Teacher Edition

# Eureka Math® Grade K Module 1

## TEKS EDITION

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# Numbers to 10

## OVERVIEW

The first day of Kindergarten is long anticipated by parents and young students. Students expect school to be a dynamic and safe place to learn, an objective that is realized immediately by their involvement in purposeful and meaningful action.

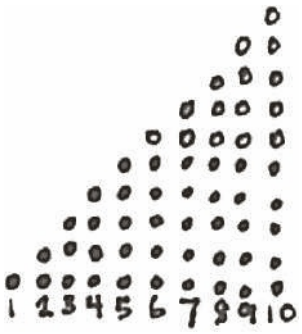
In Topics A and B, classification activities allow students to analyze and observe their world and articulate their observations. Reasoning and dialogue begin immediately. "These balloons are exactly the same." "These are the same but a different size." As Topic B closes, students recognize cardinalities as yet one more lens for classification (**K.8A**). "I put a pencil, a book, and an eraser, three things, in the backpack for school." "I put five toys in the closet to keep at home." From the moment students enter school, they practice the counting sequence so that when counting a set of objects, their attention can be on matching one count to one object, rather than on retrieving the number words (**K.2A**).

In Topics C, D, E, and F, students order, count (**K.2A**), and write numerals to represent (**K.2B**) up to ten objects to answer *how many* questions from linear, to array, to circular, and finally to scattered configurations wherein they must devise a path through the objects as they count **(K.2C)**. As students count, they also learn to represent these quantities with written numerals **(K.2B)**. Students use their understanding of numbers and matching numbers with objects to answer *how many* questions about a variety of objects, pictures, and drawings (**K.2D, K.2E**).


They learn that the last number name said tells the number of objects counted (**K.2C**). Daily, they engage in mathematical dialogue. They might compare their seven objects to a friend's. For example, "My cotton balls are bigger than your cubes, but when we count them, we both have seven!"

Very basic expressions and equations are introduced early in order to ensure students' familiarity with numbers throughout the entire year. Decomposition is modeled with small numbers with materials and drawings and as addition equations. Students see that both the expression 2 + 1 (Topic C) and the equation 3 = 2 + 1 (Topic D) describe a stick of three cubes decomposed into two parts (**K.2I**). Emphasis is not placed on the expressions and equations or using them in isolation from the concrete and pictorial—they are simply included to show another representation of decompositions alongside counters and drawings.

In Topics G and H, students use their understanding of relationships between numbers to recognize that each successive number name refers to a quantity that is one greater and that the number before is one less (**K.2F**). This important insight leads students to use the Level 2 strategy of counting on rather than counting all later in the year and on into Grade 1.




In this module, daily fluency activities with concentration and emphasis on counting (**K.2A, K.2C, K.2D, K.2E**) are integrated throughout the concept development: "I counted six beans in a row. I counted six beans in a circle and then squished them together and counted again. There were still six!" "I can make my six beans into rows, and there are no extras." Students complete units of five using the fingers of their left hand and 5-groups. The numbers 6, 7, 8, and 9 are introduced relative to the number 5: "Five fingers and ____ more." Students also explore numbers 5 to 9 in relation to 10, or two complete fives: "Nine is missing one to be ten or two fives." (**K.2I**)

As students begin to master writing numbers to 10, they practice with paper and pencil. This is a critical daily fluency that may work well to close lessons, since management of young students is generally harder toward the end of math time. The paper and pencil work is calming, though energized.

## Notes on Pacing for Differentiation

If pacing is a challenge, consider the following modifications. Consider consolidating Lessons 1 and 2 if students are competent in recognizing and discussing subtle differences in the attributes of objects.

Lessons 12, 13, 15, 18, 20, 22, 24, and 26 include numeral formation along with counting and cardinality concepts. In prioritizing a focus within each lesson (e.g., if reducing the instructional time for numeral writing), take care not to inadvertently omit the teaching of math concepts within the same lesson (e.g., cardinality, conservation, and counting in varied configurations).

# Focus Grade Level Standards[1]

## Number and Operations

**The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system. The student is expected to:**

**K.2A** count forward and backward to at least 20 with and without objects;

**K.2B** read, write, and represent whole numbers from 0 to at least 20 with and without objects or pictures;

**K.2C** count a set of objects up to at least 20 and demonstrate that the last number said tells the number of objects in the set regardless of their arrangement or order;

**K.2D** recognize instantly the quantity of a small group of objects in organized and random arrangements;

**K.2E** generate a set using concrete and pictorial models that represents a number that is more than, less than, and equal to a given number up to 20;

**K.2F** generate a number that is one more than or one less than another number up to at least 20;

**K.2I** compose and decompose numbers up to 10 with objects and pictures.

## Data Analysis

**The student applies mathematical process standards to collect and organize data to make it useful for interpreting information. The student is expected to:**

**K.8A** collect, sort, and organize data into two or three categories.

[1]In this module, work is limited to within 10.

## Foundational Standards

**The child knows:**

**V.A.1.** that objects, or parts of an object, can be counted;

**V.A.2.** how to use words to rote count from 1 to 30;

**V.A.3.** how to count 1– 10 items, with one count per item;

**V.A.4.** how to demonstrate that the order of the counting sequence is always the same, regardless of what is counted;

**V.A.5.** how to count up to 10 items and demonstrates that the last count indicates how many items were counted;

**V.A.6.** how to demonstrate understanding that when counting, the items can be chosen in any order.

**V.A.7.** how to use the verbal ordinal terms;

**V.A.9.** how to recognize one-digit numerals, 0–9.

## Focus Mathematical Process Standards

**The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**

**MPS(D)** communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

**MPS(F)** analyze mathematical relationships to connect and communicate mathematical ideas;

**MPS(G)** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

# Overview of Module Topics and Lesson Objectives

| TEKS | ELPS | Topics and Objectives | | Days |
|---|---|---|---|---|
| **K.8A** | 1.C<br>1.E<br>2.C<br>2.E<br>2.I<br>3.F<br>4.G | A | **Attributes of Two Related Objects**<br>Lesson 1: Analyze to find two objects that are *exactly the same* or *not exactly the same*.<br>Lesson 2: Analyze to find two similar objects—*these are the same but…*<br>Lesson 3: Classify to find two objects that share a visual pattern, color, and use. | 3 |
| **K.2A**<br>**K.2C**<br>**K.2D**<br>**K.8A** | 1.C<br>1.F<br>2.E<br>2.I<br>3.D<br>3.F<br>4.G | B | **Classify to Make Categories and Count**<br>Lesson 4: Classify items into two pre-determined categories.<br>Lesson 5: Classify items into three categories, determine the count in each, and reason about how the last number named determines the total.<br>Lesson 6: Sort categories by count. Identify categories with 2, 3, and 4 within a given scenario. | 3 |
| **K.2A**<br>**K.2C**<br>**K.2D**<br>**K.2I** | 1.C<br>1.F<br>2.E<br>2.I<br>3.F<br>4.C<br>4.F<br>4.G | C | **Numbers to 5 in Different Configurations, Math Drawings, and Expressions**<br>Lesson 7: Sort by count in vertical columns and horizontal rows (linear configurations to 5). Match to numerals on cards.<br>Lesson 8: Answer *how many* questions to 5 in linear configurations (5-group), with 4 in an array configuration. Compare ways to count five fingers.<br>Lesson 9: Within linear and array dot configurations of numbers 3, 4, and 5, find *hidden partners*.<br>Lesson 10: Within circular and scattered dot configurations of numbers 3, 4, and 5, find *hidden partners*.<br>Lesson 11: Model decompositions of 3 with materials, drawings, and expressions. Represent the decomposition as 1 + 2 and 2 + 1. | 5 |

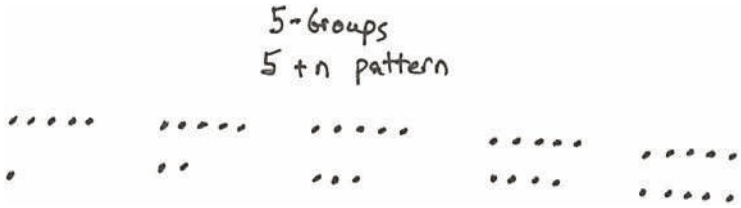
| TEKS | ELPS | Topics and Objectives | | Days |
|---|---|---|---|---|
| **K.2A**<br>**K.2B**<br>**K.2C**<br>**K.2D**<br>**K.2E**<br>**K.2I**<br>K.8A | 1.A<br>1.C<br>2.E<br>2.I<br>3.B<br>3.F<br>4.C<br>4.F<br>4.G | D | **The Concept of Zero and Working with Numbers 0–5**<br>Lesson 12: Understand the meaning of zero. Write the numeral 0.<br>Lesson 13: Order and write numerals 0–3 to answer *how many* questions.<br>Lesson 14: Write numerals 1–3. Represent decompositions with materials, drawings, and equations, 3 = 2 + 1 and 3 = 1 + 2.<br>Lesson 15: Order and write numerals 4 and 5 to answer *how many* questions in categories; sort by count.<br>Lesson 16: Write numerals 1–5 in order. Answer and make drawings of decompositions with totals of 4 and 5 without equations. | 5 |
| | | | Mid-Module Assessment: Topics A–D (Interview style assessment: 3 days) | 3 |
| **K.2A**<br>**K.2B**<br>**K.2C**<br>**K.2D**<br>**K.2E** | 1.C<br>1.E<br>2.E<br>2.G<br>2.I<br>3.E<br>3.F<br>4.C<br>4.G | E | **Working with Numbers 6–8 in Different Configurations**<br>Lesson 17: Count 4–6 objects in vertical and horizontal linear configurations and array configurations. Match 6 objects to the numeral 6.<br>Lesson 18: Count 4–6 objects in circular and scattered configurations. Count 6 items out of a larger set. Write numerals 1–6 in order.<br>Lesson 19: Count 5–7 linking cubes in linear configurations. Match with numeral 7. Count on fingers from 1 to 7, and connect to 5-group images.<br>Lesson 20: Reason about sets of 7 varied objects in circular and scattered configurations. Find a path through the scattered configuration. Write numeral 7. Ask, “How is your seven different than mine?”<br>Lesson 21: Compare counts of 8 in linear and array configurations. Match with numeral 8.<br>Lesson 22: Arrange and strategize to count 8 beans in circular (around a cup) and scattered configurations. Write numeral 8. Find a path through the scattered set, and compare paths with a partner. | 6 |
| **K.2A**<br>**K.2B**<br>**K.2C**<br>**K.2D**<br>**K.2E** | 1.C<br>2.E<br>2.I<br>3.C<br>3.E | F | **Working with Numbers 9–10 in Different Configurations**<br>Lesson 23: Organize and count 9 varied geometric objects in linear and array (3 threes) configurations. Place objects on 5-group mat. Match with numeral 9. | 6 |

| TEKS | ELPS | Topics and Objectives | | | Days |
|---|---|---|---|---|---|
| | 3.F<br>3.G<br>4.F<br>4.G | | Lesson 24: | Strategize to count 9 objects in circular (around a paper plate) and scattered configurations printed on paper. Write numeral 9. Represent a path through the scatter count with a pencil. Number each object. | |
| | | | Lesson 25–26: | Count 10 objects in linear and array configurations (2 fives). Match with numeral 10. Place on the 5-group mat. Dialogue about 9 and 10. Write numeral 10. | |
| | | | Lesson 27: | Count 10 objects, and move between all configurations. | |
| | | | Lesson 28: | Act out *result unknown* story problems without equations. | |
| **K.2A**<br>**K.2C**<br>**K.2F**<br>K.2D<br>K.2E<br>K.5 | 1.C<br>2.C<br>2.E<br>2.I<br>3.E<br>3.F<br>4.F<br>4.G | G | ***One More* with Numbers 0–10** | | 4 |
| | | | Lesson 29: | Order and match numeral and dot cards from 1 to 10. State 1 more than a given number. | |
| | | | Lesson 30: | Make math stairs from 1 to 10 in cooperative groups. | |
| | | | Lesson 31: | Arrange, analyze, and draw 1 more up to 10 in configurations other than towers. | |
| | | | Lesson 32: | Arrange, analyze, and draw sequences of quantities of 1 more, beginning with numbers other than 1. | |
| **K.2A**<br>**K.2C**<br>**K.2F**<br>K.2D<br>K.2E | 1.C<br>2.C<br>2.E<br>2.I<br>3.C<br>3.F<br>3.H<br>4.F<br>4.G | H | ***One Less* with Numbers 0–10** | | 5 |
| | | | Lesson 33: | Order quantities from 10 to 1, and match numerals. | |
| | | | Lesson 34: | Count down from 10 to 1, and state 1 less than a given number. | |
| | | | Lesson 35: | Arrange number towers in order from 10 to 1, and describe the pattern. | |
| | | | Lesson 36: | Arrange, analyze, and draw sequences of quantities that are 1 less in configurations other than towers. | |
| | | | Lesson 37: | Culminating Task | |
| | | | End-of-Module Assessment: Topics E–H (Interview style assessment: 3 days) | | 3 |
| **Total Number of Instructional Days** | | | | | **43** |

# Terminology

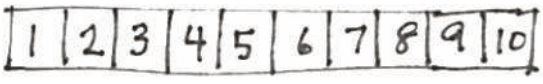
### New or Recently Introduced Terms

- Exactly the same, not exactly the same, and the same, but… (ways to analyze objects to match or sort)
- Match (group items that are the same or that have the same given attribute)
- Sort (group objects according to a particular attribute)
- How many? (with reference to counting quantities or sets)
- Hidden partners (embedded numbers)
- Counting path (with reference to order of count)
- Number story (stories with *add to* or *take from* situations)
- Zero (understand the meaning of, write, and recognize)
- Number sentence (3 = 2 + 1)
- 5-group (pictured to the right)
- Rows and columns (linear configuration types)
- Number path
- 1 more (e.g., 4. 1 more is 5.)
- 1 less (e.g., 4. 1 less is 3.)



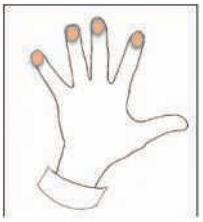

# Suggested Tools and Representations

- Rulers for use as straightedges
- Five dot mat
- Five-frame and ten-frame cards
- Number path
- Left hand mat
- Two hands mat
- 5-group cards
- Rekenrek (Slavonic abacus having beads with a color change at the five)
- Concrete materials in individual bags for counting and sorting (white beans painted red on one side, twigs, dried leaves, dry pasta, pennies, plates, forks, spoons, cups, etc.)
- Commercial concrete materials (linking cubes in tens, non-linking cubes, square-inch tiles, etc.)

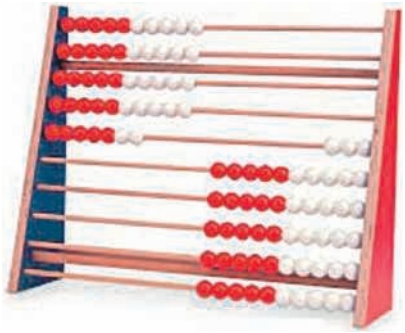



*Number Path*

*20-Bead Rekenrek*



*Left Hand Mat*



*100-Bead Rekenrek*

# The Value of Sprints in *Eureka Math®*

Myth: The purpose of Sprints is to help students learn how to solve math problems quickly.

Reality: **Sprints offer concentrated fluency practice on specific skills and concepts.**

A well-managed and carefully timed routine is used in a Sprint to create an environment where students are fully engaged and focused on the activity[2]. Students are not expected to complete all of the problems and should not be assessed on their speed. Instead, Sprints are intentionally designed to provide students with opportunities to strive for and measure their improvement from one Sprint to the next within an engaging and motivating environment.

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Myth: Sprints require students to rely on rote memorization or rote procedure.

Reality: **Sprints build understanding and flexible problem solving.**

Sprints support procedural fluency, a critical component of mathematical proficiency[3], by fostering conceptual understanding and flexible problem solving. The problems in each Sprint are carefully selected and sequenced to help students recognize patterns and structures to solve subsequent, more complex problems.

$12 = 4 \times$ ____

$12 = 2 \times 2 \times$ ____

$12 = 3 \times 2 \times$ ____

For example, consider the sequence of problems shown. The first problem contains an unknown factor. The second problem intentionally decomposes the known factor in the first problem, 4, into 2 × 2. The third problem is a variation of the second problem with one given factor changed. This type of sequence allows students to solve the problems by flexibly using factual recall, pattern recognition, and numeracy strategies.

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Myth: Sprints introduce new learning in a lesson.

Reality: **Sprints distribute practice over time.**

Sprints distribute practice over time, which leads to better retention of learning[4]. The mathematics in the Sprint may be related to the lesson but it is not used to introduce new learning.

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Myth: Sprints use problems that aren't appropriate for some students.

Reality: **Sprints let all students practice at the level appropriate for them.**

Sprints allow students to focus on their own growth and to strive for their personal best. The problems are intentionally designed to progress in difficulty from simple to complex, and students are not expected to complete all of the problems. Instead, each student does their personal best based on their current automaticity with a given concept or skill.

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[2] Sagher, Yoram and M. Vali Siadat. "Building Study Skills in a College Mathematics Classroom." Research report, Richard J. Daley College, 1997. Education Resources Information Center (ED449834). https://eric.ed.gov/?id=ED449834.

[3] National Council of Teachers of Mathematics (NCTM). "Procedural Fluency in Mathematics: A Position of the National Council of Teachers of Mathematics." Accessed April 8, 2021. https://www.nctm.org/Standards-and-Positions/Position-Statements/Procedural-Fluency-in-Mathematics/. 2014.

[4] Brown, Peter, Henry L. Roediger III, and Mark A. McDaniel. *Make It Stick: The Science of Successful Learning.* Cambridge, MA: Harvard University Press. 2014.

Myth: Sprints should be a graded activity.

Reality: **Sprints are practice and formative assessments.**

Sprints are practice. They are not summative assessments. Sprints allow students to see their improvement from one Sprint to the next and provide teachers with a sense of each student's automaticity with a particular concept or skill. We strongly discourage grading Sprints.

# Suggested Methods of Instructional Delivery

## Personal White Boards

### Materials Needed for Personal White Boards

1 heavy duty, clear sheet protector
1 piece of stiff red tag board 11" × 8 ¼"
1 piece of stiff white tag board 11" × 8 ¼"
1 3" × 3" piece of dark synthetic cloth for an eraser (e.g., felt)
1 low odor blue dry erase marker, fine point

### Directions for Creating Personal White Boards

Cut the white and red tag to specifications. Slide into the sheet protector. Store the eraser on the red side. Store markers in a separate container to avoid stretching the sheet protector.

### Frequently Asked Questions About Personal White Boards

*Why is one side red and one white?*

- The white side of the board is the "paper." Students generally write on it, and if working individually, turn the board over to signal to the teacher they have completed their work. The teacher then says, "Show me your boards," when most of the class is ready.

*What are some of the benefits of a personal white board?*

- The teacher can respond quickly to gaps in student understandings and skills. "Let's do some of these on our personal white boards until we have more mastery."
- Students can erase quickly so that they do not have to suffer the evidence of their mistake.
- They are motivating. Students love both the drill and thrill capability and the chance to do story problems with an engaging medium.
- Checking work gives the teacher instant feedback about student understanding.

*What is the benefit of this personal white board over a commercially purchased dry erase board?*

- It is much less expensive.
- Templates such as place value charts, number bond mats, hundreds boards, and number lines can be stored between the two pieces of tag board for easy access and reuse.
- Worksheets, story problems, and other problem sets can be done without marking the paper so that students can work on the problems independently at another time.

- Strips with story problems, number lines, and arrays can be inserted and still have a full piece of paper on which to write.
- The red versus white side distinction clarifies expectations. When working collaboratively, there is no need to use the red. When working independently, the students know how to keep their work private.
- The tag board can be removed if necessary to project the work.

## Homework

Homework is an opportunity for additional practice of the content from the day's lesson. The teacher is encouraged, with the support of parents, administrators, and colleagues, to determine the appropriate use of homework for his students. Some alternative suggestions to the print homework included in each lesson are to

- Send home a plastic bag with needed materials for a familiar counting or grouping activity. Printed directions might be provided for parents or guardians when necessary.
- Create a "math tool kit" from materials used during the Concept Development portion of the lessons. Sending this kit as homework gives students the opportunity to repeat the same activity modeled or practiced during class.
- Use print homework from a previous lesson as "remember homework." Students may be instructed to teach an adult at home how to do the review work.

## Scaffolds

The scaffolds integrated into *A Story of Units*® give alternatives for how students access information as well as express and demonstrate their learning. Strategically placed margin notes are provided within each lesson elaborating on the use of specific scaffolds at applicable times. They address many needs presented by English language learners, students with disabilities, students performing above grade level, and students performing below grade level. Many of the suggestions are organized by Universal Design for Learning (UDL) principles and are applicable to more than one population. To read more about the approach to differentiated instruction in *A Story of Units*, please refer to "How to Implement *A Story of Units*."

## Use of Problem Sets in Kindergarten

Providing opportunities for students to practice and show what they have learned through independent, in-class work is an integral part of *A Story of Units*. However, throughout the Kindergarten curriculum, especially in the early modules, teachers may decide to extend the actions of the Concept Development as independent work rather than use the Problem Set.

Teachers are encouraged to use professional judgment when choosing to include or omit a Problem Set. If a Problem Set is omitted, be sure to send home an alternate homework assignment (listed above) in lieu of the written homework.

Selective use of Problem Sets allows students to gradually move toward proficiently completing written work independently. It is recommended that teachers consider using the following Problem Sets from these Module 1 Lessons: 6, 8, 11, 13–15, 18–25, 31–32, 35.

Following "Preparing to Teach a Module," two protocols are provided to help teachers prepare a lesson: "Preparing to Teach a Lesson by Extending the Action of the Concept Development" and "Preparing to Teach a Lesson with a Problem Set."

## Self-Reflections

### Directions for Using Student Self-Reflections

Giving students an opportunity to think and talk about their learning process and progress empowers them to take responsibility for their knowledge development. Self-reflections can be implemented at the end of every topic to encourage students to track their strategies and understanding of key concepts as they progress through the module. Students can refer to their completed Exit Tickets from each lesson within a topic as they reflect upon their learning of these concepts. In their reflections, students should evaluate the outcomes of their learning by writing about the concepts they feel secure with and those that will require more attention and focus. Students will use this knowledge to make actionable plans for improvement with the support of their teacher.

As students reflect on their learning within each topic, they can review previous reflections and discuss how their understanding has changed over time. Students can also use all of their reflections to analyze their overall learning experience for the entire module.

A self-reflection template is provided on the following page. The template is appropriate for use with students at all grade levels. Students can answer the questions on the template by using pictures, numbers, or words. Self-reflections are intended to be easily integrated into existing data-tracking structures used by teachers and students. The reflections can also be used to facilitate communication about a student's progress with the student's family.

Name _____ Date _____

Module _____ Topic _____

I learned:

5 I understand.

4

3

2

1 I need help.

Next steps:

I still have questions about:

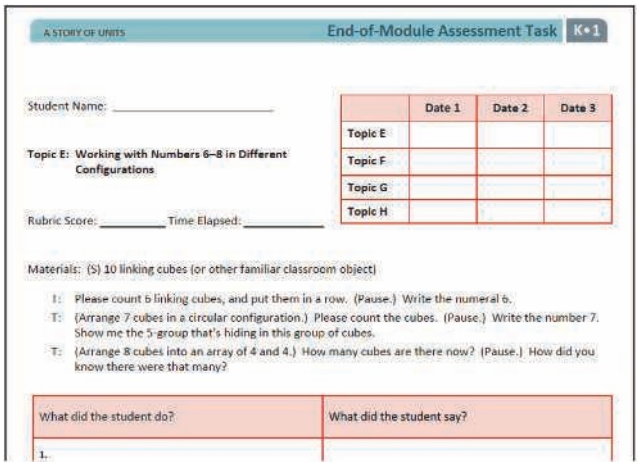
## Preparing to Teach a Module

Preparation of lessons will be more effective and efficient if there has been an adequate analysis of the module first. Each module in *A Story of Units* can be compared to a chapter in a book. How is the module moving the plot, the mathematics, forward? What new learning is taking place? How are the topics and objectives building on one another? The following is a suggested process for preparing to teach a module.

Step 1: Get a preview of the plot.

A: Read the Table of Contents. At a high level, what is the plot of the module? How does the story develop across the topics?

B: Preview the module's Mid- and End-of-Module Assessments[5] to see the trajectory of the module's mathematics and the nature of the work students are expected to be able to do.



A STORY OF UNITS — End-of-Module Assessment Task — K•1

Student Name: _____

| | Date 1 | Date 2 | Date 3 |
|---|---|---|---|
| Topic E | | | |
| Topic F | | | |
| Topic G | | | |
| Topic H | | | |

Topic E: Working with Numbers 6–8 in Different Configurations

Rubric Score: _____ Time Elapsed: _____

Materials: (S) 10 linking cubes (or other familiar classroom object)

T: Please count 6 linking cubes, and put them in a row. (Pause.) Write the numeral 6.
T: (Arrange 7 cubes in a circular configuration.) Please count the cubes. (Pause.) Write the number 7. Show me the 5-group that's hiding in this group of cubes.
T: (Arrange 8 cubes into an array of 4 and 4.) How many cubes are there now? (Pause.) How did you know there were that many?

| What did the student do? | What did the student say? |
|---|---|
| 1. | |

Step 2: Dig into the details.

A: Dig into a careful reading of the Module Overview. While reading the narrative, *liberally* reference the lessons and Topic Overviews to clarify the meaning of the text—the lessons demonstrate the strategies, show how to use the models, clarify vocabulary, and build understanding of concepts. Consider searching the video gallery on *Eureka Math*'s website to watch demonstrations of the use of models and other teaching techniques.

B: Having thoroughly investigated the Module Overview, read through the chart entitled Overview of Module Topics and Lesson Objectives to further discern the plot of the module. How do the topics flow and tell a coherent story? How do the objectives move from simple to complex?

Step 3: Summarize the story.

Complete the Mid- and End-of-Module Assessments. Use the strategies and models presented in the module to explain the thinking involved. Again, liberally reference the work done in the lessons to see how students who are learning with the curriculum might respond.

[5]A more in-depth preview can be done by searching the Problem Sets and Exit Tickets in Modules 5 and 6. Furthermore, this same process can be used to preview the coherence or flow of any component of the curriculum, such as Fluency Practice or Application Problems.

# Preparing to Teach a Lesson by Extending the Action of the Concept Development

If teachers decide to extend the actions of the Concept Development as independent work rather than use the Problem Set, a three-step process is suggested to prepare a lesson. It is understood that at times teachers may need to make adjustments (customizations) to lessons to fit the time constraints and unique needs of their students. The recommended planning process is outlined below.

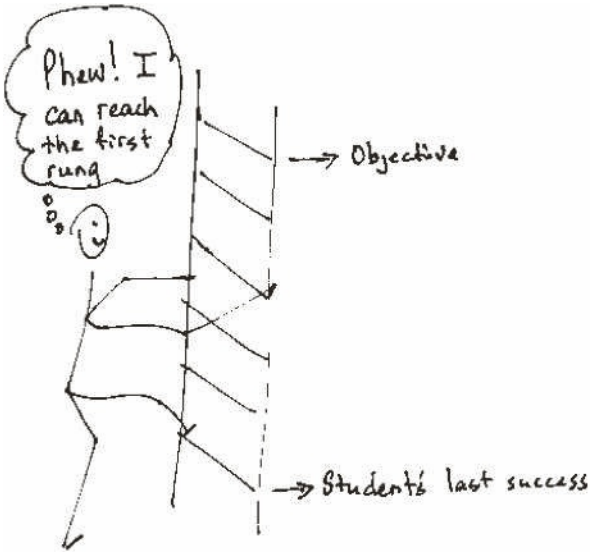
Note: The ladder of Step 2 is a metaphor for the teaching sequence. The sequence can be seen not only at the macro level in the role that this lesson plays in the overall story, but also at the lesson level, where each rung in the ladder represents the next objective in the teaching sequence. As *A Story of Units* moves into the elementary grades, the ladder is also evident between selected problems, where each rung in the ladder represents the next step in understanding or the next skill needed to reach the objective. To reach the objective, or the top of the ladder, all students must be able to access the first rung and each successive rung.

Step 1: Discern the plot.

- A: Briefly review the module's Table of Contents, recalling the overall story of the module and analyzing the role of this lesson in the module.
- B: Read the Topic Overview related to the lesson, and then review the Concept Development of each lesson in the topic.
- C: Review the assessment tasks for the topic, keeping in mind that assessments can be found midway through the module and at the end of the module.

Step 2: Find the ladder.

- A: Gather the necessary materials, and do the actions of the Concept Development for each objective (lesson) in the topic and adjacent topics as necessary (e.g., if preparing the first lesson of a topic, return to the last lesson of the prior topic in order to make sense of the rungs between the lessons).
- B: Analyze and write notes on the new complexities of each objective in the topic (e.g., smaller to larger numbers, simple to challenging configurations, concrete to pictorial to abstract). The new complexities are the rungs of the ladder.
- C: Anticipate where students might struggle, and write a note about the potential cause of the struggle.
- D: Answer the Student Debrief questions, always anticipating how students will respond.



Step 3: Hone the lesson.

At times, the lesson and the accompanying materials are appropriate for all students and the day's schedule. At others, they may need customizing. If the decision is to customize based on either the needs of students or scheduling constraints, a suggestion is to create sets of materials that allow students to move through the concept from simple to complex.

A: Having anticipated where students might struggle or need an extra challenge, identify appropriate customizations as detailed in the chart below.

| Anticipated Difficulty | Customization Suggestion |
|---|---|
| The task of the Practice[6] is too challenging. | Depending on the Practice task, consider using smaller quantities, different colors, or templates to support students working independently on the task. Once students feel confident in the task, remove the scaffolds. For example, if the task is to count 9 cubes, use 3 red, 3 yellow, and 3 blue cubes instead of mixed colors or all one color. |
| There is too big of a jump in complexity between two lessons. | Provide workstations for students to visit that repeat skills and objectives students have previously learned. For example, if students have trouble counting with one-to-one correspondence with numbers above 5, provide the supportive structure of a cropped egg carton with 10 slots to bridge to the task. |
| Students lack fluency or foundational skills necessary for the lesson. | Before beginning independent work on a Practice task, do a quick, engaging fluency exercise. Before beginning any fluency activity for the first time, assess that the sequence of questions begins by developing the concept at the simplest level before advancing. |
| More work is needed at the concrete or pictorial level. | Create sets of materials that allow students more practice with manipulatives or pictures before moving to a more complex skill. For example, continue to work with counters in a circle before asking students to count images printed in a circular configuration. |
| More work is needed moving from abstract to concrete or abstract to pictorial. | Hone the Practice to reduce the amount of drawing or use of manipulatives as appropriate for certain students or the whole class. For example, students who have already mastered counting a group and matching a numeral can be given a numeral and asked to create a matching group. |

[6]The Practice task refers to the actions of the Concept Development.

B: Adjust the Practice to reflect the customizations or to address scheduling constraints (e.g., use more challenging Problem Sets such as those that have been omitted for use by the whole class for students who work with greater fluency and understanding and who, therefore, can complete more work within a given time frame).

C: Consider how to best use the vignettes of the Concept Development section of the lesson. Read through the vignettes, and highlight selected parts to be included in the delivery of instruction so that students can be independently successful in their Practice.

D: Pay close attention to the questions chosen for the Student Debrief. Regularly ask students, "What math are we learning today?" "Could you teach what you learned to someone else?" Help them articulate the goal to encourage metacognition and use of vocabulary.

## Preparing to Teach a Lesson with a Problem Set

A three-step process is suggested to prepare a lesson. It is understood that at times teachers may need to make adjustments (customizations) to lessons to fit the time constraints and unique needs of their students. The recommended planning process is outlined below.

Note: The ladder of Step 2 is a metaphor for the teaching sequence. The sequence can be seen not only at the macro level in the role that this lesson plays in the overall story, but also at the lesson level, where each rung in the ladder represents the next step in understanding or the next skill needed to reach the objective. To reach the objective, or the top of the ladder, all students must be able to access the first rung and each successive rung.

Step 1: Discern the plot.

A: Briefly review the module's Table of Contents, recalling the overall story of the module and analyzing the role of this lesson in the module.

B: Read the Topic Overview related to the lesson, and then review the Problem Set of each lesson in the topic.

C: Review the assessment following the topic, keeping in mind that assessments can be found midway through the module and at the end of the module.

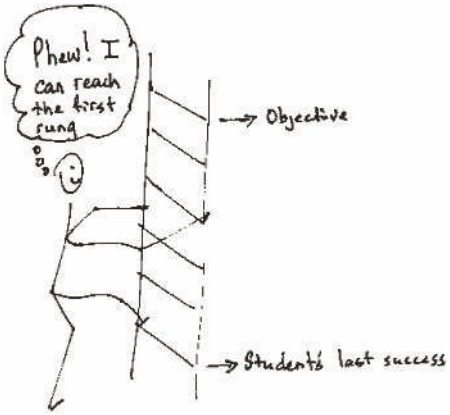
Step 2: Find the ladder.

A: Complete the lesson's Problem Set.

B: Analyze and write notes on the new complexities of each problem as well as the sequences and progressions throughout problems (e.g., pictorial to abstract, smaller to larger numbers, single- to multi-step problems). The new complexities are the rungs of the ladder.

C: Anticipate where students might struggle, and write a note about the potential cause of the struggle.

D: Answer the Student Debrief questions, always anticipating how students will respond.



Step 3: Hone the lesson.

At times, the lesson and Problem Set are appropriate for all students and the day's schedule. At others, they may need customizing. If the decision is to customize based on either the needs of students or scheduling constraints, a suggestion is to decide upon and designate "Must Do" and "Could Do" problems.

A: Select "Must Do" problems from the Problem Set that meet the objective and provide a coherent experience for students; reference the ladder. The expectation is that the majority of the class will complete the "Must Do" problems within the allocated time. While choosing the "Must Do" problems, keep in mind the need for a balance of calculations, various word problem types, and work at both the pictorial and abstract levels.

B: "Must Do" problems might also include remedial work as necessary for the whole class, a small group, or individual students. Depending on anticipated difficulties, those problems might take different forms as shown in the chart below.

| Anticipated Difficulty | "Must Do" Remedial Problem Suggestion |
|---|---|
| The first problem of the Problem Set is too challenging. | Write a short sequence of problems on the board that provides a ladder to Problem 1. Direct the class or small group to complete those first problems to empower them to begin the Problem Set. Consider labeling these problems "Zero Problems" since they are done prior to Problem 1. |
| There is too big of a jump in complexity between two problems. | Provide a problem or set of problems that creates a bridge between the two problems. Label them with the number of the problem they follow. For example, if the challenging jump is between Problems 2 and 3, consider labeling the bridging problems "Extra 2s." |
| Students lack fluency or foundational skills necessary for the lesson. | Before beginning the Problem Set, do a quick, engaging fluency exercise, such as a Rapid White Board Exchange, "Thrilling Drill," or Sprint. Before beginning any fluency activity for the first time, assess that students are poised for success with the easiest problem in the set. |
| More work is needed at the concrete or pictorial level. | Provide manipulatives or the opportunity to draw solution strategies. Especially in Kindergarten, at times the Problem Set or pencil and paper aspect might be completely excluded, allowing students to simply work with materials. |
| More work is needed at the abstract level. | Hone the Problem Set to reduce the amount of drawing as appropriate for certain students or the whole class. |

C: "Could Do" problems are for students who work with greater fluency and understanding and can, therefore, complete more work within a given time frame. Adjust the Exit Ticket and Homework to reflect the "Must Do" problems or to address scheduling constraints.

D: At times, a particularly tricky problem might be designated as a "Challenge!" problem. This can be motivating, especially for advanced students. Consider creating the opportunity for students to share their "Challenge!" solutions with the class at a weekly session or on video.

E: Consider how to best use the vignettes of the Concept Development section of the lesson. Read through the vignettes, and highlight selected parts to be included in the delivery of instruction so that students can be independently successful on the assigned task.

F: Pay close attention to the questions chosen for the Student Debrief. Regularly ask students, "What was the lesson's learning goal today?" Help them articulate the goal.

## Assessment Summary

| Assessment Type | Administered | Format | Standards Addressed |
|---|---|---|---|
| Mid-Module Assessment Task | After Topic D | Interview with Rubric | (Numbers 1–5)<br>K.2A<br>K.2B<br>K.2C<br>K.2D<br>K.2E<br>K.2I<br>K.8A |
| End-of-Module Assessment Task | After Topic H | Interview with Rubric | (Numbers 0–10)<br>K.2A<br>K.2B<br>K.2C<br>K.2D<br>K.2E<br>K.2F |
| Culminating Task | Lesson 37 | *Decide how to classify the objects in your bag into two groups. Count the number of objects in each group. Represent the greater number in various ways. Next, remove the 5-group card from your pack that shows the number of objects in the smaller group. Put your remaining cards in order from smallest to greatest. Your friends will have to figure out what card is missing when they visit your station!* | K.2A<br>K.2B<br>K.2C<br>K.2D<br>K.2E<br>K.2F<br>K.8A |

Teacher Edition

# Eureka Math® Grade K Module 2

## TEKS EDITION

Special thanks go to the Gordon A. Cain Center and to the Department of Mathematics at Louisiana State University for their support in the development of *Eureka Math*.

Great Minds® is the creator of *Eureka Math*®, *Wit & Wisdom*®, *Alexandria Plan*™, and *PhD Science*®.

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Table of Contents

# GRADE K • MODULE 2

## Two-Dimensional and Three-Dimensional Shapes

Grade K • Module 2

# Two-Dimensional and Three-Dimensional Shapes

## OVERVIEW

In Module 1, students began the year observing their world. What is exactly the same? What is the same but…? They matched and sorted according to criteria sequenced from simple to complex. Their perceptions evolved into observations about numbers to 10. "4 is missing 1 to make 5." "4 plus 1 more is 5." "There are the same number of dogs and flowers, 6."

In this module, students seek out flat and solid shapes in their world (**K.6A, K.6B**). Empowered by this lens, they begin to make connections between the wheel of a bicycle, the moon, and the top of an ice cream cone. Just as the number 4 allowed them to quantify 4 mountains and 4 mice as equal numbers, learning to identify flats and solids allows them to see the relationship of the simple to the complex, a mountain's top to a plastic triangle and cone sitting on their desk.

To open Topic A, students find and describe flat shapes in their environment using informal language, without naming them at first (**K.6A**). In Lesson 2, they sort the shapes, juxtaposing them with various examples and non-examples (**K.6E**). This process further refines their ability to talk about the shapes, for example, as closed or having straight sides (**K.6D**). The naming of the flat shape as a triangle is part of that process, not the focus of it. Student's sort are organized into simple picture graphs giving rise to opportunities for students to answer questions of "how many?" and to make simple comparisons of more and less. Interpreting data in teacher-created graphs lays the foundation for students to create their own graphs in Module 2 fluencies and later modules (**K.8A, K.8B, K.8C**).

The same process is then repeated with rectangles in Lesson 3 and hexagons and circles in Lesson 4. In Lesson 5, students manipulate all the flat shapes using position words as the teacher gives directives such as, "Move the closed shape with three straight sides behind the shape with six straight sides." These positioning words are subsequently woven into the instructional program, at times in math fluency activities, but also throughout the entire school day.

The lessons of Topic B replicate those of Topic A but with solid shapes. In addition, students recognize the presence of the flats within the solids. The module closes in Topic C with discrimination between flats and solids. A culminating task involves students in creating displays of a given flat shape with counter-examples and showing related solid shapes (**K.6A, K.6B, K.6C**).

The fluency components in the lessons of Module 1 included activities wherein students used a variety of triangles and rectangles to practice the decompositions of 3 and 4. Flats and solids will continue to be included in fluency activities in this module and throughout the year so that students have repeated experiences with shapes, their attributes, and their names. Daily number fluency practice in this new module

is critical. There are two main goals of consistent fluency practice: (1) to solidify the numbers of Module 1 and (2) to anticipate the numbers of Modules 3, 4, and 5. Therefore, students continue to work extensively with numbers to 10 and fluency with addition and subtraction to 5.

The Kindergarten year closes in Module 6 with another geometry unit. By that time, having become much more familiar with flats and solids, the students compose new flat shapes ("Can you make a rectangle from these two triangles?") and build solid shapes from components ("Let's use these straws to be the edges and these balls of clay to be the corners of a cube!"). This module will allow them to bring together all that they have learned throughout the year as they manipulate shapes and their components.

## Notes on Pacing for Differentiation

If pacing is a challenge, consider omitting Lessons 5 and 8. Instead, embed experiences with position words in other content areas and throughout the students' day. It is not essential that students be introduced to position words through the context of shapes.

# Focus Grade Level Standards

## Geometry and Measurement

**The student applies mathematical processes to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalizations about their properties. The student is expected to:**

**K.6A** identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles;

**K.6B** identify three-dimensional solids, including cylinders, cones, spheres, and cubes, in the real world;

**K.6C** identify two-dimensional components of three-dimensional objects;

**K.6D** identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably;

**K.6E** classify and sort a variety of regular and irregular two- and three-dimensional figures regardless of orientation or size.

## Data Analysis

**The student applies mathematical processes to collect and organize data to make it useful for interpreting information. The student is expected to:**

**K.8A** collect, sort, and organize data into two or three categories;

**K.8B** use data to create real-object and picture graphs;

**K.8C** draw conclusions from real-object and picture graphs.

# Foundational Standards

## The child knows:

**V.C.1.** how to names common shapes;

**V.C.2.** how to create shapes;

**V.C.3.** how to demonstrate use of location words (such as over, under, above, on, besides, next to, between, in front of, near, far, etc.);

**V.E.1.** how sort objects that are the same and different into groups and how to use language to describe how the groups are similar and different.

## Focus Mathematical Process Standards

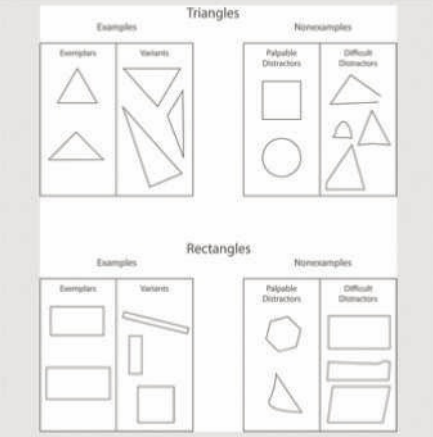
**The students uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**

**MPS(A)** apply mathematics to problems arising in everyday life, society, and the workplace;

**MPS(B)** use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and reasonableness of the solution;

**MPS(E)** create and use representations to organize, record, and communicate mathematical ideas;

**MPS(G)** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.




*Exemplars* are the typical visual prototypes of the shape category.

*Variants* are other examples of the shape category.

*Palpable distractors* are nonexamples with little or no overall resemblance to the exemplars.

*Difficult distractors* are visually similar to examples but lack at least one defining attribute.

# Overview of Module Topics and Lesson Objectives

| TEKS | ELPS | Topics and Objectives | | Days |
|---|---|---|---|---|
| **K.6A**<br>**K.6D**<br>**K.6E**<br>**K.8A**<br>**K.8B**<br>**K.8C** | 1.A<br>1.C<br>1.D<br>2.C<br>2.I<br>3.B<br>3.E<br>4.C<br>4.G<br>4.I | A | **Two-Dimensional Flat Shapes**<br>Lesson 1: Find and describe flat triangles, squares, rectangles, hexagons, and circles using informal language without naming them.<br>Lesson 2: Explain decisions about classifications of triangles into categories using variants and non-examples and record on a picture graph. Identify shapes as triangles.<br>Lesson 3: Explain decisions about classifications of rectangles into categories using variants and non-examples and record on a picture graph. Identify shapes as rectangles.<br>Lesson 4: Explain decisions about classifications of hexagons and circles identify them by name, and record on a picture graph. Make observations using variants and non-examples.<br>Lesson 5: Describe and communicate positions of all flat shapes using the words *above, below, beside, in front of, next to*, and *behind*. | 5 |
| **K.6A**<br>**K.6B**<br>**K.6C**<br>**K.6D**<br>**K.8A**<br>**K.8B**<br>**K.8C** | 1.F<br>2.C<br>2.E<br>2.I<br>3.C<br>3.E<br>4.C<br>4.G | B | **Three-Dimensional Solid Shapes**<br>Lesson 6: Find and describe solid shapes using informal language without naming them.<br>Lesson 7: Explain decisions about classification of solid shapes into categories and record on a picture graph. Name the solid shapes.<br>Lesson 8: Describe and communicate positions of all solid shapes using the words *above, below, beside, in front of, next to*, and *behind*. | 3 |
| **K.6A**<br>**K.6B**<br>**K.6C**<br>**K.6E** | 1.C<br>2.E<br>2.G<br>2.I<br>3.E<br>3.F<br>4.G | C | **Two-Dimensional and Three-Dimensional Shapes**<br>Lesson 9: Identify and sort shapes as two-dimensional or three-dimensional, and recognize two-dimensional and three-dimensional shapes in different orientations and sizes.<br>Lesson 10: Culminating Task | 2 |
| | | | End-of-Module Assessment: Topics A–C (Interview style assessment: 2 days) | 2 |
| **Total Number of Instructional Days** | | | | **12** |

# Terminology

### New or Recently Introduced Terms

- Circle
- Cone (solid shape)
- Cube (solid shape)
- Cylinder (solid shape)
- Face (flat side of a solid)[1]
- Flat (two-dimensional shape)
- Hexagon (flat figure enclosed by six straight sides)
- Rectangle (flat figure enclosed by four straight sides)
- Solid (three-dimensional shape)
- Sphere (a solid shaped like a ball)
- Square (a special rectangle, in which all sides are the same length)
- Triangle (flat figure enclosed by three straight sides)

### Familiar Terms and Symbols[2]

- Above, below, beside, in front of, next to, behind (position words)
- Match (group items that are the same or have the same given attribute)
- Sort

# Suggested Tools and Representations

- Three-dimensional shapes: cone, sphere, cylinder, and cube
- Two-dimensional shapes: circle, hexagon, rectangle, square, and triangle

[1]In the context of polyhedra, faces must be polygonal. However, in more general contexts, a face may be circular (such as the base of a right circular cylinder), or even irregular. It is this more inclusive interpretation of face that is used in this Kindergarten module.
[2]These are terms and symbols students have seen previously.

## Homework

Homework at the K–1 level is not a convention in all schools. In this curriculum, homework is an opportunity for additional practice of the content from the day's lesson. The teacher is encouraged, with the support of parents, administrators, and colleagues, to discern the appropriate use of homework for his or her students. Fluency exercises can also be considered as an alternative homework assignment.

## Scaffolds

The scaffolds integrated into *A Story of Units*® give alternatives for how students access information as well as express and demonstrate their learning. Strategically placed margin notes are provided within each lesson, elaborating on the use of specific scaffolds at applicable times. They address many needs presented by English language learners, students with disabilities, students performing above grade level, and students performing below grade level. Many of the suggestions are organized by Universal Design for Learning (UDL) principles and are applicable to more than one population.

## Assessment Summary

| Type | Administered | Format | Standards Addressed |
|---|---|---|---|
| End-of-Module Assessment Task | After Topic C | Interview with Rubric | K.6A<br>K.6B<br>K.6C<br>K.6D<br>K.6E<br>K.8A<br>K.8B<br>K.8C |
| Culminating Task | Lesson 10 | Collaborative Project | K.6A<br>K.6B<br>K.6C<br>K.6E |

Teacher Edition

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# GRADE K • MODULE 3

## Comparison of Length, Weight, Capacity, and Numbers to 10

Grade K • Module 3

# Comparison of Length, Weight, Capacity, and Numbers to 10

## OVERVIEW

Having observed, analyzed, and classified objects by shape into predetermined categories in Module 2, students now compare and analyze length, weight, capacity, and finally, numbers in Module 3. Students use language such as *longer than*, *shorter than*, *as long as*; *heavier than*, *lighter than*, *as heavy as*; and *more than*, *less than*, *the same as*. "8 is *more than* 5." "5 is *less than* 8." "5 is *the same as* 5." "2 and 3 is also *the same as* 5."

Topics A and B focus on comparison of length, Topic C on comparison of weight, and Topic D on comparison of volume (**K.7B**). Each of these topics opens with an identification of the attribute being compared within the natural context of the lesson (**K.7A**). For example, in Topic A, before exploring length, students realize they could have chosen to compare by a different attribute: weight, length, volume, or numbers (**K.7A**).

T: Students, when you compare and say it is bigger, let's think about what you mean. (After each question, allow students to have a lively, brief discussion.)

T: Do you mean that it is bigger, like this book is *heavier than* this ribbon? (Dramatize the weight of the book and ribbon.)

T: Do you mean that it is longer, like this ribbon is *longer than* this book? (Dramatize the length of the ribbon.)

T: Do you mean that it takes up more space, like this book *takes up more space* than this ribbon when it is all squished together? (Dramatize.)

T: Do you mean to compare the number of things, like *the number* of books and ribbons? (Dramatize a count.)

T: So, we can compare things in different ways! Today, let's compare by thinking about longer than, taller than, or shorter than. (Dramatize.)

After the Mid-Module Assessment, Topic E begins with an analysis using the question, "Are there enough?" This leads naturally from exploring when and if there is enough space to seeing whether there are enough chairs for a small set of students: "There are fewer chairs than students!" This bridges into Topics F and G, which present a sequence building toward the comparison of numerals (**K.2H**). Topic F begins with counting and matching sets to compare (**K.2E, K.2G**).

The module supports students' understanding of amounts and their developing number sense. For example, counting how many small cups of rice are contained within a larger quantity provides a foundational concept of place value: Within a larger amount are smaller equal units, which together make up the whole. "4 cups of rice is the same as 1 mug of rice." Compare that statement to "10 ones is the same as 1 ten" (**1.2A, 1.2B**). As students become confident directly comparing the length of a pencil and a crayon with statements such as "The pencil is longer than the crayon" (**K.7B**), they will be ready in later grades to indirectly compare using length units with statements such as "The pencil is longer than the crayon because 7 cubes is more than 4 cubes" (**1.7A, 1.7B, 1.7C, 1.7D**).

Additional foundational work for later grades is as follows:

- **Foundational work with equivalence**. The length of a stick with 5 linking cubes is the same as the length of my cell phone. A pencil weighs the same as a stick with 5 linking cubes. Each module component on measurement closes with a focus on *the same as*.
- **Foundational work for the precise use and understanding of rulers and number lines**. The module opens with lessons pointing out the importance of aligning endpoints to measure length.
- **Foundational understanding of comparison**. As students count to compare the length of linking cube sticks, they are laying the foundation for answering *how many more…than*/*less…than* questions in Grade 1 (**1.7A, 1.7B, 1.7C, 1.7D**).

## Notes on Pacing for Differentiation

Sprints are introduced in the second half of this module through a gradual progression of preparation exercises. When consolidating or omitting lessons, take care to maintain the intended sequence of the Sprints as listed.

Consider omitting Lesson 7. In order to do so, offer *the same as* as one more option to describe the comparison in Lessons 4–6. Be sure to include objects for comparison that yield descriptions of *shorter than*, *longer than*, and *the same length as*.

If students progress quickly in comparing weight by estimating, they may be ready to use the balance scale sooner, allowing for the consolidation of Lessons 8 and 9. To bridge their understanding, have students model the movement of the balance scale with their arms and hands.

Students might better grasp the concepts of volume and capacity if they observe first and explore afterwards. Consider consolidating Lessons 13–15 into a series of demonstrations with students engaged chorally, as recorders, and as acute observers (e.g., "Count the scoops as I fill the container"; "Record the number of scoops it took to fill the container"; and "Share with your partner about what happened to the water"). Students might then gain hands-on experience and explore the concept later (e.g., in centers, science). If pacing is a challenge and students study volume as part of science, consider omitting Lessons 14 and 15.

# Focus Grade Level Standards

## Number and Operations

**The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system. The student is expected to:**

**K.2E** generate a set using concrete and pictorial models that represents a number that is more than, less than, and equal to a given number up to 20;

**K.2G** compare sets of objects up to at least 20 in each set using comparative language;

**K.2H** use comparative language to describe two numbers up to 20 presented as written numerals.

## Geometry and Measurement

**The student applies mathematical process standards to directly compare measurable attributes. The student is expected to:**

**K.7A** give an example of a measurable attribute of a given object, including length, capacity, and weight;

**K.7B** compare two objects with a common measurable attribute to see which object has more of/less of the attribute and describe the difference.

# Foundational Standards

## The child knows:

**V.A.7.** how to use the verbal ordinal terms;

**V.D.1.** how to recognize and compare heights or lengths of people or objects;

**V.D.3.** how to informally recognize and compare weights of objects or people.

# Focus Mathematical Process Standards

## The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

**MPS(C)** select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

**MPS(E)** create and use representations to organize, record, and communicate mathematical ideas;

**MPS(F)** analyze mathematical relationships to connect and communicate mathematical ideas;

**MPS(G)** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

## Overview of Module Topics and Lesson Objectives

| TEKS | ELPS | Topics and Objectives | | Days |
|---|---|---|---|---|
| **K.7A**<br>**K.7B** | 1.C<br>1.E<br>2.E<br>2.I<br>3.B<br>3.E<br>4.G | A | **Comparison of Length and Height**<br>Lesson 1: Compare lengths using *taller than* and *shorter than* with aligned and non-aligned endpoints.<br>Lesson 2: Compare length measurements with string.<br>Lesson 3: Make a series of *longer than* and *shorter than* comparisons. | 3 |
| **K.7A**<br>**K.7B**<br>K.2D<br>K.2E<br>K.2F<br>K.2G<br>K.2I | 1.A<br>1.C<br>2.E<br>2.I<br>3.E<br>3.F<br>4.G | B | **Comparison of Length and Height of Linking Cube Sticks Within 10**<br>Lesson 4: Compare the length of linking cube sticks to a 5-stick.<br>Lesson 5: Determine which linking cube stick is *longer than* or *shorter than* the other.<br>Lesson 6: Compare the length of linking cube sticks to various objects.<br>Lesson 7: Compare objects using *the same as*. | 4 |
| **K.7A**<br>**K.7B**<br>K.4 | 1.C<br>1.F<br>2.C<br>2.E<br>2.I<br>3.C<br>3.E<br>3.F<br>4.G | C | **Comparison of Weight**<br>Lesson 8: Compare using *heavier than* and *lighter than* with classroom objects.<br>Lesson 9: Compare objects using *heavier than, lighter than*, and *the same as* with balance scales.<br>Lesson 10: Compare the weight of an object to a set of unit weights on a balance scale.<br>Lesson 11: Observe conservation of weight on the balance scale.<br>Lesson 12: Compare the weight of an object with sets of different objects on a balance scale. | 5 |

| TEKS | ELPS | Topics and Objectives | | Days |
|---|---|---|---|---|
| **K.7A**<br>**K.7B** | 1.C<br>2.C<br>2.E<br>2.I<br>3.D<br>3.E<br>4.G | D | **Comparison of Volume**<br>Lesson 13: Compare volume using *more than, less than*, and *the same as* by pouring.<br>Lesson 14: Explore conservation of volume by pouring.<br>Lesson 15: Compare using *the same as* with units. | 3 |
| | | | Mid-Module Assessment: Topics A–D (Interview style assessment: 3 days) | 3 |
| **K.2E**<br>**K.2G** | 1.C<br>2.C<br>2.E<br>2.I<br>3.D<br>3.E<br>4.F<br>4.G | E | **Are There Enough?**<br>Lesson 16: Compare to find if there are enough.<br>Lesson 17: Compare using *more than* and *the same as*.<br>Lesson 18: Compare using *fewer than* and *the same as*. | 3 |
| **K.2E**<br>**K.2G**<br>**K.2H**<br>K.2F<br>K.7B | 1.C<br>2.C<br>2.E<br>2.G<br>2.I<br>3.D<br>3.E<br>4.F<br>4.G | F | **Comparison of Sets Within 10**<br>Lesson 19: Relate *more* and *less* to length.<br>Lesson 20: Compare sets informally using *more, less*, and *fewer*.<br>Lesson 21: Identify and create a set that has the same number of objects.<br>Lesson 22: Reason to identify and make a set that has 1 more.<br>Lesson 23: Reason to identify and make a set that has 1 less. | 5 |
| **K.2E**<br>**K.2G**<br>**K.2H**<br>K.2F | 1.A<br>1.C<br>2.E<br>2.I<br>3.C<br>3.E<br>3.F<br>4.G | G | **Comparison of Numerals**<br>Lesson 24: Match and count to compare a number of objects. State which quantity is more.<br>Lesson 25: Match and count to compare two sets of objects. State which quantity is less.<br>Lesson 26: Strategize to compare two sets.<br>Lesson 27: Visualize quantities to compare two numerals. | 4 |
| | | | End-of-Module Assessment: Topics E–G (Interview style assessment: 3 days) | 3 |
| **Total Number of Instructional Days** | | | | 33 |

# Terminology

### New or Recently Introduced Terms

- Balance scale (tool for weight measurement)
- Capacity (with reference to volume)
- Compare (specifically using direct comparison)
- Endpoint (with reference to alignment for direct comparison)
- Enough/not enough (comparative term)
- Heavier than/lighter than (weight comparison)
- Height (vertical distance measurement from bottom to top)
- Length (distance measurement from end to end; in a rectangular shape, length can be used to describe any of the four sides)
- Longer than/shorter than (length comparison)
- More than/fewer than (discrete quantity comparison)
- More than/less than (volume, area, and number comparisons)
- Taller than/shorter than (height comparison)
- The same as (comparative term)
- Weight (heaviness measurement)

### Familiar Terms and Symbols[1]

- Match (group items that are the same or that have the same given attribute)
- Numbers 1–10

# Suggested Tools and Representations

- Balance scales (as pictured to the right)
- Centimeter cubes
- Clay
- Linking cubes in sticks with a color change at the five
- Plastic cups and containers for measuring volume

[1]These are terms and symbols students have seen previously.

## Homework

Homework at the K–1 level is not a convention in all schools. In this curriculum, homework is an opportunity for additional practice of the content from the day's lesson. The teacher is encouraged, with the support of parents, administrators, and colleagues, to discern the appropriate use of homework for his or her students. Fluency exercises can also be considered as an alternative homework assignment.

## Scaffolds

The scaffolds integrated into *A Story of Units*® give alternatives for how students access information as well as express and demonstrate their learning. Strategically placed margin notes are provided within each lesson elaborating on the use of specific scaffolds at applicable times. They address many needs presented by English language learners, students with disabilities, students performing above grade level, and students performing below grade level. Many of the suggestions are organized by Universal Design for Learning (UDL) principles and are applicable to more than one population.

## Assessment Summary

| Type | Administered | Format | Standards Addressed |
|---|---|---|---|
| Mid-Module Assessment Task | After Topic D | Constructed response with rubric | K.7A<br>K.7B |
| End-of-Module Assessment Task | After Topic G | Constructed response with rubric | K.2E<br>K.2G<br>K.2H |

Teacher Edition

# Eureka Math® Grade K Module 4

## TEKS EDITION

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# GRADE K • MODULE 4

## Number Pairs, Addition and Subtraction to 10

Grade K • Module 4

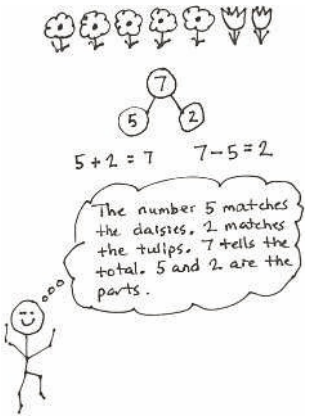
# Number Pairs, Addition and Subtraction to 10

## OVERVIEW

Module 4 marks the next exciting step in math for kindergartners—addition and subtraction! Students begin to harness their practiced counting abilities, knowledge of the value of numbers, and work with embedded numbers to reason about and solve addition and subtraction expressions and equations (**K.3A, K.3B, K.3C**).

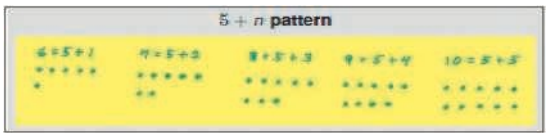
In Topic A, decompositions and compositions of numbers to 5 are revisited to reinforce how a whole can be broken into two parts and how two parts can be joined to make a whole. Decomposition and composition are taught simultaneously using the number bond model so students begin to understand the relationship between parts and wholes before adding and subtracting, formally addressed in Topics C and D. Nickels are used as objects to count in order to give students an opportunity to become familiar with this coin, and to help them differentiate it from a penny (**K.4**).

Topic B continues with decomposing and composing 6, 7, and 8 using the number bond model. Students systematically work with each quantity, finding all possible number pairs using story situations, objects, sets, arrays, 5 + *n* patterns, and numerals (**K.2I**).




Topic C introduces addition to totals of 6, 7, and 8 within concrete and pictorial settings, first generating number sentences without unknowns (e.g., 5 + 2 = 7) to develop an understanding of the addition symbol and the referent of each number within the equation. Next, students graduate to working within the addition word problem types taught in kindergarten: *add to with result unknown* (A + B = __), *put together with total unknown* (A + B = __), and *both addends unknown* (C = __ + __) (**K.3B, K.3C**). Students draw a box around the total to track the unknown.

Topic D introduces subtraction with 6, 7, and 8 with no unknown. The lessons in Topic D build from the concrete level of students acting out, crossing out objects in a set, and breaking and hiding parts, to more formal representations of decomposition recorded as or matched to equations (C – B = __).




Topics E, F, and G parallel the first half of the module with the numbers 9 and 10. Topic E explores composition, decomposition, and number pairs using the number bond model (**K.2I**). It is essential that students build deep understanding and skill with identifying the number pairs of 6 through 10 because this is foundational to Grade 1's fluency with sums and differences within 10, as well as Grade 2's fluency with sums and differences to 20. Topics F and G deal with addition and subtraction, respectively. Students are refocused on representing larger numbers by drawing the 5 + *n* pattern to bridge efficiently from seeing the embedded five to representing that as addition.

After addition and subtraction have been introduced, Topic H explores the behavior of zero: the additive identity. Students learn that adding or subtracting zero does not change the original quantity. Students also begin to see patterns when adding 1 more and the inverse relationship between addition and subtraction (8 + 2 = 10 and 10 – 2 = 8). Finally, students begin to formally study and explore partners to 10 (**K.2I**), though this essential work has been supported throughout Module 4 during Fluency Practice.

The culminating task of this module asks students to demonstrate their understanding of addition as *putting together*, or *adding to*, and subtraction as *taking apart*, or *taking from*. Students use mathematical models and equations to teach a small group of students, administrators, family members, or community partners about a decomposition of 10.

### Notes on Pacing for Differentiation

If pacing is a challenge and there is no additional adult support, consider consolidating the word problems in Lessons 16 and 17. Consider consolidating within Lessons 29, 30, 35, and 36 if students have developed automaticity in drawing and counting in 5-group formation.

## Focus Grade Level Standards

### Number and Operations

**The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system. The student is expected to:**

**K.2I** compose and decompose numbers up to 10 with objects and pictures.

### Number and Operations

**The student applies mathematical process standards to develop an understanding of addition and subtraction situations in order to solve problems. The student is expected to:**

**K.3A** model the action of joining to represent addition and the action of separating to represent subtraction;

**K.3B** solve word problems using objects and drawings to find sums up to 10 and differences within 10;

**K.3C** explain the strategies used to solve problems involving adding and subtracting within 10 using spoken words, concrete and pictorial models, and number sentences.

## Foundational Standards

**The child knows:**

**V.B.1.** how to use concrete objects, creates pictorial models and shares a verbal word problem for adding up to 5 objects;

**V.B.2.** how to use concrete models or make a verbal word problem for subtracting 0–5 objects from a set;

**V.E.3.** how to recognize and create patterns.

## Focus Mathematical Process Standards

**The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**

**MPS(A)** apply mathematics to problems arising in everyday life, society, and the workplace;

**MPS(B)** use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

**MPS(C)** select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

**MPS(D)** communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

**MPS(F)** analyze mathematical relationships to connect and communicate mathematical ideas.

# Overview of Module Topics and Lesson Objectives

| TEKS | ELPS | Topics and Objectives | | Days |
|---|---|---|---|---|
| **K.2I**<br>**K.3A**<br>K.3B<br>K.4 | 1.A<br>1.B<br>1.C<br>1.F<br>2.E<br>2.I<br>3.B<br>3.E<br>3.J<br>4.G<br>4.J | A | **Compositions and Decompositions of 2, 3, 4, and 5**<br>Lesson 1: Model composition and decomposition of numbers to 5 using actions, objects, and drawings.<br>Lesson 2: Model composition and decomposition of numbers to 5 using fingers and linking cube sticks.<br>Lesson 3: Represent composition story situations with drawings using numeric number bonds.<br>Lesson 4: Represent decomposition story situations with drawings using numeric number bonds.<br>Lesson 5: Represent composition and decomposition of numbers to 5 using pictorial and numeric number bonds.<br>Lesson 6: Represent number bonds with composition and decomposition story situations. | 6 |
| **K.2I**<br>**K.3B**<br>K.3A | 1.A<br>1.C<br>2.C<br>2.D<br>2.E<br>2.I<br>3.D<br>3.E<br>4.G | B | **Decompositions of 6, 7, and 8 into Number Pairs**<br>Lesson 7: Model decompositions of 6 using a story situation, objects, and number bonds.<br>Lesson 8: Model decompositions of 7 using a story situation, sets, and number bonds.<br>Lesson 9: Model decompositions of 8 using a story situation, arrays, and number bonds.<br>Lesson 10: Model decompositions of 6–8 using linking cube sticks to see patterns.<br>Lesson 11: Represent decompositions for 6–8 using horizontal and vertical number bonds.<br>Lesson 12: Use 5-groups to represent the 5 + *n* pattern to 8. | 6 |
| **K.3A**<br>**K.3B**<br>**K.3C**<br>K.2I | 1.C<br>2.C<br>2.E<br>2.F<br>2.G<br>2.I<br>3.B<br>3.E<br>3.F<br>4.G<br>4.K | C | **Addition with Totals of 6, 7, and 8**<br>Lesson 13: Represent decomposition and composition addition stories to 6 with drawings and equations with no unknown.<br>Lesson 14: Represent decomposition and composition addition stories to 7 with drawings and equations with no unknown.<br>Lesson 15: Represent decomposition and composition addition stories to 8 with drawings and equations with no unknown. | 6 |

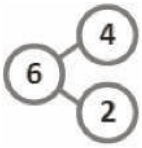
| TEKS | ELPS | | Topics and Objectives | Days |
|---|---|---|---|---|
| | | | Lesson 16: Solve *add to with result unknown* word problems to 8 with equations. Box the unknown.<br>Lesson 17: Solve *put together with total unknown* word problems to 8 using objects and drawings.<br>Lesson 18: Solve *both addends unknown* word problems to 8 to find addition patterns in number pairs. | |
| **K.2I**<br>**K.3A**<br>**K.3B**<br>**K.3C** | 1.C<br>1.E<br>2.C<br>2.E<br>2.I<br>3.C<br>3.D<br>3.E<br>4.G<br>4.H<br>5.A<br>5.B | D | **Subtraction from Numbers to 8**<br>Lesson 19: Use objects and drawings to find *how many are left*.<br>Lesson 20: Solve *take from with result unknown* expressions and equations using the minus sign with no unknown.<br>Lesson 21: Represent subtraction story problems using objects, drawings, expressions, and equations.<br>Lesson 22: Decompose the number 6 using 5-group drawings by breaking off or removing a part, and record each decomposition with a drawing and subtraction equation.<br>Lesson 23: Decompose the number 7 using 5-group drawings by hiding a part, and record each decomposition with a drawing and subtraction equation.<br>Lesson 24: Decompose the number 8 using 5-group drawings and crossing off a part, and record each decomposition with a drawing and subtraction equation. | 6 |
| | | | Mid-Module Assessment: Topics A–D | 3 |
| **K.2I** | 1.C<br>2.E<br>2.I<br>3.B<br>3.C<br>3.E<br>3.J<br>4.G | E | **Decompositions of 9 and 10 into Number Pairs**<br>Lesson 25: Model decompositions of 9 using a story situation, objects, and number bonds.<br>Lesson 26: Model decompositions of 9 using fingers, linking cubes, and number bonds.<br>Lesson 27: Model decompositions of 10 using a story situation, objects, and number bonds.<br>Lesson 28: Model decompositions of 10 using fingers, sets, linking cubes, and number bonds. | 4 |

| TEKS | ELPS | Topics and Objectives | | Days |
|---|---|---|---|---|
| **K.2I**<br>**K.3B**<br>**K.3C** | 1.C<br>2.D<br>2.E<br>2.I<br>3.C<br>3.E<br>3.G<br>4.G | F | **Addition with Totals of 9 and 10**<br>Lesson 29: Represent pictorial decomposition and composition addition stories to 9 with 5-group drawings and equations with no unknown.<br>Lesson 30: Represent pictorial decomposition and composition addition stories to 10 with 5-group drawings and equations with no unknown.<br>Lesson 31: Solve *add to with total unknown* and *put together with total unknown* problems with totals of 9 and 10.<br>Lesson 32: Solve *both addends unknown* word problems with totals of 9 and 10 using 5-group drawings. | 4 |
| **K.2I**<br>**K.3A**<br>**K.3B**<br>**K.3C** | 1.D<br>1.E<br>1.G<br>2.E<br>2.I<br>3.C<br>3.E<br>3.H<br>4.E<br>4.G | G | **Subtraction from 9 and 10**<br>Lesson 33: Solve *take from* equations with no unknown using numbers to 10.<br>Lesson 34: Represent subtraction story problems by breaking off, crossing out, and hiding a part.<br>Lesson 35: Decompose the number 9 using 5-group drawings, and record each decomposition with a subtraction equation.<br>Lesson 36: Decompose the number 10 using 5-group drawings, and record each decomposition with a subtraction equation. | 4 |
| **K.2I**<br>**K.3A**<br>**K.3B**<br>**K.3C** | 1.A<br>1.H<br>2.C<br>2.E<br>2.I<br>3.E<br>3.F<br>3.G<br>4.G | H | **Patterns with Adding 0 and 1 and Making 10**<br>Lesson 37: Add or subtract 0 to get the same number and relate to word problems wherein the same quantity that joins a set, separates.<br>Lesson 38: Add 1 to numbers 1-9 to see the pattern of *the next number* using 5-group drawings and equations.<br>Lesson 39: Find the number that makes 10 for numbers 1-9, and record each with a 5-group drawing.<br>Lesson 40: Find the number that makes 10 for numbers 1-9, and record each with an addition equation.<br>Lesson 41: Culminating task—choose tools strategically to model and represent a stick of 10 cubes broken into two parts. | 5 |
| | | | End-of-Module Assessment: Topics E–H | 3 |
| **Total Number of Instructional Days** | | | | **47** |

# Terminology

## New or Recently Introduced Terms

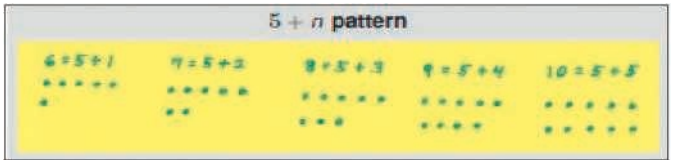
- Addition (specifically using *add to with result unknown, put together with total unknown, put together with both addends unknown*)
- Addition and subtraction sentences (equations)
- Make 10 (combine two numbers from 1 to 9 that add up to 10)
- Minus (–)
- Number bond (mathematical model)
- Number pairs or partners (embedded numbers)
- Part (addend or embedded number)
- Put together (add)
- Subtraction (specifically using *take from with result unknown*)
- Take apart (decompose)
- Take away (subtract)
- Whole (total)



Number Bond

## Familiar Terms and Symbols[1]

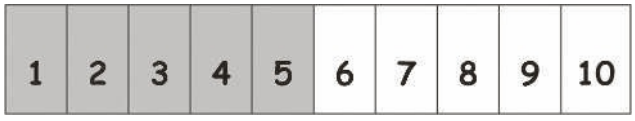
- 5-group
- Equals (=)
- Hidden partners (embedded numbers)
- Number sentence (3 = 2 + 1)
- Number story (stories with *add to* or *take from* situations)
- Numbers 0–10
- Plus (+)



5-groups highlight the *5 + n* pattern

# Suggested Tools and Representations

- 5-group dot cards
- Coins (pennies, nickels, and dimes)
- Dice
- Hula hoops
- Linking cubes
- Number bonds
- Number path
- Number towers
- Rekenrek
- Sets of objects
- Showing fingers the Math Way



Number Path

[1]These are terms and symbols students have seen previously.

## Homework

Homework at the K–1 level is not a convention in all schools. In this curriculum, homework is an opportunity for additional practice of the content from the day's lesson. The teacher is encouraged, with the support of parents, administrators, and colleagues, to discern the appropriate use of homework for his students. Fluency exercises can also be considered as an alternative homework assignment.

## Scaffolds

The scaffolds integrated into *A Story of Units*® give alternatives for how students access information as well as express and demonstrate their learning. Strategically placed margin notes are provided within each lesson elaborating on the use of specific scaffolds at applicable times. They address many needs presented by English language learners, students with disabilities, students performing above grade level, and students performing below grade level. Many of the suggestions are organized by Universal Design for Learning (UDL) principles and are applicable to more than one population.

## Assessment Summary

| Type | Administered | Format | Standards Addressed |
|---|---|---|---|
| Mid-Module Assessment Task | After Topic D | Constructed response with rubric | K.2I<br>K.3A<br>K.3B<br>K.3C |
| End-of-Module Assessment Task | After Topic H | Constructed response with rubric | K.2I<br>K.3A<br>K.3B<br>K.3C |
| Culminating Task | Lesson 41 | Choose tools strategically to model and represent a stick of 10 cubes broken into two parts. | K.2I<br>K.3A<br>K.3B<br>K.3C |

Teacher Edition

# Eureka Math® Grade K Module 5

## TEKS EDITION

Special thanks go to the Gordon A. Cain Center and to the Department of Mathematics at Louisiana State University for their support in the development of *Eureka Math*.

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Table of Contents

# GRADE K • MODULE 5

## Numbers 10–20, Counting to 100, and Understanding Work

Grade K • Module 5

# Numbers 10–20, Counting to 100, and Understanding Work

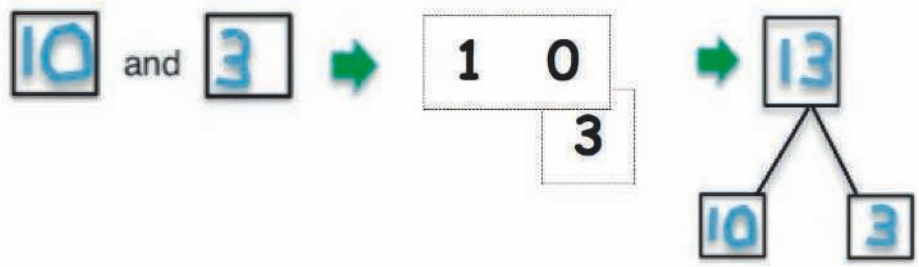
## OVERVIEW

Students have worked intensively within 10 and have often counted to 30 using the Rekenrek during Fluency Practice. This sets the stage for Module 5, where students clarify the meaning of the 10 ones and some ones within a teen number and extend that understanding to count to 100. In Topic A, students start at the concrete level, counting 10 straws.

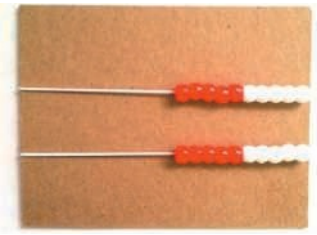
T: Count straws with me into piles of ten.
S: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. 1, 2, 3, …, 8, 9, 10. 1, 2, 3, …, 8, 9, 10.
T: Let's count the piles!
S: 1 pile, 2 piles, 3 piles, 4 piles.

Thus, Kindergarten students learn to comfortably talk about 10 ones, setting the foundation for the critical Grade 1 step of understanding 1 ten. They next separate 10 objects from within concrete and pictorial counts up to 20, analyzing the total as 10 ones and no ones or 10 ones and some ones (**K.2E, K.2F, K.5**). They see two distinct sets which are then counted the Say Ten way: ten 1, ten 2, ten 3, ten 4, ten 5, ten 6, ten 7, ten 8, ten 9, 2 tens. Students hear the separation of the 10 ones and some ones as they count, solidifying their understanding as they also return to regular counting: eleven, twelve, thirteen, …, etc.

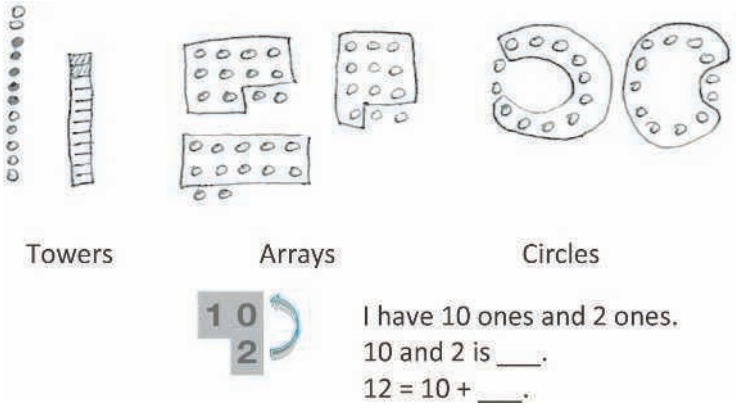
In Topic B, the two distinct sets of ones are composed, or brought together, through the use of the Hide Zero cards (pictured below) and number bonds. Students represent the whole number numerically while continuing to separate the count of 10 ones from the count of the remaining ones with drawings and materials (**K.2E, K.2F**). Emerging from Topic B, students should be able to model and write a teen number without forgetting that the 1 in 13 represents 10 ones (**K.2B**).



Topic C opens with students making a simple Rekenrek to 20 (pictured below) and modeling numbers thereon. The tens can be seen both as two lines with a color change at the five or two parallel unicolor fives.



In Topic C, the focus is now on the decomposition of the total teen quantity so that one part is ten ones. This is what makes Topic C a step forward from Topics A and B. Previously, the ten and ones were always separated when modeled pictorially or with materials. Now, the entire teen number is a whole quantity represented both concretely and pictorially in different configurations: towers or linear configurations, arrays (including the 10-frame or 5-groups), and circles. Students decompose the total into 10 ones and some ones. Through their experiences with the different configurations, students have practice both separating 10 ones within teen numbers and counting or conservation as they count quantities arranged in different ways and, as always, use math talk to share their observations (**K.2D, K.2E**). They also come to know each successive teen number as one larger than the previous number (**K.2A**).




In Topic D, students extend their understanding of counting teen numbers to numbers from 21 to 100. They first count by tens both the Say Ten way—1 ten, 2 tens, 3 tens, 4 tens, etc.—and the regular way: twenty, thirty, forty, etc. They then count by ones to 100, first within a decade and finally across the decade (**K.5**). Topic D involves the Grade 1 standard **1.2C** because students also write their numbers from 21 to 100.

The writing of larger numbers has been included because of the range of activities they make possible. The writing of these numbers is not assessed nor emphasized, however. Topic D closes with an optional exploration of numbers on the Rekenrek, bringing together counting with decomposition and finding embedded numbers within larger numbers. This lesson is optional because it does not directly address a particular Kindergarten standard.

In Topic E, students apply their skill with the decomposition and composition of teen numbers. In Lesson 20, they represent both compositions and decompositions as addition statements (**K.2E, K.2F**). In Lesson 21, they model teen quantities with materials in a number bond and hide one part. The hidden part is represented as an addition sentence with a hidden part (e.g., 10 + ___ = 13 or 13 = ___ + 3). The missing addend aligns Lesson 21 to the Grade 1 standard **1.5F**. In Lesson 22, students apply their skill with decomposition into 10 ones and some ones to compare the some ones of two numbers and thus to compare the teen numbers. They *stand* on the structure of the 10 ones and use what they know of numbers 1–9. Comparison of numbers 1–9 is a Kindergarten standard (**K.2E, K.2G, K.2H**).

In Lesson 23, students reason about situations to determine whether they are decomposing a teen number (as 10 ones and some ones) or composing 10 ones and some ones to find a teen number. They analyze their number sentences that represent each situation to determine if they started with the total or the parts and if they composed or decomposed, for example, 13 = 10 + 3 or 10 + 3 = 13 (**K.2E, K.2F**). Throughout the lesson, students draw the number of objects presented in the situation (**K.2D, K.2E**).

Lesson 24 is a culminating task, wherein students integrate all the methods they have used up until now to show decomposition. For example, they are instructed, "Open your mystery bag. Show the number of objects in your bag in different ways using the materials you choose" (**MPS(C)**). This experience also serves as a part of the End-of-Module Assessment, allowing students to demonstrate skill and understanding using all they have learned throughout the module.

The lessons in Topic F investigate personal financial literacy. Students add to their recognition of U.S. coins by comparing dimes and quarters to other coins they already know—the penny and nickel **(K.4)**. In Lesson 25, students learn to differentiate between money earned (income) and money received as gifts. Students then consider different ways income can be earned (**K.9A, K.9B**). Lesson 26 investigates the connection between work and income, various jobs that are sources for income, and skills needed to perform these jobs (**K.9C**). Finally, in Lesson 27, students are introduced to the concept that income can be used to purchase items that are either needed or desired and the difference between the two (**K.9D**).

## Notes on Pacing for Differentiation

If pacing is a challenge, consider the following modifications and omissions. Consider collaborating with a specialist teacher to have students build the Rekenrek from Lesson 10 (e.g., make a Rekenrek in art, practice counting in foreign language class), or plan an event to engage families in math activities such as these.

If writing numbers 21–100 overwhelms students, omit the Problem Sets in Lessons 15, 16, and 17. Instead, complete the verbal counting activities in the lessons that prepare them for numeral writing to 100 as required in Grade 1. This allows for the completion of these three lessons in just one or two days.

Lesson 19 is exploratory in nature and addresses some standards beyond the level of Kindergarten. It works well as an extension lesson if students are advancing quickly, but if pacing is a challenge, it could be omitted.

# Focus Grade Level Standards

## Number and Operations[1]

**The student applies mathematical process standards to understand how to represent and compare whole numbers, the relative position and magnitude of whole numbers, and relationships within the numeration system. The student is expected to:**

**K.2A** count forward and backward to at least 20 with and without objects;

**K.2B** read, write, and represent whole numbers from 0 to at least 20 with and without objects or pictures;

**K.2C** count a set of objects up to at least 20 and demonstrate that the last number said tells the number of objects in the set regardless of their arrangement or order;

**K.2D** recognize instantly the quantity of a small group of objects in organized and random arrangements;

**K.2E** generate a set using concrete and pictorial models that represents a number that is more than, less than, and equal to a given number up to 20;

**K.2F** generate a number that is one more than or one less than another number up to at least 20;

**K.2G** compare sets of objects up to at least 20 in each set using comparative language;

**K.2H** use comparative language to describe two numbers up to 20 presented as written numerals.

## Number and Operations

**The student applies mathematical process standards to identify coins in order to recognize the need for monetary transactions. The student is expected to:**

**K.4** identify U.S. coins by name, including pennies, nickels, dimes, and quarters.

## Algebraic Reasoning

**The student applies mathematical process standards to identify the pattern in the number word list. The student is expected to:**

**K.5** recite numbers up to at least 100 by ones and tens beginning with any given number.

[1]K.2A is addressed in Module 1

### Personal Financial Literacy

**The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:**

**K.9A** identify ways to earn income;

**K.9B** differentiate between money received as income and money received as gifts;

**K.9C** list simple skills required for jobs;

**K.9D** distinguish between wants and needs and identify income as a source to meet one's wants and needs.

## Foundational Standards

**The child knows:**

**V.A.5.** how to count up to 10 items and demonstrates that the last count indicates how many items were counted;

**V.B.1.** how to use concrete objects, creates pictorial models and shares a verbal word problem for adding up to 5 objects;

**V.B.2.** how to use concrete models or make a verbal word problem for subtracting 0–5 objects from a set.

## Focus Mathematical Process Standards

**The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**

**MPS(C)** select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

**MPS(D)** communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

**MPS(F)** analyze mathematical relationships to connect and communicate mathematical ideas;

**MPS(G)** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

# Overview of Module Topics and Lesson Objectives

| TEKS | ELPS | Topics and Objectives | | Days |
|---|---|---|---|---|
| **K.2A**<br>**K.2E**<br>**K.2F**<br>**K.5**<br>K.2C<br>K.2D | 1.A<br>1.C<br>1.E<br>2.C<br>2.E<br>2.I<br>3.E<br>3.G<br>4.F | A | **Count 10 Ones and Some Ones**<br>Lesson 1: Count straws into piles of ten; count the piles as 10 ones.<br>Lesson 2: Count 10 objects within counts of 10 to 20 objects, and describe as 10 ones and ___ ones.<br>Lesson 3: Count and circle 10 objects within images of 10 to 20 objects, and describe as 10 ones and ___ ones.<br>Lesson 4: Count straws the Say Ten way to 19; make a pile for each ten.<br>Lesson 5: Count straws the Say Ten way to 20; make a pile for each ten. | 5 |
| **K.2A**<br>**K.2B**<br>**K.2E**<br>**K.2F**<br>K.2C<br>K.2D<br>K.5 | 1.C<br>2.A<br>2.E<br>2.I<br>3.A<br>3.E<br>3.J<br>4.A | B | **Compose Numbers 11–20 from 10 Ones and Some Ones; Represent and Write Teen Numbers**<br>Lesson 6: Model with objects and represent numbers 10 to 20 with place value or Hide Zero cards.<br>Lesson 7: Model and write numbers 10 to 20 as number bonds.<br>Lesson 8: Model teen numbers with materials from abstract to concrete.<br>Lesson 9: Draw teen numbers from abstract to pictorial. | 4 |
| **K.2A**<br>**K.2C**<br>**K.2D**<br>**K.2E**<br>**K.2F**<br>**K.2G**<br>K.2B | 1.C<br>1.E<br>2.C<br>2.E<br>2.I<br>3.B<br>3.E<br>3.J<br>4.G | C | **Decompose Numbers 11–20, and Count to Answer "How Many?" Questions in Varied Configurations**<br>Lesson 10: Build a Rekenrek to 20.<br>Lesson 11: Show, count, and write numbers 11 to 20 in tower configurations increasing by 1—a pattern of *1 larger*.<br>Lesson 12: Represent numbers 20 to 11 in tower configurations decreasing by 1—a pattern of *1 smaller*.<br>Lesson 13: Show, count, and write to answer *how many* questions in linear and array configurations.<br>Lesson 14: Show, count, and write to answer *how many* questions with up to 20 objects in circular configurations. | 5 |
| | | | Mid-Module Assessment: Topics A–C (Interview-style assessment) | 3 |

| TEKS | ELPS | Topics and Objectives | | Days |
|---|---|---|---|---|
| **K.5**<br>K.2B<br>K.2D<br>K.2E<br>K.2F | 1.A<br>2.E<br>2.I<br>3.C<br>3.E<br>3.F<br>3.J<br>4.B | D | **Extend the Say Ten and Regular Count Sequence to 100**<br>Lesson 15: Count up and down by tens to 100 with Say Ten and regular counting.<br>Lesson 16: Count within tens by ones.<br>Lesson 17: Count across tens when counting by ones through 40.<br>Lesson 18: Count across tens by ones to 100 with and without objects.<br>Lesson 19: Explore numbers on the Rekenrek. (Optional) | 5 |
| **K.2D**<br>**K.2E**<br>**K.2F**<br>**K.2G**<br>**K.2H**<br>K.2B<br>K.5<br>1.2E<br>1.2F<br>1.2G[2]<br>1.5F[3] | 1.C<br>1.E<br>2.A<br>2.E<br>2.H<br>2.I<br>3.A<br>3.C<br>3.E<br>4.B<br>5.G | E | **Represent and Apply Compositions and Decompositions of Teen Numbers**<br>Lesson 20: Represent teen number compositions and decompositions as addition sentences.<br>Lesson 21: Represent teen number decompositions as 10 ones and some ones, and find a hidden part.<br>Lesson 22: Decompose teen numbers as 10 ones and some ones; compare *some ones* to compare the teen numbers.<br>Lesson 23: Reason about and represent situations, decomposing teen numbers into 10 ones and some ones and composing 10 ones and some ones into a teen number.<br>Lesson 24: Culminating Task—Represent teen number decompositions in various ways. | 5 |
| | | | End-of-Module Assessment: Topics D–E (Interview-style assessment) | 4 |
| **K.4**<br>**K.9A**<br>**K.9B**<br>**K.9C**<br>**K.9D** | 1.A<br>1.F<br>2.C<br>2.I<br>3.B<br>3.E<br>4.F | F | **Understanding Work**<br>Lesson 25: Understand gifts, income, and ways to earn income.<br>Lesson 26: Define jobs as sources of income.<br>Lesson 27: Understand the difference between needs and wants. | 3 |
| **Total Number of Instructional Days** | | | | **34** |

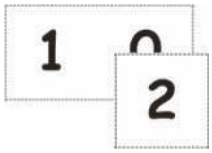
[2]Kindergarten standards K.2E, K.2G, and K.2H compare numbers to 20. Grade 1's standards 1.2E and 1.2G compares numbers to 120.
[3]While using concrete materials, a hidden part is related to 10 + ___. Missing addends are aligned to 1.5F.

# Terminology

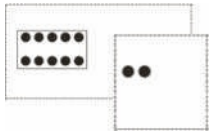
## New or Recently Introduced Terms

- 10 and __
- 10 ones and some ones
- 10 plus
- Dime
- Earn
- Gift
- Hide Zero cards (called Place Value cards in later grades, pictured to the right)
- Income
- Job
- Needs
- Quarter
- Regular counting by ones from 11 to 20 (eleven, twelve, thirteen, etc.)
- Regular counting by tens to 100 (e.g., ten, twenty, thirty, forty, fifty, sixty, seventy, eighty, ninety, one hundred)
- Say Ten counting by tens to 100 (e.g., 1 ten, 2 tens, 3 tens, 4 tens, 5 tens, 6 tens, 7 tens, 8 tens, 9 tens, 10 tens)
- Skills
- Teen numbers
- Wants

Hide Zero card (front)




Hide Zero card (back)



## Familiar Terms and Symbols[4]

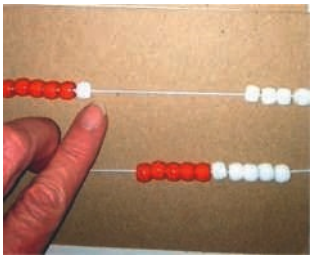
- 10-frame
- 5-group
- Circle 10 ones
- Circular count
- Count 10 ones
- Dot path, empty path, number path
- Linear count
- Nickel
- Number bond
- Number tower

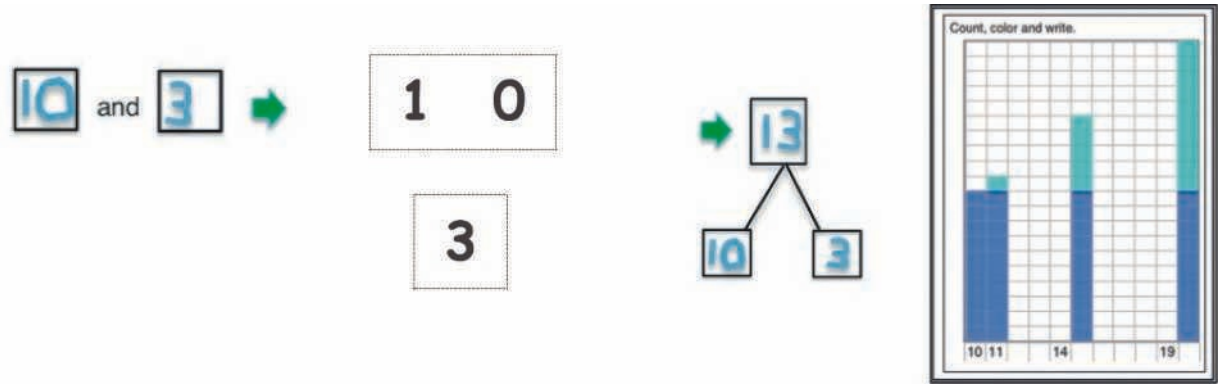
[5]These are terms and symbols students have used or seen previously.

- Part, whole, total
- Penny
- Say Ten counting (e.g., 11–20 is spoken as “ten one, ten two, ten three, ten four, ten five, ten six, ten seven, ten eight, ten nine, two tens”)
- Scatter count

## Suggested Tools and Representations

- 50 sticks or straws for each group of 2 students
- Student-made Rekenrek (pictured to the right): 10 red and 10 white pony beads, 1 cardboard strip, 2 elastics
- 1 egg carton per pair of students with 2 slots cut off to make a carton with 10 slots
- Hide Zero cards (called Place Value cards in later grades)
- Objects to put in the egg carton such as mandarin oranges, plastic eggs, or beans
- Single and double 10-frames
- Linking cubes: ideally 10 of two different colors per student
- Number bond template
- Collection of U.S. Coins (1 penny, nickel, dime, and quarter (real or plastic) per student)





## Homework

Homework at the K–1 level is not a convention in all schools. In this curriculum, homework is an opportunity for additional practice of the content from the day's lesson. The teacher is encouraged, with the support of parents, administrators, and colleagues, to discern the appropriate use of homework for his students. Fluency exercises can also be considered as an alternative homework assignment.

## Scaffolds

The scaffolds integrated into *A Story of Units*® give alternatives for how students access information as well as express and demonstrate their learning. Strategically placed margin notes are provided within each lesson elaborating on the use of specific scaffolds at applicable times. They address many needs presented by English language learners, students with disabilities, students performing above grade level, and students performing below grade level. Many of the suggestions are organized by Universal Design for Learning (UDL) principles and are applicable to more than one population.

## Assessment Summary

| Assessment Type | Administered | Format | Standards Addressed |
|---|---|---|---|
| Mid-Module Assessment Task | After Topic C | Interview with Rubric | K.2A<br>K.2B<br>K.2C<br>K.2D<br>K.2E<br>K.2F<br>K.2G<br>K.5 |
| End-of-Module Assessment Task | After Topic E | Interview with Rubric | K.2D<br>K.2E<br>K.2F<br>K.2G<br>K.2H<br>K.5 |

Teacher Edition

# Eureka Math® Grade K Module 6

## TEKS EDITION

Special thanks go to the Gordon A. Cain Center and to the Department of Mathematics at Louisiana State University for their support in the development of *Eureka Math*.

Great Minds® is the creator of *Eureka Math*®, *Wit & Wisdom*®, *Alexandria Plan*™, and *PhD Science*®.

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# GRADE K • MODULE 6

## Analyzing, Comparing, and Composing Shapes

Grade K • Module 6

# Analyzing, Comparing, and Composing Shapes

## OVERVIEW

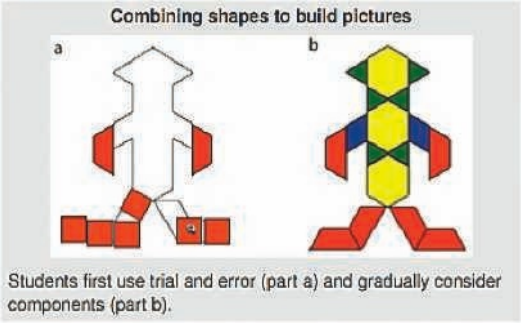
The kindergarten chapter of *A Story of Units*® comes to a close with another opportunity for students to explore geometry. Throughout the year, students have built an intuitive understanding of two- and three-dimensional figures by examining exemplars, variants, and non-examples. They have used geometry as a context for exploring numerals as well as comparing attributes and quantities. To wrap up the year, students further develop their spatial reasoning skills and begin laying the groundwork for an understanding of area through composition of geometric figures.

Topic A begins with students applying their knowledge of attributes to analyze two- and three-dimensional shapes from the real-world and to construct models using sticks and clay (**K.6F**). Students use the sticks to make the sides of shapes and they put the sticks together at each corner using clay. Students use their understanding of ordination to thirds to share and communicate the systematic construction of flats and solids. "First, I cut four sticks to be the same length. Second, I made a square by placing the four sticks so they look like a frame. Third, I connected the sides at the corners with four little clay balls."

As in Module 2, students explore the relationship between flats and solids, this time using flats to build solids. "I made my square into a cube. First, I made another square the same size. Second, I attached the two squares with four straws the same length." They also apply their knowledge of ordinal numbers to describe the relative position of shapes within a set. "The yellow circle is first, and the red square is tenth."

The lessons of Topic B focus on composition and decomposition of flat shapes (**K.6F**). Students begin by using flats to compose geometric shapes. "I put two triangles together to make a square." They then decompose shapes by covering part of a larger shape with a smaller shape and analyzing the remaining space. "When I cover part of my square with this triangle, I can see another triangle in the empty space."

As they build competence in combining and composing shapes, students build toward more complex pictures and designs. Students progress through stages as they build competence in combining shapes to form pictures, beginning with trial and error and gradually considering the systematic combination of components. "This square fits here because the corners match the puzzle." The culminating task of this module is set up as a Math Olympics, a celebration of student learning from the whole year. Students complete tasks related to number, measurement, operations, and geometry.



Students first use trial and error (part a) and gradually consider components (part b).

Composition and decomposition of geometric figures reinforce the idea that smaller units can combine to form larger units. This concept, central to *A Story of Units*, underlies not only area concepts but also the base ten number system. Students leave this module and the kindergarten year prepared to tackle the mathematical concepts of Grade 1 and beyond.

### Notes on Pacing for Differentiation

Some lessons address ordinal numbers and relative position. Using ordinal words to describe a procedure is included in Lesson 1 and parts of Lesson 5, as well as the Application Problems in Lessons 4, 5, and 6. Consider omitting pertinent lessons partly or entirely.

If pacing is a challenge and describing relative position is not required, consider omitting Lesson 4.

Even in schools where teaching ordinal numbers and relative position is required, there are many possibilities for embedding the concept throughout the school day in practical applications (e.g., lining up for recess, lunch, or water). The concept might also appear as part of language arts or science where students use sequence vocabulary (e.g., the steps in making a cheese sandwich or the steps in the growth of a seed).

## Focus Grade Level Standards

### Geometry and Measurement

**The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalizations about their properties. The student is expected to:**

**K.6C** identify two-dimensional components of three-dimensional objects;

**K.6D** identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably;

**K.6F** create two-dimensional shapes using a variety of materials and drawings.

## Foundational Standards

**The child knows:**

**V.A.7.** how to use the verbal ordinal terms;

**V.E.1.** how to sort objects that are the same and different into groups and uses language to describe how the groups are similar and different;

**V.C.2.** how to create shapes.

## Focus Mathematical Process Standards

**The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**

**MPS(A)** apply mathematics to problems arising in everyday life, society, and the workplace;

**MPS(B)** use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

**MPS(D)** communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

**MPS(E)** create and use representations to organize, record, and communicate mathematical ideas.

# Overview of Module Topics and Lesson Objectives

| TEKS | ELPS | Topics and Objectives | | Days |
|---|---|---|---|---|
| **K.6C**<br>**K.6D**<br>**K.6F**<br>K.6A<br>K.6B<br>K.6E | 1.D<br>1.E<br>2.B<br>2.E<br>2.I<br>3.C<br>3.E<br>3.I<br>3.J<br>4.D | A | **Building and Drawing Flat and Solid Shapes**<br>Lesson 1: Describe the systematic construction of flat shapes using ordinal numbers.<br>Lesson 2: Build flat shapes with varying side lengths and record with drawings.<br>Lesson 3: Compose solids using flat shapes as a foundation.<br>Lesson 4: Describe the relative position of shapes using ordinal numbers. | 4 |
| **K.6F**<br>K.6A<br>K.6D<br>K.6E | 1.A<br>1.C<br>2.E<br>2.I<br>3.E<br>3.F<br>3.J<br>4.F<br>4.G<br>5.C<br>5.D<br>5.E<br>5.F | B | **Composing and Decomposing Shapes**<br>Lesson 5: Compose flat shapes using pattern blocks and drawings.<br>Lesson 6: Decompose flat shapes into two or more shapes.<br>Lesson 7: Compose simple shapes to form a larger shape described by an outline.<br>Lesson 8: Culminating task—review selected topics to create a cumulative year-end project. | 4 |
| | | | End-of-Module Assessment: Topics A–B | 3 |
| **Total Number of Instructional Days** | | | | **11** |

# Terminology

## New or Recently Introduced Terms

- First, second, third, fourth, fifth, sixth, seventh, eighth, ninth, tenth (ordinal numbers)
- Vertex (the corner of a three dimensional solid—the place on a three dimensional solid where at least three edges meet)

### Familiar Terms and Symbols[4]

- Above, below, beside, in front of, next to, behind (position words)
- Circle
- Cone (three-dimensional shape)
- Corner
- Cube (three-dimensional shape)
- Cylinder (three-dimensional shape)
- Edge
- Face (two-dimensional side of a three-dimensional shape)
- Flat (two-dimensional shape)
- Hexagon (flat figure enclosed by six straight sides)
- Rectangle (flat figure enclosed by four straight sides)
- Side
- Solid (three-dimensional shape)
- Sphere (three-dimensional shape)
- Square (flat figure enclosed by four straight, equal sides)
- Triangle (flat figure enclosed by three straight sides)

## Suggested Tools and Representations

- Clay and sticks
- Geoboards
- Pattern block activity cards or attribute block activity cards
- Three-dimensional shapes: cone, sphere, cylinder, and cube
- Two-dimensional shapes: circle, hexagon, rectangle, square, and triangle

## Homework

Homework at the K–1 level is not a convention in all schools. In this curriculum, homework is an opportunity for additional practice of the content from the day's lesson. The teacher is encouraged, with the support of parents, administrators, and colleagues, to discern the appropriate use of homework for his students. Fluency exercises can also be considered as an alternative homework assignment.

[4]These are terms and symbols students have seen previously.

## Scaffolds

The scaffolds integrated into *A Story of Units* give alternatives for how students access information as well as express and demonstrate their learning. Strategically placed margin notes are provided within each lesson elaborating on the use of specific scaffolds at applicable times. They address many needs presented by English language learners, students with disabilities, students performing above grade level, and students performing below grade level. Many of the suggestions are organized by Universal Design for Learning (UDL) principles and are applicable to more than one population.

## Assessment Summary

| Type | Administered | Format | Standards Addressed |
|---|---|---|---|
| End-of-Module Assessment Task | After Topic B | Constructed response with rubric | K.6C<br>K.6D<br>K.6F |
| Culminating Task | Lesson 8 | Collaborative project: Review selected topics to create a cumulative year-end project. | K.6F |