



INTRODUCTION

What is the KIPP K–8 Mathematics Blueprint?

The KIPP K–8 mathematics blueprint (blueprint) is KIPP’s ideal instructional design for a K–8 mathematics classroom. The blueprint aligns to KIPP’s instructional vision and the instructional shifts in the Common Core State Standards.

The sections describe three components of a KIPP math classroom: Eureka Math, Cognitively Guided Instruction (CGI), and Personalization.

When and how can audiences use the blueprint?

Teachers and leaders can use this tool to:

- Design mathematics instructional blocks
- Develop systems to support math instruction
- Understand the rationale for KIPP Foundation’s time and curricular recommendations

Scheduling

These sample elementary and middle school schedules are intended to be a starting point for planning the structure of the school day, as it is recognized that there are different needs and constraints across the network. These schedules include both the teaching and learning prioritized in the literacy and math instructional blueprints as well as the enabling systems for teacher development. Before using, please read the notes (first tab).

BLUEPRINT OVERVIEW

Rationale for Recommendations

EUREKA MATH

KIPP recommends Eureka Math because it aligns to the Common Core State Standards and balances conceptual understanding, application, and procedural fluency. The tasks included with each lesson are rigorous and promote student discourse. The materials that provide clear thorough guidance for teachers and promote a deep understanding of the content.

CGI

CGI will help students select relevant and efficient strategies to solve problems across domains and learn from each other’s strategies. Incorporating multiple opportunities for students to focus on problem solving and application will prepare students to tackle complex problem solving in later grades as called for in the KIPP Math Vision.

Recommendations at a Glance

The following tables give an overview of all components and time recommendations for math instruction. The components do not need to happen concurrently within one math instructional block. The 45 minute Personalization block is shared with the ELA personalization block. Determining which times are used for ELA and which times for math is up to the discretion of the school leader.

K–4

COMPONENT		TIME/FREQUENCY	RESOURCES
Do Now		5 minutes/5 days a week	Data from previous lessons
Eureka Math	Fluency	5–10 minutes/5 days a week	Fluency templates, sprints, fluency practice sets, manipulatives
	Application problem	10–15 minutes/5 days a week	Daily lessons include application problems
	Concept development and lesson debrief	25–40 minutes/5 days a week	Opening example problems, problem sets, vignettes, student work samples
	Exit Ticket ¹	5–10 minutes/5 days a week	Daily lessons include an exit ticket
	Total Time for Eureka Math	70 ² minutes/5 days a week	
Personalization		45 minutes/3–5 days a week	Eureka lessons from previous grades, online learning programs
CGI		30 minutes/ 5 days a week	CGI Toolkit on KIPP Share

TOTAL TIME REQUIREMENTS FOR K–4

145 minutes total

¹ Please see the Assessment section of the Blueprint overview for more information about exit tickets

² The maximum times for each component total more than the recommended time because it is not intended for the instructional block to hit the maximum time for each component every day.

5–8

COMPONENT		TIME/FREQUENCY	RESOURCES
Do Now		5 minutes/5 days a week	Data from previous lessons
Eureka Math	Fluency	5–10 minutes/5 days a week	Fluency templates, sprints, fluency practice sets
	Concept development	20–30 minutes/5 days a week	Opening example problems, problem sets, vignettes and student work samples included
	Practice, application, and lesson debrief	5–10 minutes/5 days a week	Class exercises, closing question, student debrief, exit ticket
	Exit Ticket ³	5 - 10 minutes/5 days a week	Daily lessons include an exit ticket
	Total Time for Eureka Math	70 ⁴ minutes/3–5 days a week	
Personalization		45 minutes/3–5 days a week	Eureka lessons from previous grades, online learning programs
CGI (Grades 5 and 6)		30 minutes/ 5 days a week	CGI Toolkit on KIPP Share

¹ Please see the Assessment section of the Blueprint overview for more information about exit tickets

TOTAL TIME REQUIRED FOR 5–6

145 minutes total

TOTAL TIME REQUIRED FOR 7–8

115 minutes total

Classroom Overview

While this blueprint outlines the ideal amount of time and curricular resources in a math block, aspects of math instruction that span across components are not in the blueprint. These include:

PROCESS AND PRODUCT

Questions should help students explore mathematical concepts and justify their reasoning. More emphasis should be on the *process* of solving the question versus on the final solution.

HEAVY LIFTING

Students should do 75% of the heavy lifting, thinking, and speaking. They should always grapple with mathematical ideas and relationships and persevere to solve problems.

CLASSROOM COMMUNITY

In a math class, the teacher and students should always embrace challenges and believe that mistakes are crucial to the learning process. Students should have opportunities to be math leaders, shape the thinking of others in supportive, collegial ways, and accept the same support from others.⁵ The beauty of mathematics should be celebrated and integral to every lesson.

³ Please see the Assessment section of the Blueprint overview for more information about exit tickets

⁴ The maximum times for each component total more than the recommended time because it is not intended for the instructional block to hit the maximum time for each component every day.

⁵ National Council of Teachers of Mathematics (2000), *Principles and Standards for School Mathematics (Executive Summary)* Washington, DC., 32

Assessments

The Eureka Math Curriculum is broken-out into 6–8 modules per year for each grade that are then broken down into topics. Each module contains three types of assessments – exit tickets, mid-module assessments, and end of module assessments. The assessments are designed to measure student mastery of grade level standards for each module and are not cumulative throughout the year. In addition to the assessments that are included in the Eureka Math Curriculum, KIPP Foundation is also developing Topic Assessments.

EXIT TICKETS	
Frequency	Daily
Time	5–10 minutes
Format	Open-ended
Purpose	Exit tickets measure mastery at the objective level. They are designed to let teachers know if their students have mastered the content for the day’s lesson. Because the objectives strategically build towards mastery, exit tickets help teachers determine if their students are on track to master the standard. Teachers should track exit ticket data to inform interventions.

MID-MODULE ASSESSMENTS	
Frequency	Once per module; at the mid-way point
Time	30–45 minutes
Format	Open-ended
Purpose	Mid-module assessments are designed to assess if students can apply their understanding of the standard and are designed to be an almost verbatim measure of the standard. Questions may have multiple parts and measure more than one standard at a time.

END OF MODULE ASSESSMENTS	
Frequency	Once per module; at the end
Time	One class period
Format	Open-ended
Purpose	End of module assessments measure not only students understanding of the standard, but also if they can manipulate the standard. In end of module assessment questions, students may be asked to demonstrate an understanding of multiple standards within a question or to show understanding on a deeper level.

TOPIC ASSESSMENTS	
Frequency	At the end of each topic
Time	10–15 minutes
Format	Selected Response
Purpose	Topic assessments have five selected response questions. The assessments are designed to be an additional check-point before a mid or end of module assessment to track students' progress towards mastery of a single standard. Topic assessments measure student's mastery of the central standard in the topic.

K–8 MATHEMATICS RECOMMENDATIONS

K–4 Eureka Math

RECOMMENDED TIME: 70 MINUTES

While the lessons may take longer at the start of the year when teachers and students are orienting themselves to the curriculum, as the year progresses, teachers will become proficient with the pacing of the lessons. The suggested timing for each component (fluency, application problem, and concept development and lesson debrief) will vary throughout the lesson, generally within the time frames outlined in the time recommendations. All timing is at the teacher’s discretion.

COMPONENTS OF A EUREKA LESSON

Do Now



Do nows are not included in the Eureka Math materials, however, they should be leveraged as a crucial piece of the Eureka Math component of the math block. Do nows are an opportunity for spiral review and are an opportunity for students to practice a concept that they have mastered. They can also be used to prime students prior knowledge for the upcoming lesson.

Fluency



Fluency develops speed, accuracy, and flexibility in calculations. Fluency activities also help promote number sense in students, particularly in the lower grades. Fluency activities are part of opening routines and revisit previously learned material to develop automaticity, anticipate future concepts, and strategically preview or build skills for the day’s concept development.

Application Problem



The application problem gives students a chance to apply newly learned concepts and grapple with novel concepts. This section can often serve as the opening worthy task of a lesson.⁶ During this time, students practice thinking creatively and quantitatively, focusing on how mathematics connects to the world around them.

Concept Development and Lesson Debrief



Concept development and lesson debrief is when students explore new concepts. Students move in a deliberate progression from concrete to pictorial to abstract representations of a concept. This progression will happen over a span of time, sometimes building from lesson to lesson, and, at other times, building from year to year, depending on the grade and concept. The lesson debrief at the end of this component is a time to summarize the learning for the day and check for student understanding.

Exit Ticket



Every Eureka Math lesson has an exit ticket that aligns with the day’s objective. They are an opportunity for students to demonstrate that they have mastered the lesson material for the day. Exit tickets are an important component of Data Driven Instruction and should be administered after each lesson.

⁶ For more information about the opening worthy task and the role it plays in students’ conceptual understanding, please see the Teaching for Conceptual Understanding Toolkit on KIPP Share.

5–8 Eureka Math

RECOMMENDED TIME ALLOTMENT: 70 MINUTES⁷

Eureka Math lessons are paced to be 60 minutes in length for grade 5 and 45 minutes for grades 6–8. While the lessons may take longer at the start of the year when teachers and students are orienting themselves to the curriculum, as the year progresses, teachers will become proficient with the pacing of the lessons. The suggested timing for each component (fluency, application problem, and concept development and lesson debrief) will vary throughout the lesson, generally within the time frames in the time recommendations. All timing is at the teacher’s discretion.

COMPONENTS OF A EUREKA LESSON

Do Now



Do nows are not included in the Eureka Math materials, however, they should be leveraged as a crucial piece of the Eureka Math component of the math block. Do nows are an opportunity for spiral review and are an opportunity for students to practice a concept that they have mastered. They can also be used to prime students prior knowledge for the upcoming lesson.

Fluency



Fluency develops speed, accuracy, and flexibility in calculations. The fluency activities are part of opening routines and revisit previously learned material to develop automaticity, anticipate future concepts, and strategically preview or build skills for the day’s concept development. Fluency activities will range from sprints, recall activities, and mental math.

Concept Development



Concept development and lesson debrief is the longest section of the mathematics block. It is the time when students explore new concepts. During this time, students move in a deliberate progression from concrete to pictorial to abstract representations of a concept. This progression will happen over a span of time, sometimes building from lesson to lesson, and, at other times, building from year to year, depending on the grade and concept. In a Eureka Math lesson, teachers should use “example” problems during this time.

In the grade 5 curriculum, Eureka Math lessons include separate application and concept development components.⁸ The lessons for grades 6–8 include four lesson types:

- **Problem Set:** Students and teachers work through examples and complete exercises to develop or reinforce a concept.
- **Socratic Discussion:** Teachers lead students in a conversation to develop a specific concept or proof.
- **Exploration:** Teachers facilitate independent or small group work on a challenging problem followed by debrief to clarify, expand or develop math knowledge.
- **Modeling:** Students practice all or part of the modeling cycle with real-world or mathematical problems that are ill-defined.

⁷ The maximum times for each component total more than the recommended time because it is not intended for the instructional block to hit the maximum time for each component every day. For example, a day that introduces a new concept may require that a teacher plan for a longer concept development and therefore use less than the maximum time for fluency.

⁸ For a description of the specific components of a Eureka Math lesson 5th grade, please refer to the K–4 math blueprint.

Practice, Application, and Lesson Debrief



Students apply concepts to novel situations or real-world examples. The time may include independent work, partner work, or small group work, depending on the needs of the students. In a Eureka Math lesson, teachers should use “exercise” problems during this time. The lesson debrief is the time to summarize the main concept for the day and check for student understanding.

Exit Ticket



Every Eureka Math lesson has an exit ticket that aligns with the day’s objective. They are an opportunity for students to demonstrate that they have mastered the lesson material for the day. Exit tickets are an important component of Data Driven Instruction and should be administered after each lesson.

Personalization

RECOMMENDED TIME: 45 MINUTES

Personalized Learning is an instructional design approach that reserves time and space during the school day for instruction aligned to individual student needs rather than grade level expectations or a predetermined scope and sequence. It should be scheduled a minimum of three days a week and can overlap with the ELA personalization block if needed.

To understand what this looks like, we have adopted a two part strategy to implement personalization:

Personalization = Differentiation + Individualization

Differentiation is using formative assessments to find specific strengths and weaknesses of each student and delivering targeted lessons to help address those needs in small groups, individually, and online. The types of instruction should include remediation for students who are significantly behind, extension for students who need more challenging instruction, and interventions for students who need timely opportunities to clarify concepts that will help them engage with grade level material.

Individualization is a collection of strategies to help maximize the impact of differentiation with student-centered instructional design. Since differentiation uses data to find appropriate lessons aligned to student strengths and weaknesses, mastery based progression is required so that students continuously receive appropriate instruction aligned to their needs based on their performance. To help make this all happen, schools must create a flexible learning environment with innovations in schedules, staffing, and physical space to create opportunities for the different types of instructional strategies. This is typically done in a Personalized Learning Block (i.e. Intervention Block, Power Hour, etc.) that is separate from core instructional times.

Schedule	<ul style="list-style-type: none"> Personalization in Traditional Schedule: Schools may choose to implement stations within a traditional schedule in the homeroom/literacy teacher’s classroom. While this allows time for small group instruction for different groups of learners, it requires teachers to design different lesson plans for each of those groups. Personalization in Flexible Schedule: There are many ways to introduce flexibility to a schedule so that teachers can plan for fewer groups of learners. This is done by homogenously grouping students during an intervention block across multiple classrooms, so that each classroom has similar student needs. Then, students can rotate while the teacher delivers the same or similar lesson to multiple groups.
Staffing	<ul style="list-style-type: none"> Personalization in Traditional Staffing Model: Each teacher designates times for intervention blocks for small group instruction aligned to student needs. While this allows for time for small group instruction for different groups of learners, it requires teachers to design different lesson plans for each of those groups. Personalization in Flexible Staffing Models: There are several ways to introduce flexibility in the staffing model that helps to reduce the planning load for teachers and increase opportunities to deliver personalized small group instruction. These models work best within flexible schedule options as well.
Physical Space	<ul style="list-style-type: none"> Personalization in Traditional Models: A traditional use of physical space can be used to implement a station rotation or lab rotation (including mobile carts of devices) to convert any

	<p>space into a technology-enhanced intervention block. While this is the easiest model to implement, it still requires teachers to plan for multiple lessons for different groups of students.</p> <ul style="list-style-type: none">• Personalization in Flexible Models: A flexible use of space can help to create opportunities for different types of instruction for different students, aligned to their strengths and weaknesses. Multiple instructional opportunities can happen at the same time, which helps reserve time for other priorities.
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ED TECH

Ed Tech programs can help personalize instruction for students and provide an extra source of student data for teachers. The recommended ed tech programs were selected for the following features:

- Aligned to instructional priorities in the blueprint
- The usage recommendations align with typical schedules
- The platforms deliver lessons, assessments, and a strategic learning path for students
- The content has proven to be engaging for at least 2–3 years
- The platform meets technical requirements for student data, i.e. account provisioning and access to student usage, progress, and mastery data
- The platform meets technical requirements for usage, e.g. devices, network, etc.
- The program allows for free or low cost pilots
- The program provides customizable professional development

K–4 Recommendations

ED TECH OPTIONS	TIME/FREQUENCY	DESCRIPTION AND IMPLEMENTATION NOTES
ST Math	20–30 mins, 3–5 times a week	<ul style="list-style-type: none"> ST Math delivers a common core aligned curriculum that uses manipulatives to model concepts and teach spatial skills for foundational math concepts. The lack of verbal or written directions helps younger students, ELL students, and students with reading deficiencies feel successful.
Zearn	20–30 mins, 3–5 times a week	<ul style="list-style-type: none"> Zearn is a rigorous online curriculum that compliments the instructional strategies and scope and sequence in Eureka Math. Zearn delivers grade level instruction and also includes remediation pathways designed to review foundational concepts that build up to grade level standards.
Dreambox (secondary option)	20–30 mins, 3–5 times a week	<ul style="list-style-type: none"> Dreambox is an adaptive program that aligns instruction to student strengths and weaknesses in the program. It should only be used in grades 3-4 if students are no longer engaged in ST Math.
Khan Academy (secondary option)	5–10 mins, 3–5 times a week	<ul style="list-style-type: none"> Khan Academy is a collection of math assessment questions and tutorial videos. Since the actual instruction is not rigorous, this should be used as an extra source of assessment data for teachers. With extended use, students lose engagement and investment. It is most helpful to teachers for DDI when students work on a pre-determined path of activities that either align to remediation priorities or the scope and sequence of classroom instruction.

5–8 Recommendations

ED TECH OPTIONS	TIME/FREQUENCY	DESCRIPTION AND IMPLEMENTATION NOTES
Think Through Math	20–30 mins, 3–5 times a week	<ul style="list-style-type: none"> Think Through Math is an adaptive online learning program that aligns instruction to student strengths and weaknesses, and also provides live tutors for struggling students. This is recommended for students who have mastered K–4 math, and are ready for the push to algebra proficiency over the course of middle school.
ST Math	20–30 mins, 3–5 times a week	<ul style="list-style-type: none"> For new-to-KIPP 5th grade students, ST Math helps to develop foundational math skills these students may have missed in elementary schools. Many students in 6th grade and almost all students in 7th–8th grade should move on to Think Through Math.

ED TECH OPTIONS	TIME/FREQUENCY	DESCRIPTION AND IMPLEMENTATION NOTES
Zearn for 5 th grade	20–30 mins, 3–5 times a week	<ul style="list-style-type: none"> • Zearn is a rigorous online curriculum that compliments the instructional strategies and scope and sequence in Eureka Math. • Zearn delivers grade level instruction and also includes remediation pathways designed to review foundational concepts that build up to grade level standards.
Khan Academy	5–10 mins, 3–5 times a week	<ul style="list-style-type: none"> • Khan Academy is a collection of math assessment questions and tutorial videos. • Since the actual instruction is not rigorous, this should be used as an extra source of assessment data for teachers. • With extended use, students lose engagement and investment. • It is most helpful to teachers for DDI when students work on a pre-determined path of activities that either align to remediation priorities or the scope and sequence of classroom instruction.

CGI (K–6)

RECOMMENDED TIME: 30 MINUTES

CGI is an approach – not a curriculum – to help K–6 students develop problem-solving skills and conceptual understanding. CGI is based on two big ideas: (1) children have an intuitive knowledge of mathematics, and (2) instruction should be based on the relationship between computational skills and problem solving. CGI both empowers teachers to make instructional decisions that are right for their students and allows students to make sense of problems in their own ways.

Every CGI lesson has the same three components

- Launch
 - The teacher tells an engaging story to provide motivation and background for the context of the story problem, reads the story problem aloud, and then strategically calls on three students to retell the problem. The launch closes with the teacher posing a comprehension problem to the class
- Student Work Time
 - The teacher actively monitors the strategies students use to solve the problem and chooses three students to present during the discourse.
- Discourse
 - Three students present their work in a progression from least to most sophisticated. As students are presenting, the teacher precisely creates a representation that accurately represents the strategy that each student shares.