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GRADE K • MODULE 3

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

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Answer Key 287

Progression: Simple → complex

MMA

EOMA

28 lessons
↳ 33 days
(5 days for testing, district decision)

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." (Exit tickets are not included in this module.)

Topics A and B focus on comparison of length, Topic C on comparison of weight, and Topic D on comparison of capacity (**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, capacity, 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**).

In Topic F, students relate *more* and *less* to length (**K.2E, K.2G**) before using real-object graphs to compare sets by using *more than*, *fewer than*, and *the same number as* (**K.8A, K.8B, K.8C**). By the end of Topic F, students use data to create picture graphs and draw conclusions from their graphs: "10 is more than 7, so the bus group has more people than the walking group."

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. The

Topic A: compare attributes
Comparison of length

Topic B: continue comparison of length

Topic C: comparison of weight balance scale

Topic D: Comparison of capacity

Topic E: "Are there enough?"

Topic F:
- relate more and less to length
- picture graph to compare

concept that "4 cups of rice is the same as 1 mug of rice" prepares students for "10 ones is the same as 1 ten" in later grades (**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**).

  Note: TEKS standards will not be assessed at a Grade 1 level.

Throughout Module 3 students engage with the TEKS mathematical process standards by using linking cube sticks to analyze and compare length and height (**K.1F**). They create number stairs from 1 to 10 and then use the 5-stick to organize each linking cube stick into two categories: those longer than the 5-stick and those shorter than the 5-stick (**K.1E**). Next, students use the balance scale as a tool to compare the weights of objects by first visually comparing objects that are close in weight. For example, they might say, "My pencil is lighter than this marker" (**K.1C**). Students then create and display a picture graph to show how everyone in the class gets home from school. They use the data to draw conclusions and justify their arguments. For example, they might say, "10 is more than 7, so the bus group has more students than the walking group" (**K.1D**, **K.1G**).

Collaboratively Troubleshooting Student Misconceptions

It is common for students to make mistakes as they build their understanding of new or difficult concepts. As noted in the Program and Implementation Guide, *collaborative troubleshooting* is a routine to help teachers address students' misconceptions. The three steps to collaborative troubleshooting are

(1) surface student thinking;

(2) validate what the student did right; and

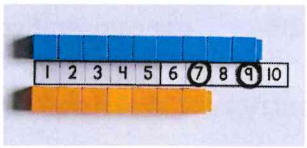
(3) bridge to a better understanding.

The following table presents teachers with guidance on how to collaboratively troubleshoot misconceptions with students. The first three columns of the table outline misconceptions that commonly arise in this module, reasons why students may have the misconceptions, and associated TEKS. Teachers can use this information to help them decide which questions to ask students to surface thinking and to validate what the students understood or did correctly.

The last column of the table provides instructional strategies and sample guided questions that can support students as they build on what they already know and bridge to a better understanding.

Note: Teachers can also refer to the sample teacher–student dialogue in the "Collaboratively Troubleshooting Student Misconceptions" section of the Grade K Course Guide for additional guidance on implementing the three-step routine.

Topic	TEKS	Student Misconception	Bridge to Understanding
Topic A–B	K.7B	Students misalign endpoints	Use a desk, wall, or other straight object as a tool to align endpoints (e.g., the edge of a rectangular rug if working with objects on the floor).
Topic C	K.7B	Students use generic size terminology such as "big" or "small" to describe weight or length use precise language	Use gestures accompanied by rephrasing, such as the following: "You're saying the pencil is lighter than the book?" (Hold one hand out and then gradually lift it up, modeling a balance scale.) 
Topics D–E	K.7A	Students associate "measure" with length only	Share and discuss real-world examples (e.g., using measuring spoons when baking or being weighed at the doctor's office).
Topics E–F	K.2G	Students compare through perception (i.e., using sight, hearing, or touch to tell which set has more or fewer)	Build an anchor chart with the class as comparison strategies, such as the following, are introduced: ▪ Compare length ▪ Match with one-to-one correspondence ▪ Count ▪ Use a tool Add a student work sample to illustrate each strategy. Discuss when and why each strategy works.

Topic	TEKS	Student Misconception	Bridge to Understanding
Topic G	K.2H	Students view a comparison statement and its inverse as two different comparison statements (e.g., fifteen is greater than eleven; eleven is less than fifteen)	Use a visual model (e.g., a number path) to help students compare numbers by highlighting ▪ number order (e.g., "9 comes after 7 when we count. So, 9 is greater than 7.") and ▪ length ("7 looks shorter than 9 on the number path. So, 7 is less than 9.").  Provide sentence frames to support students in making related comparison statements. For example, you might use the following pedagogical sequence with students: 1. Which is more, 9 or 7? 2. Let's say a more than statement. 9 is more than ... 3. Which is less, 9 or 7? 4. Let's say a less than statement. 7 is less than ...

TEKS 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.

Data Analysis

The student applies mathematical process standards to 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

prior knowledge

PK4.V.D.1. Recognize and compare heights or lengths of people or objects.

PK4.V.D.2. Recognize and compare capacity based on how much space exists within an object.

PK4.V.D.3. Recognize and compare weights of objects.

Prek guidelines

TEKS Mathematical Process Standards

Problem Solving

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

K.1C 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;

K.1D communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

K.1E create and use representations to organize, record, and communicate mathematical ideas;

K.1F analyze mathematical relationships to connect and communicate mathematical ideas;

K.1G 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 **K.7B**	1.E 3.B 4.C	A	**Comparison of Length and Height** Lesson 1: Compare lengths using *taller than* and *shorter than* with aligned and non-aligned endpoints. Lesson 2: Compare length measurements with string. Lesson 3: Make a series of *longer than* and *shorter than* comparisons.	3
K.7A **K.7B** K.2D K.2E K.2F K.2G K.2I K.8A K.8C	1.A 2.E 2.I 3.E 3.F 3.G 4.E 4.G	B	**Comparison of Length and Height of Linking Cube Sticks Within 10** Lesson 4: Compare the length of linking cube sticks to a 5-stick. Lesson 5: Determine which linking cube stick is *longer than* or *shorter than* the other. Lesson 6: Compare the length of linking cube sticks to various objects. Lesson 7: Compare objects using *the same as*.	4
K.7A **K.7B** K.4A K.8B	1.F 2.C 3.C 3.F 3.J 4.C 4.E 4.G	C	**Comparison of Weight** Lesson 8: Compare using *heavier than* and *lighter than* with classroom objects. Lesson 9: Compare objects using *heavier than, lighter than*, and *the same as* with balance scales. Lesson 10: Compare the weight of an object to a set of unit weights on a balance scale. Lesson 11: Observe conservation of weight on the balance scale. Lesson 12: Compare the weight of an object with sets of different objects on a balance scale.	5
K.7A **K.7B**	3.D 3.J 4.C 4.E 4.F 4.G 5.B	D	**Comparison of Capacity** Lesson 13: Compare capacity using *more than, less than*, and *the same as* by pouring. Lesson 14: Explore conservation of capacity by pouring. Lesson 15: Compare using *the same as* with units.	3
			Mid-Module Assessment Task: Topics A–D	2

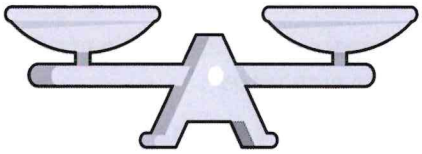
TEKS	ELPS	Topics and Objectives		Days
K.2E **K.2G** K.2F	2.C 2.F 3.D 3.E 4.C 4.F	E	**Are There Enough?** Lesson 16: Compare to find if there are enough. Lesson 17: Compare using *more than* and *the same as*. Lesson 18: Compare using *fewer than* and *the same as*.	3
K.2E **K.2G** **K.2H** **K.8A** **K.8B** **K.8C** K.2F K.7B	3.J 4.C 4.D 4.F 5.B	F	**Comparison of Sets Within 10** Lesson 19: Relate *more* and *less* to length. Lesson 20: Compare sets presented in graphs using *more*, *fewer*, and *the same number as* Lesson 21: Identify and create a set that has the same number of objects. Lesson 22: Reason to identify and make a set that has 1 more. Lesson 23: Reason to identify and make a set that has 1 less. Lesson 24: Use data to create picture graphs and draw conclusions from the graphs.	6
K.2E **K.2G** **K.2H** K.2F	1.A 2.E 3.C 3.J 4.C 4.G	G	**Comparison of Numerals** Lesson 25: Match and count to compare a number of objects. State which quantity is more. Lesson 26: Match and count to compare two sets of objects. State which quantity is less. Lesson 27: Strategize to compare two sets. Lesson 28: Visualize quantities to compare two numerals.	4
			End-of-Module Assessment Task: Topics E–G	3
Total Number of Instructional Days				33

Terminology

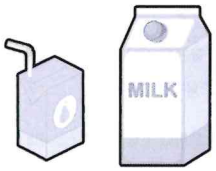
A Spanish cognate is included when the term has a similar meaning and spelling in English. Not every term in this module has a Spanish cognate.

New or Recently Introduced Terms

- **Balance scale** (*Balanza*): a tool used to find out which object is heavier, which is lighter, or whether objects are the same weight

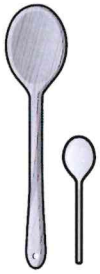


- **Capacity** (*Capacidad*): the amount of liquid a container can hold when it's completely full



The capacity of the juice box is less than the capacity of the milk carton.

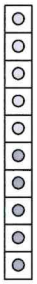
- **Compare**: to look at two objects and decide what is the same or what is different



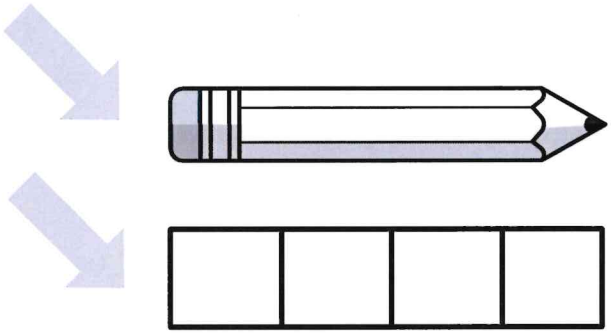
Let's compare the spoons to see which one is shorter.

- **Data** (*Datos*): information that can be collected, sorted, and organized

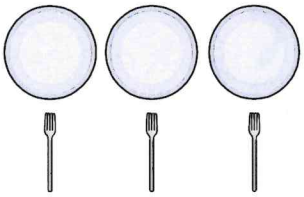
- **Dot path**: a counting tool made of 10 boxes that each have 1 dot inside



- **Endpoint**: the beginning or end of an object

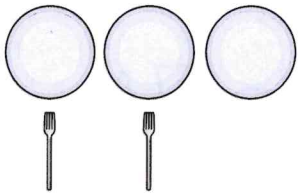


- **Enough**: the number of objects matches what is needed



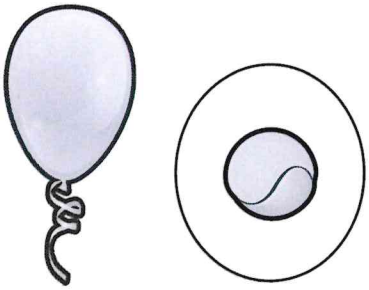
There is a fork for each plate. We have enough forks.

- **Not enough**: the number of objects does not match what is needed



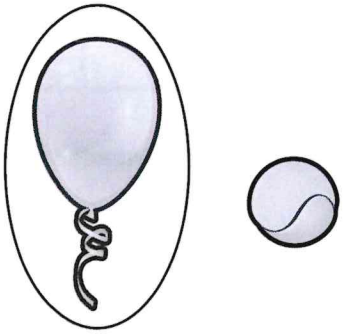
There is not a fork for each plate. We do not have enough forks.

- **Heavier than**: when comparing two objects and one object weighs, or presses down, more than the other object



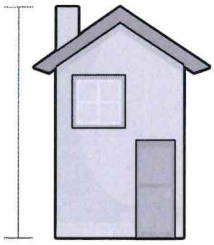
The ball is heavier than the balloon.

- **Lighter than**: when comparing two objects and one object weighs, or presses down, less than the other object

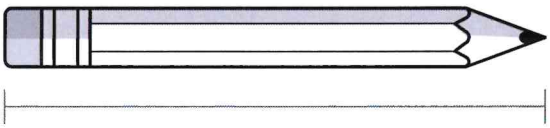


The balloon is lighter than the ball.

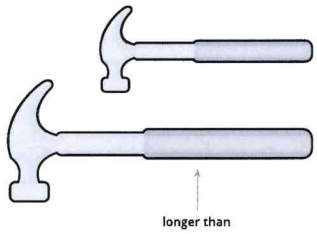
- **Height**: how tall an object is from the bottom to the top



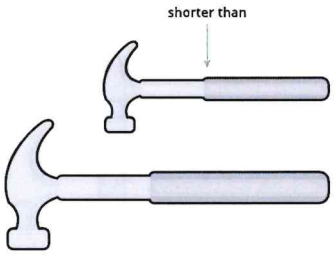
- **Length**: how long something is from one end to the other end



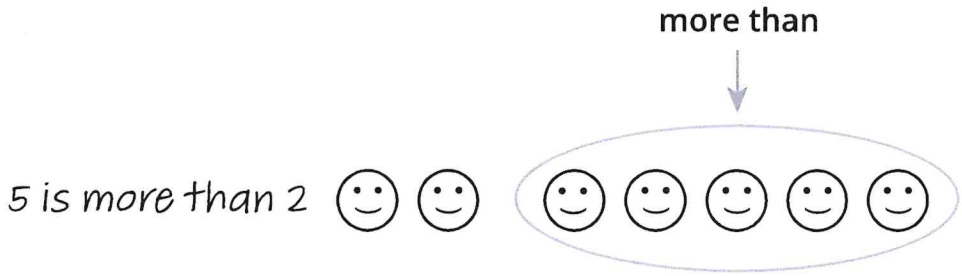
- **Longer than**: when an object is lined up with another object and it stretches out farther than the other object



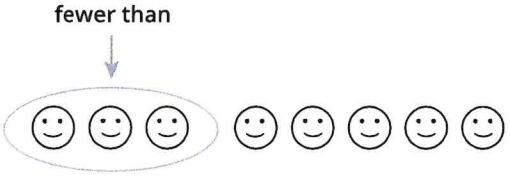
- **Shorter than**: when an object is lined up with another object and it is not as long as the other object



- **More than**: when comparing two numbers and one number is bigger than the other number, or when comparing two groups and one group has more objects than the other group



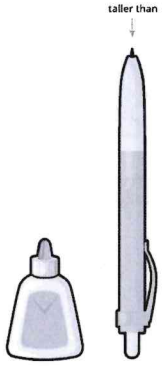
- **Fewer than**: when comparing two groups and one group does not have as many objects as the other group



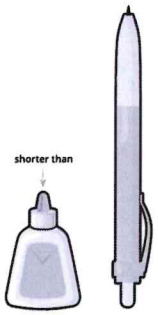
- **Less than**: when comparing two numbers and one number is smaller than the other number

2 is less than 5

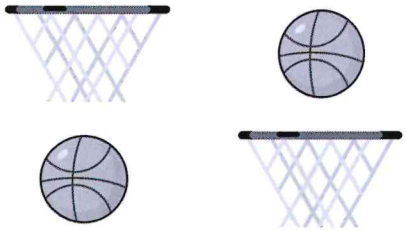
- **Taller than**: when comparing two objects and one object stands up higher than the other object



- **Shorter than**: when comparing two objects and one object is not as tall as the other

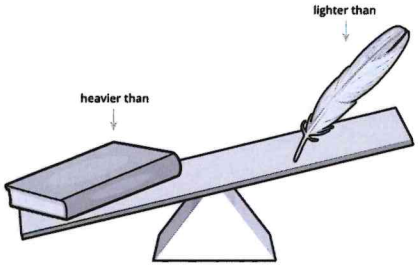


- **The same as**: when objects are alike in size, shape, height, length, weight, or number



The number of hoops is the same as the number of basketballs.

- **Weight**: the measurement of the heaviness of an object



The balance of the scale can be used to compare the weight, or heaviness, of two objects.

Familiar Terms and Symbols[1]

- **Match**: to find objects that are the same in some way

The basket and ball match because they are both used to play basketball.

- **Numbers 1–10** (*Números*): numerals, as in 1, 2, 3...

1, 2, 3

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 capacity

Balance Scale

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

Module 3 Lesson Overview Materials List

Lesson	Teacher Materials	Student Materials *All counts are per student unless otherwise indicated.*
1	Heavy book 1 Piece of ribbon 1 meter long 2 chairs 2 different lengths of string 2 pencils of different lengths	3 pennies Number path (T)* Template (T) 2 strips of paper (a longer blue one and a shorter red one)
2	1 Marker 1 Crayon String Scissors Masking strip	Beans in a bag Laminated paper or foam work mat Dice Pre-cut string Scissors Clipboard Pencil Longer or shorter recording sheet (T)
3		Hidden numbers mat (T) Personal white board 10 Beans in a bag Laminated paper or foam work mat Dice Longer than and shorter than work mat (T) Popsicle stick Paper bag filled with various items to measure (e.g., pencil, eraser, glue stick, toy car, small block, 12-inch piece of string, marker, child's scissors, crayon, tower of 5 linking cubes) per pair
4	Chart paper	1 sticky note Bag of loose linking cubes per pair: 40 red and 15 of another color or 30 of one color and 25 of another Longer or shorter mat (T)
5	Large 5-group cards (T)	Dot path (T) Personal white board Lesson 5 Template (T) 1 bag of linking cube stairs from Lesson 4 per pair

Lesson	Teacher Materials	Student Materials *All counts are per student unless otherwise indicated.*
6	20-bead Rekenrek	Hidden numbers mat (T) Personal white board Crayon Paper 1 bag of linking cube number stairs Paper bag filled with various items to measure (eg., pencil, eraser, glue stick, toy car, small block, 8-inch piece of string, marker, child's scissors, crayon) per pair
7	20-bead Rekenrek 1 Green and 1 red dry-erase markers 1 bag of linking cube number stairs Riddle work mat (T) Personal white board	Die (with the 6-dot side covered) Personal white board 1 small ball of clay 1 bag of linking cube number stairs Riddle work mat (T) Personal white board
8	20-bead Rekenrek Personal white board	Bag of beans Laminated paper or foam work mat 2 dice Number path (T) Make 5 (T) Collect enough objects from the classroom of varying weights so that each pair of students has at least three objects to test (e.g., bag of rice cakes, a can, a stack of books, a pencil, an eraser, a marker, a balloon, a tower of linking cubes, a block, a sphere, some cotton balls, some rocks, and a bag of coins)
9	Large 5-group cards (5–7) (T) Lighter or heavier recording sheet (T)	Hidden numbers mat (T) Personal white board Die (with the 6-dot side covered) Balance scale Assortment of objects such that each small group of students has at least three things to compare (include some objects that are the same weight) Lighter or heavier recording sheet (T)

Lesson	Teacher Materials	Student Materials *All counts are per student unless otherwise indicated.*
10	1 Green and 1 red dry-erase markers Large 5-group cards (T) Balance scale Pencil Marker Bag of 30 pennies As heavy as recording sheet (T)	Bag of beans Foam or laminated paper work mat 2 dice Balance scale Bag of 30 pennies Bag of objects to weight (including a pencil, an eraser, a marker, a small child's pair of scissors, a linking cube, and a small block or toy) per pair or small group As heavy as recording sheet (T)
11	Chart paper Large 5-group cards (T) Balance scale Ball of clay	1 sticky note Hidden numbers mat (T) Personal white board Small bag of 10 Lego-type building blocks Balance scale for small group or pair 20 pennies Ball of clay per small group or pair
12	5-group cards (T) Simple balance scale Pennies Various objects Marker Small bag of linking cubes Small counters Beans As heavy as a set recording sheet (T)	Die with 6-dot side covered Personal white board Dot path (T) 1 simple balance scale per pair or small group 4 small bags of various items to use as weights (pennies, linking cubes, small counters, and large dried beans) Collection of classroom objects for the balance exercise As heavy as a set recording sheet (T)
13	Dot cards of 6 (T) Fluency Template 2 2 cups of uncooked rice Several small containers (two with equal capacity: coffee or beverage scoop, ¼ cup measure, teacup, bowl, small drinking cup, small box, tablespoon) Tray per pair or small group Capacity recording sheet (T)	Dot cards of 6 (T) Pair of dice with the 6-dot side covered with a sticker Small ball of clay 2 cups of uncooked rice Several small containers (two with equal capacity: coffee or beverage scoop, ¼ cup measure, teacup, bowl, small drinking cup, small box, tablespoon) Tray per pair or small group Capacity recording sheet (T)

Lesson	Teacher Materials	Student Materials *All counts are per student unless otherwise indicated.*
14	Large 5-group cards (T) Set of student materials for demonstration: 2 cups of rice Clear containers (if possible) with varying diameters (e.g., a glass, small bowl, small vase with an interesting shape, bottle, mug) Tray Funnel Spoon Capacity recording sheet (T)	Hidden numbers mat (T) Small ball of clay 2 cups of rice Clear containers (if possible) with varying diameters (e.g., a glass, small bowl, small vase with an interesting shape, bottle, mug) Tray Funnel Spoon Capacity recording sheet (T)
15	Dot cards of 7 (T) Set of student materials for demonstration: 2 cups of rice Assortment of containers (teacup, small bottle, bowl, glass, small box, measuring cup) Small scoop such as a coffee scoop Funnel Tray We've Got the Scoop Recording Sheet(T)	Dot cards of 7 (T) Bag of beans Foam or laminated paper work mat 2 dice with 6-dot sided covered 10 linking cubes Small ball of clay 10 beans We've Got the Scoop Recording Sheet(T) Items per pair or small group: 2 cups of rice Assortment of containers (teacup, small bottle, bowl, glass, small box, measuring cup) Small scoop such as a coffee scoop Funnel Tray
16	Dot cards of 8 (T) Chart paper Music player Chairs, carpet squares, or pieces of construction paper per student Several chairs, carpet squares, or pieces of construction paper than students	Dot cards of 8 (T) 1 sticky note Paper plate Cup Spoon Napkin Popcorn (or some other snack) Bottle of water

Lesson	Teacher Materials	Student Materials *All counts are per student unless otherwise indicated.*
17	Basket of 3 blocks or small toys Additional blocks	Dice Personal white board Bag of 5 loose red linking cubes Bag of 10 loose blue linking cubes Pair of dice with the 6-dot side covered Additional red linking cubes
18	Varied dot cards of 9 (T) Box of markers	Varied dot cards of 9 (T) Lined writing paper 1 small ball of clay Bag of 5 pennies Bag of 10 loose linking cubes
19	Framed portrait of the teacher at 5–6 years old Bag of 20 linking cubes 10-sided die Small cards	10 linking cubes Square path letter trains (T) Bag of 20 linking cubes 10-sided die Small cards
20	Sample name train Chart paper Marker	Linking cubes Dry erase marker Name trains (from Application Problem) Bags containing a variety of objects to sort (1 bag of red, yellow, and blue objects per student with no more than 10 objects of each color)
21	Fluency Template (T)	Bag of beans Foam or laminated paper work mat 2 dice with 6-dot side covered Personal white board 7 linking cubes Small piece of clay 10-sided die (or spinner) 20 linking cubes in a bag 20 pennies in a bag

Lesson	Teacher Materials	Student Materials *All counts are per student unless otherwise indicated.*
22		Pair of dice with the 6-dot side covered with a sticker 10-sided die 20 linking cubes in a bag per pair 20 pennies in a bag per pair
23		Pair of dice with the 6-dot side covered with a sticker 20 linking cubes in a bag per pair 20 pennies in a bag per pa
24	20-bead Rekenrek Large 5-group cards (T) Transportation posters (T) Tape Several copies of transporta-tion cards (T)	
25	White board markers Shapes (T)	10 pennies in a bag 8 linking cubes in a bag
26	Dot cards of 6 (T) Fluency Template (T) White board Markers Shapes (T)	Dot cards of 6 (T)
27	Ruler Pencil 2 sets of student materials: 10-sided die Bag of 10 linking cubes Bag of 10 beans Bag of 10 pennies Bag of 10 counters	Hidden numbers mat (T) Pattern blocks Small bucket per pair Items per pair: 10-sided die Bag of 10 linking cubes Bag of 10 beans Bag of 10 pennies Bag of 10 counters
28	Bell, chime, or other gentle noisemaker	Paper Crayons Small ball of clay 1 set of 5-group cards (T)

**(T) Template provided in TE, Practice, and/or Learn*