School, all teachers have the resources necessary to provide high-quality mathematics instruction for tier one, tier two, and tier three. Throughout the school year, teachers engage in job-embedded coaching, mentoring, collaboration, and observations with feedback to improve mathematics teaching and learning. Teachers are actively involved in collaborative interaction through

participation in professional learning communities. We offer high-quality professional learning opportunities to deepen teachers' understanding of:

- evidence-based instructional practices
- *Kentucky Academic Standards for Mathematics*
- *Standards for Mathematical Practice*
- *Mathematics Teaching Practices*

Teachers apply their knowledge of these best practices and the *Kentucky Academic Standards for Mathematics* to increase student proficiency in mathematics.

For FY24, the rubric is Part 5 of the application and should be submitted as a seperate 3rd attachment.

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Question 3: Instructional Resources Alignment Rubric

Kentucky Department of EDUCATION

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

ISBN: Grade K: 978-1-7924-6274-0; Grade 1: 978-1-7924-6275-7; Grade 2: 978-1-7924-6276-4; Grade 3: 978-1-7924-6277-1; Grade 4: 978-1-7924-6278-8; Grade 5: 978-1-7924-6279-5
Publisher: Kendall Hunt Publishing Company
Title: Kendall Hunt's Illustrative Math
Type: core mathematics curriculum
Electronic or Print: electronic and print
Author: Illustrative Mathematics

Copyright: 2021
Edition: 1
Readability: on or below-grade level
Course: K-5
Grade(s): K-5
Teacher Edition ISBN: Grade K: 978-1-7924-6287-0; Grade 1: 978-1-7924-6289-4; Grade 2: 978-1-7924-6290-0; Grade 3: 978-1-7924-6291-7; Grade 4: 978-1-7924-6292-4; Grade 5: 978-1-7924-6293-1

Information Provided by the School District

District: Harrison
Principal (or other Chair of SBDM): Josh Powers

School: Northside Elementary School
Evaluating SBDM Members/Committee Members: Debbie Kendall, Andrea Pope, Josh Powers, Heidi Mullins, Makayla Short

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

Overall Strengths:	Overall Weaknesses	Comments
Illustrative Mathematics is a high-quality instructional resource. ● **It is aligned with the *Kentucky Academic Standards***. *Illustrative Mathematics* is a rich, engaging core program fully attending to the intent of the focus, coherence and rigor of the mathematical content standards *and* the mathematical practice standards to foster learning for all students. ● **It is research-based and externally validated**. *Illustrative Mathematics* received top ratings from EdReports.org in all three gateways for all grade levels, K-5, earning perfect scores in the areas of Focus & Coherence and Rigor & Mathematical Practices. The problem-based instructional framework integrates what research says about how students best learn mathematics and what teaching practices support that learning. It supports all learners through a coherent progression of the mathematics based on both the standards and on research-based learning trajectories. ● **It is comprehensive to include engaging texts, problems, and assessments**. Instructional resources develop conceptual understanding of key mathematical concepts, giving attention to procedural skill and fluency, and spend sufficient time	**Assessment Follow-Up**: As noted by EdReports.com, the indicator, "*assessment system provides multiple opportunities throughout the grade, course, and/or series to determine students' learning and sufficient guidance to teachers for interpreting student performance and suggestions for follow-up,"* is only partially met. Assessments provide substantial guidance for teachers to interpret and gauge student performance of both content and practice standards, however, suggestions for following	Implementation of *Illustrative Mathematics* meets our school's mathematical needs as detailed in our needs assessment and described by our shared vision for mathematics teaching and learning. It addresses how research says students best learn mathematics, the needs of our school community, as well as the professional learning needed to empower teachers as effective instructors of mathematics. It aligns with our beliefs that all students are mathematicians who

working with engaging applications of mathematics. The three aspects of rigor are developed together and interconnected in the instructional resources in ways that support student understanding. ● **It is culturally relevant and free from bias.** Instructional resources are designed to affirm students as they build positive mathematical identities. Units and lessons begin by inviting students to use their prior knowledge, language, and culture to make sense of new mathematical concepts. Problem-solving contexts support the implementation of culturally relevant and responsive pedagogy. ● I**t is accessible for all students**. *Illustrative Mathematics* is founded on the principle that "all students, each with unique knowledge and needs, enter the mathematics community as capable learners of meaningful mathematics." Students develop new mathematical understandings by engaging in meaningful problem solving in real-world and mathematical contexts that builds upon the knowledge and experiences they bring to the classroom. During these learning experiences, teachers listen to, learn from, and support each student, and students see themselves as mathematical thinkers with worthwhile ideas and perspectives. In addition, all lessons include suggested supports to meet the varying needs of individual students, including embedded supports for students with disabilities, English learners, and extensions for students who are ready to advance deeper into the mathematics. The materials are available in both English and Spanish versions. ● **It is a rich, engaging, problem-based core program.** The problem-based design allows students to learn by doing mathematics, rather than by watching someone else do math, or being told what needs to be done. Instructional resources include structures that support students in taking risks, engaging in math discourse, productively struggling through problems, and participating in ways that make their ideas visible. Through these classroom structures, teachers have daily opportunities to learn about and leverage their students' understandings and experiences and how to position each student as a capable learner of mathematics. ● **It is centered on community building and student dispositions about mathematics.** *Illustrative Mathematics* promotes "a world where all learners know, use, and enjoy mathematics." It supports students in developing positive and productive dispositions about mathematics. Instructional time is spent building a classroom community where all students feel comfortable and have the opportunity to express their mathematical ideas and discuss them with others. Instructional routines provide opportunities for all	up with students are minimal. The school math team will work to develop a plan to address assessment follow-up with students. **Area to Supplement**: The Kindergarten cluster, *identify coins by name*, which includes one *KAS* standard (KY.K.MD.4, *recognize and identify coins by name (penny, nickel, dime, quarter*), will need to be addressed through supplemental material. This supplementation can be as simple as incorporating a quick routine into daily instruction that exposes students to coins and focuses on coin names. The school math team, along with Kindergarten teachers, will work to develop a plan to address this standard.	are capable of high-quality work and deep understanding of mathematical concepts.

students to engage in mathematical discourse and contribute to mathematical conversations as valued members of the classroom community. ● **Student learning experiences include purposeful representations of mathematics.** Students use representations to develop concrete understandings, and move through a progression leading to representations that are more abstract. Students are encouraged to use representations that make sense to them, and are given opportunities to make connections between different representations and the concepts and procedures they represent. ● **Learning experiences and assessments include a balance across all levels of cognitive complexity**. A balance of the levels of cognitive complexity within conceptual understanding, procedural skill/fluency, and application is evident in learning experiences and assessment tasks. ● **It includes a strong professional learning component for teachers, administrators, coaches, and support staff.** The shift to a problem-based mathematics curriculum is significant. The professional learning associated with the curriculum provides teachers with the understandings, tools, and strategies for this shift in practice. Teacher effectiveness is enhanced through development of skills and confidence to implement standards-aligned instruction, ensure curricular coherence within and across grade levels, facilitate meaningful discussions, and implement engaging and effective instructional routines. Professional learning is ongoing in each unit through *Professional Learning Community* activities, and each lesson includes *Teacher Reflection Questions* about the mathematical work or pedagogical practices of the lesson. These embedded teacher supports promote effective implementation of the instructional resources and teaching practices. ● **The importance of family support is valued.** *Family Materials* are a part of each unit, which include information described in plain language to help families understand the mathematical work that their students are doing, activities for home, and questions that promote conversations about mathematics. Both English and Spanish versions of the family materials are available.		

Recommended? ___✔__ YES _____ NO

Criteria for Evaluation

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

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)
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.***

How to find the evidence:	Sample Considerations	Evidence
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	**In any single grade/course, instructional time is spent on grade-level standards:** Learning experiences, including units, lessons, activities, instructional routines, practice problems, and assessments, are **clearly aligned to *KAS for Mathematics***. Instructional resources include extensive work with grade-level problems to meet the full intent of grade-level standards. Instructional time is spent developing understanding of grade-level standards through these learning experiences as exemplified below: • **Kindergarten, Unit 5, Lesson 1, Instructional Routine: *Notice and Wonder***: This learning experience targets **KY.K.OA.3a**: *Decompose numbers into two groups in more than one way by using objects or drawings and record each decomposition by a drawing or equation.* Students are shown two images of 5 objects. The first image shows the objects in one group of 5, and the second shows them as two and

	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	three. Students are asked what they notice and wonder to elicit the understanding that numbers can be broken into two parts. Understanding of this very abstract concept is developed as students make meaning for themselves through exploring and discussing the images. ● **1st grade, Unit 3, Lesson 3, Activity 2**: Students engage in extensive work to determine if equations are true or false. They model the equations using counters and discuss their reasonings with partners. This learning experience targets **KY.1.OA.7**: *Understand the meaning of the equal sign and determine if equations involving addition and subtraction are true or false.* ● **2nd grade, Unit 2, Adding and Subtracting within 100** devotes instruction throughout the unit to developing students' abilities to understand and apply **KY.2.NBT.5**: *Fluently add and subtract within 100 using strategies based on place value, properties of operations and/or the relationship between addition and subtraction.* In this unit, students engage in learning experiences that build conceptual understanding by reasoning with base-ten blocks and drawings and articulating their thinking for adding and subtracting within 100. ● **3rd grade, Unit 5, Fractions as Numbers, Lessons 10, 11, and 12** engage students in the full intent of **KY.3.NF.3b**: *Recognize and generate simple equivalent fractions. Explain why the fractions are equivalent through writing or drawing*. Students work with fraction strips and models as they learn what it means for two fractions to be equivalent, generate equivalent fractions, and use a number line to determine if fractions are equivalent. ● **4th grade, Unit 7, Angles and Angle Measurement, End-of-Unit Assessment, Task 6:** *Use a protractor to complete the following: a. Draw a ray that makes a 25 degree angle with the given ray. b. Draw a ray that makes a 60 degree angle with the given ray. c. What is the size of the angle made by the two rays you drew? Explain how you know.*

	measurement involving unknown quantities.	One ray is provided in the problem. This assessment task addresses both **KY.4.MD.6**: *Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.* and **KY.4.MD.7**: *Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems.* ● **5th grade, Unit 7, Lesson 6, Activity 1**: Students work with toothpicks to construct quadrilaterals with the same lengths but different angles to notice that a square is a special kind of rhombus and that a rectangle is a special kind of parallelogram, specifically addressing **KY.5.G.4**: *Classify two-dimensional figures in a hierarchy based on properties.* **All students engage in extensive work with grade level problems to meet full intent of grade level standards from *KAS for Mathematics.*** ● **Each K-5 lesson is problem-based**, therefore students are **engaged in daily problem solving** to elicit conceptual understanding. Instructional routines such as *Which one doesn't belong?* engage students in meaningful problem solving activities. An example of this comes from **2nd grade, Unit 2, Lesson 1** where students are given four models to represent a number of sunny days and cloudy days: Base 10 model, bar model, linear Unifix cubes, and a horizontal bar graph. Students must analyze each model to determine which does not belong, and justify their thinking with a partner. This learning experience targets **KY.2.NBT.1:** *understand that the three digits of a three-digit number represent amounts of hundreds, tens and ones*, **KY.2.MD.5**, *use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units by using drawings and equations with a symbol for the unknown number to represent the*

		problem, and **KY.2.MD.10**, *solve simple put together, take-apart and compare problems using information presented in a bar graph.* **Materials include problems and activities that serve to connect two or more clusters in a domain or two or more domains in a grade from *KAS for Mathematics*:** As demonstrated in the *Standards Alignment* section of the *Scope and Sequence* for each grade, each unit and section addresses multiple standards that connect clusters in a domain and/or domains in a grade. The following is an example of a domain to domain connection within the curriculum: ● **1st grade, Unit 6, *Length Measurements Within 120 Units, Section B**: *Measure by Iterating up to 120 Length Units* connects the **Number and Operations in Base 10** domain to the **Measurement & Data** domain by counting, reading, and writing numbers in a measurement context through the following learning goals: count groups of up to 120 objects and write a number to represent them and lay length units end-to-end with no gaps or overlaps and count the units to determine length (**KY.1.NBT.1**, *count and represent numbers to 120;* **KY.1.MD.2**, *express the length of an object as a whole number of same size length units, by laying multiple copies of a shorter object end to end with no gaps or overlaps*).

How to find the evidence:	Sample Considerations	Evidence

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.	**Instructional resources follow a progression consistent with that outlined within the *KAS for Mathematics*:** Instructional resources follow a **coherent progression**, and are **vertically aligned K-5 as outlined by *KAS for Mathematics***. Grade-level, unit, lesson, and activity narratives describe decisions about the organization of mathematical ideas, connections to prior and upcoming grade-level work, and the purpose of each lesson and activity. The **progression is demonstrated in the following development of curriculum units** across grade levels Kindergarten to 5th grade, along with the standards addressed within *KAS for Mathematics*: ● **Kindergarten, Unit 6, Section B: 10 Ones and Some More → KY.K.NBT.1**: *Compose and decompose numbers from 11 to 19 using quantities (numbers with units) of ten ones and some further ones.* ● **1st grade, Unit 4, Section B: Tens and Ones → KY.1.NBT.2**: *Understand the two-digits of a two-digit number represent amounts of tens and ones.* ● **2nd grade, Unit 5, Section A: The Value of Three Digits → KY.2.NBT.1**: *Understand that the three digits of a three-digit number represent amounts of hundreds, tens and ones.* ● **3rd grade, Unit 3, Section C: Round Within 1,000 → KY.3.NBT.1**: *Use place value understanding to round whole numbers to the nearest 10 or 100*. ● **4th grade, Unit 4, Section B: Place Value Relationships through 1,000,000→ KY.4.NBT.1**: *Recognize in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.* ● **5th grade, Unit 5, Section A, Numbers to Thousandths → KY.5.NBT.1**: *Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left*

- 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).

64/65 clusters in grades K-5 are reflected in instructional resources.

- The following table includes each ***KAS for Mathematics*** cluster for each grade, and the ***main*** **unit(s) that address each cluster**. Note that clusters may also be addressed in other units as prerequisite material or as review during instructional routines. Also, in addition to having lessons devoted to problem-solving, it is embedded throughout every lesson as each lesson is problem-based. One Kindergarten cluster, *Identify coins by name*, which includes one *KAS* standard (KY.K.MD.4, *recognize and identify coins by name (penny, nickel, dime, quarter*) will require a plan for supplementation as it is not included in the instructional resources. This supplementation can be as simple as incorporating a quick routine into daily instruction that exposes students to coins and focuses on coin names. The school math team, along with Kindergarten teachers, will work to develop a plan to address this cluster and standard.

Grade	*KAS for Mathematics* Cluster	Units
K	Know number names and the count sequence.	1, 2, 6, 8
K	Count to tell the number of objects.	1, 2, 4, 6, 7, 8
K	Compare numbers.	2, 6, 8
K	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.	4, 5, 8
K	Working with numbers 11-19 to gain foundations for place value.	6, 8
K	Describe and compare measurable attributes.	3, 7
K	Classify objects and count the number of objects in each category.	3, 7
K	Identify coins by name.	Supplement

- Does the instructional resource provide opportunities for project based learning or performance based activities?

K	Identify and describe shapes.	3, 7
K	Analyze, compare, create and compose shapes.	3, 7
1	Represent and solve problems involving addition and subtraction.	1, 2, 3, 8
1	Understand and apply properties of operations and the relationship between addition and subtraction.	1, 2, 3, 8
1	Add and subtract within 20.	1, 2, 3, 8
1	Work with addition and subtraction equations.	1, 2, 3, 8
1	Extend the counting sequence.	6, 8
1	Understand place value.	4, 8
1	Use place value understanding and properties of operations to add and subtract.	4, 5
1	Measure lengths indirectly and by iterating length in units.	6
1	Work with time and money.	4, 7
1	Understand and apply the statistics process.	1
1	Reason with shapes and their attributes.	7
2	Represent and solve problems involving addition and subtraction.	1, 2, 4, 7, 9
2	Add and subtract within 20.	1, 9
2	Work with equal groups of objects to gain foundations for multiplication.	8
2	Understand place value.	2, 5
2	Use place value understanding and properties of operations to add and subtract.	2, 5, 7
2	Measure and estimate lengths in standard units.	3, 9

Table continued on follwoing pages

	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 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.	

2	Relate addition and subtraction to length.	3, 4, 9
2	Work with time and money.	6
2	Understand and apply the statistics process.	1
2	Reason with shapes and their attributes.	6
3	Represent and solve problems involving multiplication and division.	1, 2
3	Understand properties of multiplication and the relationship between multiplication and division.	4
3	Multiply and divide within 100.	4
3	Solve problems involving the four operations and identify and explain patterns in arithmetic.	3
3	Use place value understanding and properties of operations to perform multi-digit arithmetic.	3, 4
3	Develop understanding of fractions as numbers.	5, 9
3	Solve problems involving measurement and estimation of intervals of time, liquid volumes and masses of objects.	6, 9
3	Understand and apply the statistics process.	1
3	Geometric measurement: understand concepts of area and relate area to multiplication and to addition.	2, 7
3	Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	7
3	Reason with shapes and their attributes	7
4	Use the four operations with whole numbers to solve problems.	6, 9
4	Gain familiarity with factors and multiples.	1
4	Generate and analyze patterns.	6
4	Generalize place value understanding for multi-digit whole numbers.	4

4	Use place value understanding and properties of operations to perform multi-digit arithmetic.	4, 6, 9
4	Extend understanding of fraction equivalence and ordering.	2, 3
4	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	2
4	Understand decimal notation for fractions and compare decimal fractions.	2, 3, 4
4	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	5
4	Understand and apply the statistics process.	2
4	Geometric measurement: understand concepts of angle and angle measurements.	7
4	Draw and identify lines and angles and classify shapes by properties of their lines and angles.	7
5	Write and interpret numerical expressions.	4, 5, 6, 8
5	Analyze patterns and relationships.	4, 5, 6, 8
5	Understand the place value system.	5
5	Perform operations with multi-digit whole numbers and with decimals to hundredths.	4, 5
5	Use equivalent fractions as a strategy to add and subtract fractions.	2
5	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	3
5	Convert like measurement units within a given measurement system.	6
5	Understand and apply the statistics process.	6
5	Geometric measurement: understand concepts of volume and relate volume to multiplications and to addition.	1
5	Graph points on the coordinate plane to solve real-world and mathematical problems.	7
5	Classify two-dimensional figures into categories based on their properties.	7

		Content from previous or future grades does not unduly interfere with on-grade-level content: *KAS for Mathematics* content from future grades is identified and related to grade-level work, and instructional resources relate grade level concepts explicitly to prior knowledge from earlier grades in an effective manner that supports all students' learning and understandings. Examples include: ● **3rd grade, Unit 1, Lesson 16**: Students are shown an image of a full egg carton and asked what they notice and wonder. Student discussion is built around prior knowledge from **KY.2.OA.4**, *use addition to find the total number of objects arranged in rectangular arrays*. The connection to content from previous grades fosters use of array models in multiplication. ● **5th grade, Unit 4, Wrapping Up Multiplication and Division with Multi-Digit Numbers, Section B**, connects **KY.5.NBT.6**, *Divide up to four-digit dividends by two-digit divisors. a. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors using strategies based on place value, the properties of operations, the relationship between multiplication and division,* to the work of dividing multi-digit numbers using the standard algorithm in **KY.6.NS.2**, *fluently divide multi-digit numbers using an algorithm*. Lesson Narrative states, *Note that use of the standard algorithm for division is not an expectation in grade 5, but students can begin to develop the conceptual understanding needed to do so. The algorithms using partial quotients seen here are based on place value, which will allow students to make sense of the logic of the standard algorithm they'll learn in grade 6*. The learning experiences in this section fully support the content of the next grade-level without interfering with grade-level content.

Scoring NN 1A:	□✔ Strong Evidence	□ Moderate Evidence	□ Little or No Evidence	□ NA
Scoring NN 1B:	□✔ Strong Evidence	□ Moderate Evidence	□ Little or No Evidence	□ NA

***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)

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*.

How to find the evidence:	Sample Considerations	Evidence
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*, **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.	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	**Instructional resources support the development of students' conceptual understanding:** Conceptual understanding is at the forefront of the design of the instructional resources. The problem-based curriculum fosters conceptual understanding by students "doing" and making sense of math through solving problems in real-world and mathematical contexts. Opportunities to connect new ideas, concepts, representations and language to prior knowledge support students in building conceptual understanding. Learning experiences use manipulatives as tools to develop concrete conceptual understanding, making connections to pictorial representations and finally abstract, symbolic written methods. Routines embedded in each lesson foster conceptual understanding and making mathematical connections. These classroom structures allow teachers daily opportunities to learn about and leverage their students' conceptual understandings. Examples include: ● **Kindergarten, Unit 5, Lesson 1, Make 2 Parts, Warm-up activity**: Students engage in a "notice and wonder" routine that develops their conceptual understanding of the idea that numbers can be broken into parts. This rather abstract concept is brought to life for students through their own thinking and discussion with classmates.

Identify standards for the grade/course being evaluated that relate specifically to **conceptual understanding**. 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 within conceptual understanding.	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?	• **2nd grade, Unit 5, Lesson 2, Make Hundreds, Activity 2**: Students work cooperatively in groups to represent the number 700 in two ways: one way using only hundreds blocks and one way using only tens blocks. Students develop their conceptual understanding of representations of more than one hundred and make connections between multiples of 10 and multiples of 100 as they consider the relationship between 70 tens and 7 hundreds. **The instructional resources offer a balance across the levels of cognitive complexity within conceptual understanding:** High-quality learning experiences and assessment tasks address all levels of cognitive complexity, with the **majority of tasks focusing on levels 2 and 3**. Examples include: • **Conceptual Complexity Level 2: 3rd grade, Unit 1, Practice Problem 5:** Students are shown an image of circles formed in a rectangular array with 3 rows of 6 circles in each row. Students must explain or show two different ways they see equal groups in the array, and arrange the dots in an array in a different way. • **Conceptual Complexity Level 2: 4th grade, Unit 3, End-of-Unit Assessment Task 5**: Students evaluate a line plot and reason about specific questions asked about it. Students must connect their conceptual understanding of line plots and fractions to plot specific mixed numbers, and analyze the line plot for specific mixed numbers when only provided with whole numbers on the line plot. • **Conceptual Complexity Level 3: 4th grade, Unit 2, End-of-Unit Assessment Task 8**: Students work to determine which of two geometric designs has more blue based on the fractional part of blue for each design. Solving this problem requires

		students to relate multiple-grade level concepts, to evidence reasoning, and to work with a sophisticated line of reasoning as they describe the size of fractions, sketch examples of the geometric designs, and determine which design has more blue based on reasoning. **The curriculum offers a variety of formative and summative assessment opportunities that reveal student conceptual understanding of the mathematics.** ● Instructional tasks are accompanied by commentary that includes expected student responses and opportunities to advance student thinking so that teachers can adjust their instruction based on student observations, as well as suggested questions to help teachers better understand students' thinking. ● Lessons in grades 2–5 include a cool-down (exit slip) to assess student understanding of the lesson content. In grades K-1, cool-downs are included frequently, but a lesson synthesis is included in every lesson. ● Each lesson includes one or more practice problems (starting in Kindergarten, Unit 2). These can be used to assess certain learning on a particular concept. Each section contains two or more explorations, designed to engage students in thinking creatively about the mathematics of the unit at school or at home. ● Section checkpoints in kindergarten and grade 1 include a checklist to indicate that students are meeting the goals of that section. Section checkpoints in grades 2-5 include 3-4 problems to assess the section learning goals. Each section also has a monitoring sheet that can be used to indicate that students are meeting the section goals.

		• Each unit includes a summative, end-of-unit assessment to assess the learning goals of the unit.
How to find the evidence:	**Sample Considerations**	**Evidence**
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*, **procedural 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**.	For additional support, see Fluency in Mathematics and Table 6: Fluency Standards across All Grade Levels 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?	**Instructional resources are designed so that students attain the procedural skills and fluencies required by the *KAS for Mathematics*:** Students engage in repeated practice that **fosters the development of procedural skills and fluencies over time** during instructional routines, lesson activities, practice problems, games, and centers. Fluency is approached through a coherent progression of skills **integrated throughout the K-5 curriculum.** Fluency is not a single unit or assessment, but rather an overall goal of the entire program and developed over time through daily learning experiences, as recommended by *KAS for Mathematics.* Students **build procedural fluency and gain deep conceptual understanding simultaneously** by learning the meaning of the operations and the relationships between them. Instruction promotes use of knowledge students already have to support new learning and foster procedural fluency alongside conceptual understanding. Procedural fluency is developed during learning experiences by focusing on number sense, relationships among numbers, place value in non-traditional ways, pattern extension and prediction, multiplicative reasoning, as well as explanation and justification. This approach to instruction allows procedural fluency to be **based on accuracy, efficiency, flexibility, and appropriateness**. Examples include: • **Kindergarten, Unit 8, Lesson 13, Activity 1**, *Domino Sort* addresses the Kindergarten **fluency standard, KY.K.OA.5** *Fluently add and subtract within 5*, while still promoting

Evaluate lessons, assignments and assessments for indicators of the development of **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 within procedural skill/fluency.		conceptual understanding by having students write expressions for domino patterns. ● **2nd grade, Unit 1, Lesson 4, Warm-up**, *Number Talk: Make 10* addresses a **2nd grade fluency standard, KY.2.OA.2**, *fluently add and subtract within 20 using mental strategies*. The number talk strategically elicits strategies and understandings needed for fluently making a ten to add. ● **4th grade, Unit 4, Lesson 16, Warm-up**, *Number Talk: Missing Numbers* addresses **KY.4.NBT.4**, *fluently add and subtract multi-digit whole numbers using an algorithm*. In this number talk students find missing addends within 10,000. The number talk encourages students to think about the distance of a number to a multiple of 100, 1,000, or 10,000 by relying on the structure of the base-ten number system. **The instructional resources offer a balance across the levels of cognitive complexity within procedural skill/fluency:** Learning experiences and assessment tasks address all levels of cognitive complexity, with the **majority of tasks focusing on levels 2 and 3**. Examples include: ● **Procedural Complexity Level 2: 1st grade, Unit 2, End-of-Assessment Task 5:** Students are given five equations (addition and subtraction within 10) and are asked to circle 3 true equations. Students must understand the meaning of =, as some equations are written as 4=10-6. ● **Procedural Complexity Level 2: 3rd grade, Unit 4, Practice problem 6**: Students work to solve the following problem: *A rope is 640 inches long. Andre cuts off 5 pieces of rope that are 16 inches each. How much rope is left?* Procedural fluency of more than one operation is assessed.

		● **Procedural Complexity Level 3: 5th grade, Unit 4, End-of-Assessment Task 6:** Students are asked to find the length of a box when given the area in square centimeters and the height in centimeters and explain why the volume is less than 30,000 cubic centimeters. **Assessment Tasks reveal that students have fluencies required by standards.** ● Each unit at each grade includes section checkpoints (at least 3 per unit). For K and 1, these include observation checklists to record formative data collected on each student through observations of counting, addition, and subtraction methods. For example, in 1st grade, Unit 1, Section A Checkpoint data is collected on students' addition methods to assess their abilities in working towards fluency of addition within 10. Through observations during class work, game play, small group instruction, the teacher records when students count all to find sums, counts on to find sums, etc. Using this data, teachers gauge students' progress toward reaching fluency. ● For other grades, section checkpoints are in written form. All tasks ask students to explain or show their thinking, thus supporting teachers' abilities to gauge students' progress toward reaching fluency. ● End-of-Unit assessment tasks all include the requirement that students show or explain their thinking, thus supporting teachers' abilities to gauge students' progress toward reaching fluency.
How to find the evidence:	**Sample Considerations**	**Evidence**

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*, **Application** 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. Examine instructional resources to ensure learning experiences offer a balance across the levels of cognitive complexity within application.	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 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	**Instructional resources are designed so that students apply mathematics in relevant and meaningful ways as required by the *KAS for Mathematics***: Learning experiences are designed so that students spend sufficient time working with **engaging applications of mathematics** and **apply concepts in meaningful, authentic ways**. Single and multi-step, grade-level appropriate, real-world applications of mathematics are embedded throughout the instructional resources. Learning experiences provide **ample opportunities for students to engage in *The Modeling Process*** (as defined by *KAS for Mathematics*), both when applying learned content and when students are encountering new content. The modeling embedded provides opportunities for students to develop critical thinking skills as they notice, wonder, estimate, pose problems, create representations, assess reasonableness, and continually make revisions as needed. In early grades, these opportunities involve various foundational modeling skills that support students in being flexible about the ways they solve problems. In upper elementary, these skills become various stages of the modeling process that students will experience in later grades. Examples include: ● **Kindergarten, Unit 4, Lesson 18**: Students **engage in meaningful application** of their understanding of story problems and expressions to create story problems that match a given expression. Students share their story problems and other students figure out which expression matches their story (application of domain, *Operations and Algebraic Thinking*, and cluster, *understand addition as putting together and adding to and understand subtraction as taking apart and taking from*). ● **1st grade, Unit 2, Lesson 3**: Students **encounter new content** as they work to solve a new type of story problem, *Add To,*

	The Modeling Process 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? ○ 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?	*Change Unknown*. A problem is posed and students work through The Modeling Process to elicit strategies for solving these types of problems (application of domain, *Operations and Algebraic Thinking,* and cluster, *represent and solve problems involving addition and subtraction*). ● **2nd grade, Unit 2, Lesson 16:** Students apply previously learned material as they **engage in meaningful mathematical modeling**. In previous lessons students learned how to add and subtract within 100. In this lesson, students apply this mathematics by role-playing buying and selling items in a store. Students are responsible for selling three types of goods and keeping 100 items in stock for sale (application of domain, *Number and Operations in Base 10,* and cluster, *use place value understanding and properties of operations to add and subtract*). ● **4th grade, Unit 3, Lesson 20**: Students **engage in meaningful application** of their knowledge of multiplying a fraction by whole number to create sticky note designs given a set of constraints, describe their design to peers, and are then given supplies to make their design (application of domain, *Number and Operations Fractions*, and cluster, *build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers*.) **A variety of application problems are addressed, as referred to in *KAS for Mathematics.*** Examples include: ● **1st grade, Unit 2** addresses common addition and subtraction problems as specified in Appendix A, Table 1 of *KAS for Mathematics.* These types of problems can also be **found throughout learning experiences thereafter in all grade levels**.

		○ Add to: Unit 2, Section A ○ Take from: Unit 2, Section A ○ Put together/Take apart: Unit 2, Section B ○ Compare: Unit 2, Section C ● **3rd grade, Unit 1 and 4th grade, Unit 5** address common multiplication and division problems as specified in Appendix A, Table 2 of *KAS for Mathematics.* These types of problems can also be **found throughout learning experiences thereafter in all grade levels**. ○ Equal Groups: 3rd grade, Unit 1, Section B ○ Arrays: 3rd grade, Unit 1, Section C ○ Compare: 4th grade, Unit 5, Section A **Learning experiences offer a balance across the levels of cognitive complexity within application.** ● **Application Complexity Level 2: 3rd grade, Unit 1, Practice problem 10:** Students are asked to find equal groups of objects in their environment, describe the objects, create a drawing to represent the objects, and write an equation showing how many objects there are. ● **Application Complexity Level 3: 5th grade, Unit 3, Section B, Practice problem 9:** The task begins with the following statement: *It takes Earth 1 year to go around the Sun.* In this multi-step problem, students are asked to determine how many years it takes Mercury and Saturn to make 1 full orbit of the Sun based on the time it takes Earth to go around the Sun comparatively.

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

Alignment Criterion 2: Standards for Mathematical Practice
Instructional resources must demonstrate authentic connections between content standards and practice standards.

How to find the evidence:	Sample Considerations	Evidence
AC 2A: Instructional resources 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.* See Engaging the SMPs: Look Fors & Questions Stems 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.	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 regularity in repeated reasoning about proportional relationships and linear functions. ● In high school, students use regularity in repeated reasoning	**Instructional resources 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:** A key design principle of the curriculum is establishing norms for *community building*, focusing on the importance for teachers to establish and build a mathematical community to support student disposition about mathematics and **foster engagement in the mathematical practices**. This is a common theme embedded in lessons throughout the year. Instructional materials provide guidance for teachers on how to ensure that during tasks, **all students are provided the opportunity to engage in the mathematical practices**. *Instructional Routines, Lesson Preparation Narratives,* and *Lesson Activities' Narratives* **explicitly identify the math practices addressed and explain how they apply to the learning experiences and content standards**. The following describes examples of how each of the SMPs are embedded in instruction: ● **MP1: *Make sense of problems and persevere in solving them***: The curriculum is problem-based. Daily learning experiences engage students in doing math through solving problems. Students take part in productive struggle as they interact with rich, standards-based

	to illuminate formal algebra as well as functions, particularly recursive definitions of functions.	problems, often with multiple solutions possible. Specifically, the routine, *5 Practices,* addresses this practice as it allows students to solve problems in ways that make sense to them. Students actively engage in a problem as the teacher facilitates to uncover and help develop new conceptual understandings. ● **MP2: *Reason abstractly and quantitatively***: The routine, *Estimation Exploration*, evokes reasoning abstractly and quantitatively by making connections between what they know and what they can see (an image) to solve problems for an estimate. This routine uses a variety of problems in different contexts that allow students to arrive at solutions in different ways. Students use think aloud strategies as they reason abstractly and quantitatively, and teachers encourage the flexible use of properties, objects, and solution strategies. ● **MP3: *Construct viable arguments and critique the reasoning of others****:* Students engage in this practice on a daily basis as tasks are posed that require students to explain, argue, or critique. Daily opportunities for student discourse in pairs, groups and during whole group instruction allow students to construct arguments using precise language and critique the reasoning of others as part of the problem-based curriculum. ● **MP4: *Model with mathematics***: *Act It Out*, a Kindergarten routine, encourages student use of developmentally and content-appropriate mathematical models by enabling the youngest learners to represent story problems by listening to a mathematical story and acting it out.

		● **MP5: *Use appropriate tools strategically***: Use of math tools to develop conceptual understanding is evident throughout learning experiences at each grade level. Students engage in learning experiences that develop their understanding of the benefits and limitations of each tool, and their ability to select appropriate tools for themselves. Examples of tools used in primary grades include connecting cubes, pattern blocks, two-color counters, counting mats, 5 and 10-frames, geoblocks, solid shapes, inch tiles, centimeter cubes, Base-ten blocks, and rulers. Examples of tools used in intermediate grades include connecting cubes, counters, Base-ten blocks, fraction strips, inch tiles, pattern blocks, rulers, centimeter cubes, graph paper, grid paper, measuring cups, protractors, yardsticks, and meter sticks. ● **MP6: *Attend to precision***: The routine, *Which One Doesn't Belong,* offers opportunities for attending to precision when describing why something doesn't belong when given four settings. Students must communicate precisely using clear language and accurate mathematics vocabulary when defending their reasoning. ● **MP7: *Look for and make use of structure***: The routine, *How Many Do You See?,* offers opportunities to look for and make use of structure as students subitize or use grouping strategies to describe the images they see. They find patterns in numbers, and use these patterns to develop their own "rules" for math. ● **MP8: *Look for and express regularity in repeated reasoning***: *Number Talks* engage students in looking for patterns, attending to details, and evaluating the

		reasonableness of results as they develop conceptual understanding and computational fluency.
How to find the evidence:	**Sample Considerations**	**Evidence**
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.) ● 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	**Tasks and assessments of student learning are designed to provide evidence of students' proficiency in the Standards for Mathematical Practice:** Throughout the curriculum, the *Teacher Guide* identifies instructional routines, lessons and activities where Mathematical Practices are likely to be observed. The curriculum also provides a unit-level Mathematical Practice chart that highlights lessons in each unit that address specific Mathematical Practices. Through observations during student learning experiences, teachers are able to **informally assess students' proficiency in the Standards for Mathematical Practice** as they monitor collaborative work and note student engagement with the Mathematical Practices. Other **considerations for assessing student engagement with the Standards for Mathematical Practice** include providing students with a list of learning targets to self-assess their use of the practices and creating a portfolio of student work that highlights progress in using the Mathematical Practices throughout the grade. A list of **learning targets** for each Mathematical Practice is provided to **support teachers and students in recognizing when engagement with a particular Mathematical Practice is happening**. These learning targets, written as "I can" statements, are examples of the types of actions students could do if they are engaging with a particular Mathematical Practice. They include a broad "I can" statement, as well as more targeted statements for each. For example, the main learning target for MP3 is: *I can construct viable arguments*

	mathematical explanations taught rather than assumed? ○ 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? o Do the instructional resources contain embedded activities (or extensions) that emphasize use of technology for problem solving?	*and critique the reasoning of others,* with more specific targets being: *I can explain or show my reasoning in a way that makes sense to others.; I can listen to and read the work of others and offer feedback to help clarify or improve the work; I can come up with an idea and explain whether that idea is true.* **Summative assessments** also consistently offer opportunities for students to demonstrate the full intent of both grade-level content *and* practice standards through a variety of item types, including multiple choice, multiple response, short answer, restricted constructed response, and extended response. The following is an example of a 2nd grade summative end-of-unit assessment task from Unit 8 that **assesses students' proficiency in the Standards for Mathematical Practice**, specifically MP3 (construct viable arguments and critique the reasoning of others): *Here are some pattern blocks that Jada and Diego want to share. a. Explain why there are an even number of trapezoids. b. Jada says that she and Diego can share the pattern blocks so they each have 9 pattern blocks. Explain why Jada is correct. c. Can Jada and Diego share all of the pattern blocks so that they each have the same set of pattern block shapes? Explain or show your reasoning.* Students must demonstrate their ability to critique the reasoning of another student's thinking and construct an argument by explaining or showing their own reasoning.

Scoring AC 2A:	□✔ Strong Evidence	□ Moderate Evidence	□ Little or No Evidence	□ NA
Scoring AC 2B:	□✔ Strong Evidence	□ Moderate Evidence	□ Little or No Evidence	□ NA

Alignment Criterion 3: Access to Standards for All Learners
Instructional resources must provide supports to help ensure equitable access across all student populations.

How to find the evidence:	Sample Considerations	Evidence
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?	**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**: The curriculum is rooted on foundational principles for supporting language development for all students. Each lesson includes "***Access for English Learners,"*** instructional supports for planning and delivery of instruction that help teachers **address the specialized academic language demands in math**. They are designed to support all learners of mathematics, but they are particularly useful to meet the needs of students who are learning mathematics while also acquiring English. The portion of the Teacher's Guide, ***Mathematical Language Development and Access for English Learners***, states, "to support students who are learning English in their development of language, this curriculum includes instruction devoted to fostering language development alongside mathematics learning, fostering language-rich environments where there is space for all students to participate. This interwoven approach is grounded in four design **principles that promote mathematical language use and development**: ● Principle 1. Support sense-making: Scaffold tasks and amplify language so students can make their own meaning. ● Principle 2. Optimize output: Strengthen opportunities for students to describe their mathematical thinking to others, orally, visually, and in writing.

		● Principle 3. Cultivate conversation: Strengthen opportunities for constructive mathematical conversations. ● Principle 4. Maximize meta-awareness: Strengthen the meta-connections and distinctions between mathematical ideas, reasoning, and language. These design principles and related mathematical language routines ensure l**anguage development is an integral part of planning and delivering instruction**. Moreover, they work together to guide teachers to amplify the most important language that students are expected to know and use in each unit." Mathematics **vocabulary is developed through the process of actively exploring and learning mathematics**. Students **make sense of mathematical concepts using informal language before academic terms are introduced**. Embedded throughout the curriculum are ***Mathematical Language Routines*** *(MLRs).* According to the curriculum Teacher's Guide, these eight instructional routines are designed to "provide structured but adaptable formats for amplifying, assessing, and developing students' language. The MLRs included in this curriculum were selected because they **simultaneously support students' learning of mathematical practices, content, and language**. They are particularly well-suited to meet the needs of linguistically and culturally diverse students who are learning mathematics while simultaneously acquiring English. These routines are flexible and can be adapted to support students at all stages of language development in using and improving their English and disciplinary language use. MLRs are included in select activities in each unit to provide all students with explicit opportunities to develop mathematical and academic language proficiency. These "embedded" MLRs are described in the teacher notes for the lessons in which they appear."

How to find the evidence:	**Sample Considerations**	**Evidence**
AC 3B: Design of lessons attends to the needs of a variety of learners. Instructional resources 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	**Design of lessons attends to the needs of a variety of learners. Instructional resources 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:** Instructional resources and learning experiences empower all students and ensure that all learners can meaningfully participate in rigorous mathematical content by **building on their existing strengths and abilities**. All lessons provide teachers with options for additional support to address the needs of all learners. **Consideration of student strengths and weaknesses** is at the forefront of meeting students' individual needs, with specific **focus on areas of cognitive functioning that affect mathematics learning**: conceptual processing, language, visual-spatial processing, organization, memory, attention, social-emotional functioning, and fine motor skills. To support these areas and reduce student barriers, each lesson includes ***Access for Students with Disabilities*** as part of the activity narratives. These supports are aligned to the *Universal Design for Learning Guidelines* and address areas of cognitive functioning to provide teachers with **ways to modify the learning environment to maximize learning for all students**. The *Teacher's Guide* states, "Designed to facilitate access to Tier 1 instruction by capitalizing on student strengths to address challenges related to cognitive functions or disabilities, these strategies and supports are appropriate for any students who need additional support to access

	proficiency, along with suggestions for supporting learners in both circumstances?	rigorous, grade-level content." Teachers are provided with a table that organizes the ***Universal Design for Learning* supports** found in the instructional resources. This table addresses the *Universal Design for Learning* principles: engagement, representation, and action and expression. It includes "varied levels with suggestions that **support ways to increase *access* to the learning goal, ways to *develop or build* understanding, and ways to empower learners to *internalize* learning and executive function."** Also built into the instructional resources are features that **support students with visual impairments**. The *Teachers' Guide* lists these supports: "a color palette using colors that are distinguishable to people with the most common types of color blindness; tasks and problems designed such that success does not depend on the ability to distinguish between colors; mathematical diagrams are presented in scalable vector graphic (SVG) format, which can be magnified without loss of resolution, and are possible to render in Braille; where possible, text associated with images is not part of the image file, but rather, included as an image caption that is accessible to screen readers; alt text on all images, to make the materials easier to interpret for users accessing the materials with a screen reader."
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.	**The instructional resources embeds connections to literacy, supporting all learners in accessing the content:** Opportunities for speaking, writing, reading, and listening are intentionally embedded into instructional resources, and are foundational to the problem-based structure of the curriculum. Examples of literacy integrations include: ● ***Picture books*** are used throughout the instructional resources to create mathematical learning experiences based on literature. For example, in **Kindergarten, Unit 1, Lesson 6**, picture books are

	• 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. • Focus on critical vocabulary vs. extensive lists. • Identify key vocabulary through definitions in both text and glossary.	used as a learning experience for students to recognize and name quantities in the books, which prepares them to see and analyze quantities to use mathematics to describe their world. A list of picture book suggestions is included. • ***Student Journal Prompts*** are identified as a *key structure* of the instructional resources. To encourage the use of writing, a list of journal prompts is provided, as well as student starter prompts. The prompts can be used at any point during the year, both as a part of math and writing instruction. The curriculum *Course Guide* states, "It is our hope that through the use of these questions and prompts, students will communicate to learn mathematics as well as learn to communicate mathematically." Student Journal Prompts are divided into two categories: *Reflecting on Content and Practices* and *Reflection on Learning and Feelings about Math.* Examples include: ○ *Reflecting on Content and Practices* journal prompt: *What math did you learn and do today that connected to something you knew from an earlier unit or grade?* ○ *Reflection on Learning and Feelings about Math* student starter prompt: *I felt my ideas were valued during class today when . . .*

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

*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**

Question 4: Professional Learning Plan

Curriculum Implementation Professional Learning Plan

Illustrative Mathematics Professional Learning

PL Structure*	Potential Focus and Outcomes	Target Audience	Date/ Time Frame	Person(s) Responsible **	Funding Source(s)
2 Summer PL days	**Title**: *Teach and Learn* **Focus**: What is a problem-based curriculum and how do teachers implement it in their classrooms? What instructional resources are a part of the program and how are they implemented? **Outcomes**: ● Familiarize teachers with the problem-based lesson structure used in the *Illustrative Mathematics* program and understand the significance of a problem-based math community ● Explore specific resources in the materials to support implementation; leverage the structures in the curriculum to invite and engage all students in grade-level math; explain the components within and outside of the lesson plan that support all learners ● Articulate the structure of a lesson and the purpose of each component in helping to thread key mathematical ideas; explore supports, understand assessment materials, and begin to use student thinking as a	100% of K-5 math teachers, math coach, principal	Summer 2023	Vendor: *Illustrative Mathematics* Certified Facilitator	Mathematics Achievement Fund Mini Grant

	vehicle for productive planning ● Investigate and reflect on content and language routines; summarize the structure and describe strategies for successful implementation of instructional routines				
1 School PL day	**Title**: *Leveraging the Problem-Based Lesson Structure* **Focus**: deepen teacher understanding of the problem-based lesson structure **Outcomes**: ● Reflect on initial experiences teaching *Illustrative Mathematics* ● Participants deepen their understanding of the problem-based lesson structure, their role in student learning, and bringing activities to life with students	100% of K-5 math teachers, math coach, principal	October 2023	Vendor: *Illustrative Mathematics* Certified Facilitator	Mathematics Achievement Fund Mini Grant
1 School PL day	**Title**: *Adapting a Lesson Using Learning Goals* **Focus**: strategies for making adaptations to lessons, based on learning goals, in order to maintain pacing **Outcomes**: ● How focusing on pedagogical decisions in planning can support the focus and pacing of the lessons ● Build on participants' understanding of the problem-based lesson structure to gain an understanding of how the learning goals can help inform day-to-day choices to help with pacing in this flexible curriculum ● Learn to plan in order to improve pacing of lessons, and plan with a deeper focus on the	100% of K-5 math teachers, math coach, principal	December 2023	Vendor: *Illustrative Mathematics* Certified Facilitator	Mathematics Achievement Fund Mini Grant

	important mathematical ideas of a lesson				
1 School PL day	**Title**: *Understanding Math Content Progressions Across Grades* **Focus**: understanding the progression of mathematical ideas in a unit to support planning and teaching lessons across the unit **Outcomes:** ● Learn a process to help understand the mathematical progression of ideas in an upcoming unit through the use of unit narratives and assessments ● Explore representations to guide learning about a mathematical progression ● Use understandings of mathematical progressions to support planning with mathematical goals in mind for advancement of student learning	100% of K-5 math teachers, math coach, principal	February 2024	Vendor: *Illustrative Mathematics* Certified Facilitator	Mathematics Achievement Fund Mini Grant
Ongoing PLCs	**Title**: *Professional Learning Communities* **Focus**: ongoing teacher support of implementation of *Illustrative Mathematics* and best mathematics teaching practices **Outcomes:** ● Participate in grade-level/grade-band professional learning communities to create a community of educators supporting each other through learning, collaborating, analyzing and reflecting on new teaching methods and strategies ● Participate in the PLC activities included in each *Illustrative Mathematics* unit section. These activities either highlight an important	100% of K-5 math teachers, math coach, principal	Through year 1 of implementation (2023-24), year 2 of implementation (2024-25), and beyond to include all years of implemen-	Elementary Math Coach, Mathematics Leadership Team school members	District funded elementary mathematics coach; Title II professional development funds

	mathematical idea in the unit or have complex facilitation that would benefit from teachers planning and rehearsing the activity together. (*Illustrative Mathematics* includes a structure for the learning communities in the *Professional Learning Community* section of the *Course Guide*.) ● Continue development of best teaching practices for mathematics		tation		
Coaching and Mentoring	**Title**: Coaching and Mentoring **Focus**: ongoing, embedded coaching, modeling, collaboration, classroom observations, reflection, planning **Outcomes:** ● Job-embedded coaching with the elementary math coach including modeling, observing, reflecting, and planning support ● Collaboration with the elementary math coach and members of the Mathematics Leadership Team to support effective implementation of *Illustrative Mathematics* and best instructional practices	100% of K-5 math teachers, math coach	Through year 1 of implementation (2023-24), year 2 of implementation (2024-25), and beyond to include all years of implementation	Elementary Math Coach, Mathematics Leadership Team school members	District funded elementary mathematics coach

** Summer PL days, districts PL days, school PL days, ongoing PLCs, etc.*

*** Vendor, Leader, Teacher, etc.*

Question 5: Budget and Budget Summary

Mathematics Achievement Fund Mini Grant Budget Form

District: Harrison County

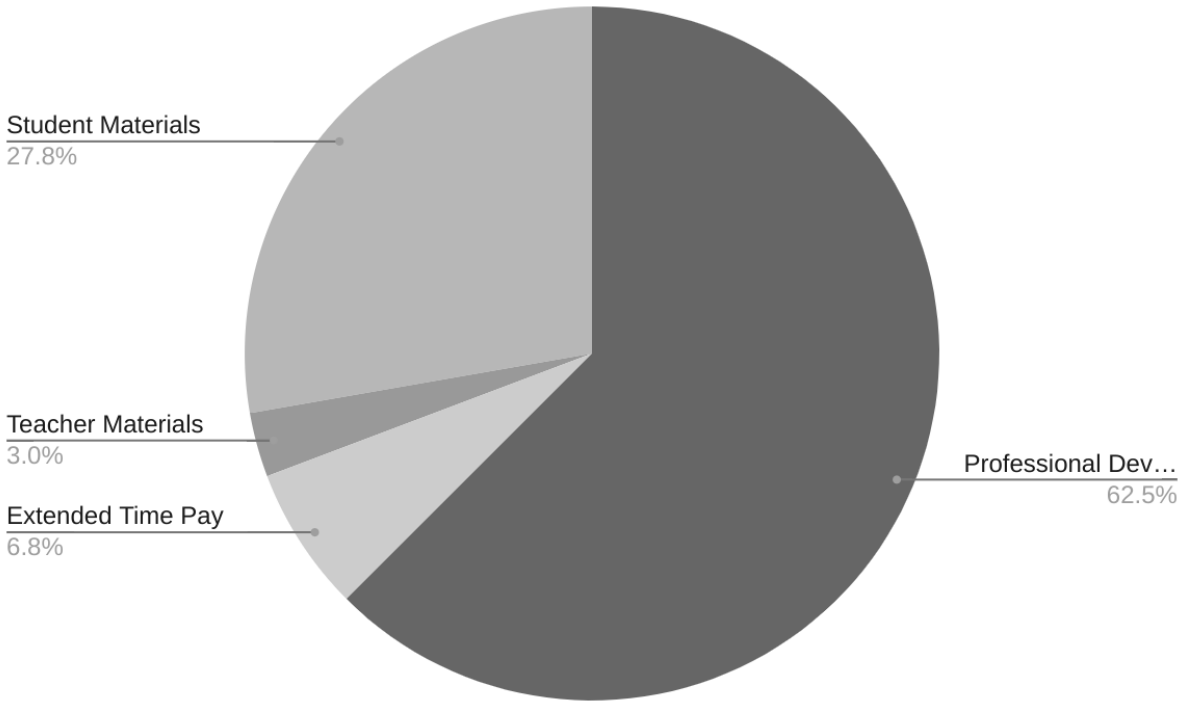
Name of School: Northside Elementary School

Instructions: Use this form to provide a detailed, itemized explanation of expenditures for each MUNIS Code. Not all MUNIS codes listed need to be used. However, the school may not use MAF grant monies for any MUNIS code that is not listed. Successful approval of budget is pending further review by the KDE.

MUNIS Code	Description	Amount	Explanation of Expenditures
0110	Certified Services - (Contract)		
0111	Extended Day (Contract)		
0112	Extra Duty (Contract)		
0113	Other Certified (Not part of Contract)	$2700	Extended time pay for teachers for after school training (15 teachers x 6 hours x $30 rate per hour)
0321	Workshop Consultant		
0322	Educational Consultant	$25,000	*Illustrative Mathematics* Professional Learning Trainings for 100% of K-5 math teachers, principal, & math coach
0335	Professional Consultant		
0339	Other Professional Services:		
0580	Travel		
0591	Services Purchased from another district or Educational Agency within the state		
0592	Services Purchased from another district or Educational Agency out of state		
0610	General Supplies		
0643	Supplemental Books, Study Guides & Curriculum	$1200	*Illustrative Mathematics* Teacher Guide Sets (16 X $75)
0644	Textbooks & other Instructional Materials Data required for State reporting	$11,100	*Illustrative Mathematics* student edition sets (271 students x $25 = $6775) and manipulative kits ($4,325)
0734	Technology Related Hardware		
0735	Supplies – Technology Related		
Total		**$40,000**	

Budget Summary

Funding from the Mathematics Achievement Fund Mini-Grant will provide our school with high-quality instructional resources to help all students reach mathematics proficiency through implementation of *Illustrative Mathematics*, and even more importantly, the high-quality professional development that accompanies it. The pie chart below displays the percentages allocated to each of our four areas of expenses: **professional development, extended time pay for teachers, teacher materials, and student materials**.



As demonstrated in the chart, a large portion of funds will be spent on high-quality professional development for 100% of mathematics teachers in our school ($25,000). This includes all teachers of mathematics, both regular and special education, as well as the school principal and math coach. Each participant will engage in five days of

professional development led by *Illustrative Mathematics* Certified Facilitators. These trainings will go beyond implementation of the program, and will help teachers develop deep understandings of best practices in mathematics instruction. In the book, The Teaching Gap, authors Stigler and Hiebert (2009) lay out a clear plan for improving education. They state, "*to really improve teaching we must invest far more than we do now in generating and sharing knowledge about teaching"* (p. 12). Funding from the Mathematics Achievement Fund Mini Grant will enable us to do just that, **providing teachers with the professional development needed to improve tier one mathematics instruction in our school**.

Funds from this grant will also allow us to pay teachers for extended time for training that will take place beyond the school day ($2,700). Placing importance on the value of teacher time boosts teacher morale, therefore affecting teacher success and performance. Other areas of expenses for effective implementation include *Illustrative Mathematics* teacher guide sets ($1,200), *Illustrative Mathematics* full-color student edition workbooks ($6,775), and *Illustrative Mathematics* student manipulatives to support concrete learning and develop conceptual understanding of mathematics ($4,325).

Our school and district are also invested in improving mathematics instruction alongside implementation of *Illustrative Mathematics*. A district-funded elementary math coach will work closely with teachers in our school through job-embedded coaching and mentoring, and through collaboration during professional learning communities to strengthen mathematics teaching and learning. In addition, our school and district are committed to the funding required for student materials beyond

year one of implementation of *Illustrative Mathematics*. These commitments are made to ensure **implementation of the strongest tier one mathematics instruction possible**, therefore reducing the number of students requiring mathematics intervention in our school.

Funding from the Mathematics Achievement Fund Mini Grant, combined with our school and district's investments, will allow for a **transformation of mathematics teaching and learning in our school**. The opportunities this grant will provide are priceless for our teachers as educators and our students as mathematicians.

References

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