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GRADE PK • MODULE 4

Comparison of Length, Weight, Capacity, and Numbers to 5

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Note: The student sheets were created using the KG Primary Penmanship font—a clear and simple font for Pre-Kindergarteners. Please download this font to ensure accurate depiction of numerals in the Word documents.

Grade PK • Module 4

Comparison of Length, Weight, Capacity, and Numbers to 5

OVERVIEW

In the first half of this module, students identify measurable attributes of objects in terms of length, weight, and capacity. Children make their bodies *tall* like a tree and hold up a finger to show *short* like a blade of grass. The scope in which they consider objects is stretched by introducing words such as *small*, *big*, *short*, *tall*, *empty*, *full*, *heavy*, and *light* so that students will have the vocabulary needed to describe objects (PK.MD.1).

Topic A explores length using the words *tall* and *short*. Students recognize the importance of aligning endpoints to compare the lengths of two objects: “Susie isn’t really taller than the teacher; it just looks that way because she is standing on a chair!” Children then compare lengths of various objects to the length of a linking cube stick using *longer than*, *shorter than*, and *about the same as* statements. By using a linking cube stick, children are indirectly exposed to the notion that there can be no gaps or overlaps between units of measure. They might also casually notice that each unit of measure is equal or the same.

Topics B and C cover weight and volume, respectively. In each topic, vocabulary is introduced to give the students the language needed to articulate their comparisons. In Topic B, students first state which objects are heavy and light, progressing to using *heavier than*, *lighter than*, and *about the same as* statements (PK.MD.1). Finally, students learn to use a balance scale to verify some of their comparisons. To mimic the scale, students hold their arms straight out from their sides, with an object in each hand, and tip the arm down that is holding the heavier object while lifting up the other arm.

Topic C compares capacity, i.e., volume, by introducing different-sized containers for students to pour sand and water. As they explore, students respond to the questions, “Which container holds more? Which container holds less?” As in Topics A and B, children progress to using the language of comparison, *more than*, *less than*, and *about the same as*, e.g., “The blue container holds *more than* the red container.” The first half of this module culminates with students finding objects that match using length, weight, and volume comparison statements, e.g., “The pink eraser is *lighter than* the wooden block.”

The comparison of length, weight, and capacity naturally leads to discussions about quantity and number. Topic D’s three lessons focus on identifying first and last in quantities up to 5 and 10 in different configurations (PK.CC.6): scattered (2–5), linear (2–10), and circular (2–10). Measurement is connected to quantity as students reason *if there are enough* in Topic E. For example, students match teddy bear counters to chairs to see that “There are not enough chairs!” Later in the topic, students match the bears to movie theater seats to observe that there are enough seats, with some extras.

In Modules 1 and 3, students worked extensively to develop an understanding of numbers to 10. Topic F now bridges this work with number and measurement comparisons (first half of M1) to *more than*, *less than*, and *the same as* statements as students compare sets using matching and counting strategies (PK.CC.5). In Topic F lessons, students listen to story situations and compare 2 sets of 5 or fewer objects, making statements to

describe them, e.g., “There are *fewer cups than* straws.”

Comparing concrete sets leads to comparing quantities and abstract numbers in Topic G, e.g., “3 is less than 5.” Students make *greater than*, *less than*, or *equal to* statements, matching the numeral to the set, and verifying with materials, such as linking cube towers (PK.CC.5).

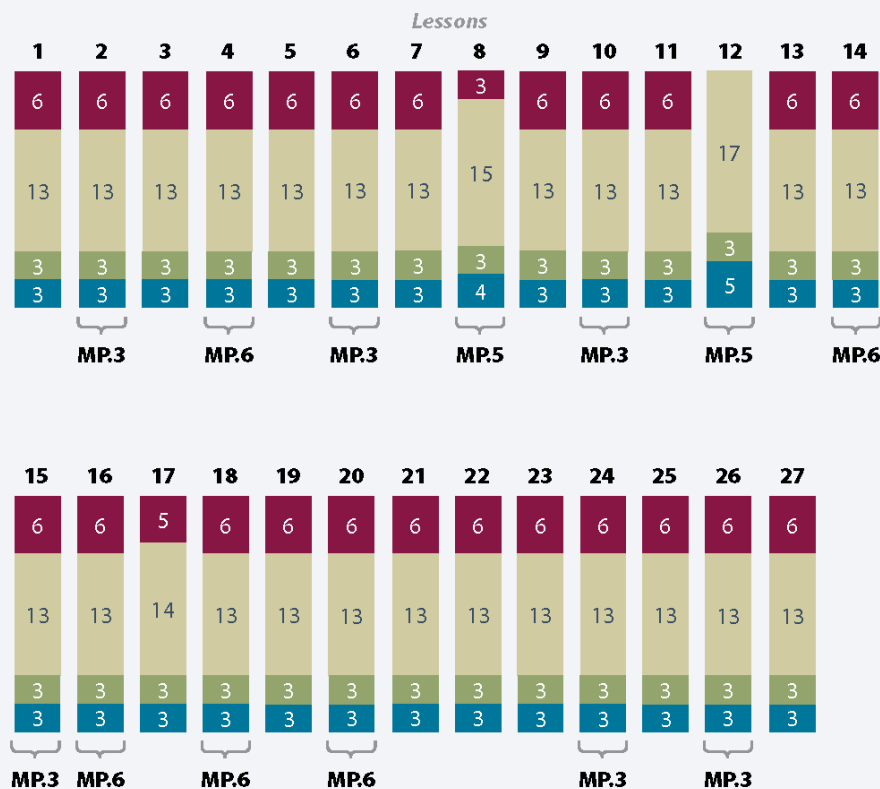
In Module 4, fluency activities focus on two core goals: touching and counting quantities to 10 and rote counting to 20. Students decompose quantities up to 5 in preparation for simple addition and subtraction stories. Also, numeral formation activities anticipate writing numerals in Module 5.



Distribution of Instructional Minutes

This diagram represents a suggested distribution of instructional minutes based on the emphasis of particular lesson components in different lessons throughout the module.

- Fluency Practice
- Concept Development
- Application Problems
- Student Debrief



MP = Mathematical Practice

Focus Grade Level Standards

Describe and compare measurable attributes.¹

- PK.MD.1** Identify measurable attributes of objects, such as length, and weight. Describe them using correct vocabulary (e.g., small, big, short, tall, empty, full, heavy, and light).

Compare numbers.

- PK.CC.5** Identify whether the number of objects in one group is more, less, greater than, fewer, and/or equal to the number of objects in another group, e.g., by using matching and counting strategies.²
- PK.CC.6** Identify “first” and “last” related to order or position.

Foundational Standards

- PK.CC.3** Understand the relationship between numbers and quantities to 10; connect counting to cardinality.
- When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
 - Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
- PK.CC.4** Count to answer “how many?” questions about as many as 10 things arranged in a line, a rectangular array, or a circle, or as many as 5 things in a scattered configuration; given a number from 1–10, count out that many objects.

Focus Standards for Mathematical Practice

- MP.3** **Construct viable arguments and critique the reasoning of others.** Students learn how to defend comparisons of measurable attributes by learning how to articulate a statement about the specific attribute. With practice, students are able to confidently say that one object is *shorter than* another object after aligning endpoints and measuring by placing the objects side by side. They are also able to question another student’s comparison statement based on their observation of the measurement.
- MP.5** **Use appropriate tools strategically.** In Topics A–C, students use different tools to explore measurement. In Lesson 12, students must choose the appropriate tool to find objects that match comparison statements, e.g., “Find something that is *heavier than* this book.” Students compare weights using a balance scale or their two hands. Likewise, they compare capacity and length using different-sized containers and linking cubes, respectively.

¹PK.MD.2 is the focus standard in Pre-K, Module 1, Topic B.

² Up to 5 objects.

MP.6 **Attend to precision.** Students will informally weigh two objects by placing one object in each hand and stating which one they think is heavier or lighter. This information is charted. On the following day, the same items are weighed with a balance scale, and students cross-check their informal weight comparisons. Students see the need to be precise because some of their predictions about heavier and lighter from the previous day may be incorrect.

Overview of Module Topics and Lesson Objectives

Standards	Topics and Objectives	Days
PK.MD.1	A Comparison of Length Lesson 1: Identify the attribute of length by describing objects as <i>tall</i> or <i>short</i> . Lesson 2: Compare length using <i>taller than</i> and <i>shorter than</i> with aligned and non-aligned endpoints. Lesson 3: Compare length using <i>longer than</i> , <i>shorter than</i> , and <i>about the same as</i> with a simple straight object. Lesson 4: Compare length using <i>longer than</i> , <i>shorter than</i> , and <i>the same as</i> with a stick of linking cubes. Lesson 5: Compare length using <i>about the same as</i> with a stick of linking cubes.	5
PK.MD.1	B Comparison of Weight Lesson 6: Identify the attribute of weight by describing objects as heavy or light. Lesson 7: Compare weight using <i>heavier than</i> , <i>lighter than</i> , and <i>about the same as</i> . Lesson 8: Compare weight using <i>heavier than</i> , <i>lighter than</i> , and <i>the same as</i> with balance scales.	3
PK.MD.1	C Comparison of Volume Lesson 9: Identify the attribute of volume by describing containers as big or small. Lesson 10: Compare volume using <i>more than</i> or <i>less than</i> . Lesson 11: Compare volume using <i>the same as</i> with sand and explore conservation. Lesson 12: Find objects that match given length, weight, and volume comparison statements.	4
	Mid-Module Assessment: Topics A–C (Interview style assessment: 4 days)	4



Standards	Topics and Objectives	Days
PK.CC.6 PK.CC.4 PK.CC.3a PK.CC.3b	D First and Last Lesson 13: Identify first and last in a scattered configuration with 2–5 objects. Lesson 14: Identify first and last in a linear configuration with 2–10 objects. Lesson 15: Identify first and last in a circular configuration with 2–10 objects.	3
PK.CC.5 PK.CC.3a	E Are There Enough? Lesson 16: Compare: Match to find there are not enough. Lesson 17: Compare: Match to find there are exactly enough. Lesson 18: Compare: Match to find that there are enough, with some extras.	3
PK.CC.5 PK.CC.3a PK.CC.3b	F Comparison of Sets Up to 5 Lesson 19: Count and match to compare using <i>fewer than</i> statements. Lesson 20: Count and match to compare using <i>the same as</i> statements. Lesson 21: Count and match to compare using <i>more than</i> statements. Lesson 22: Count and match to make sets that are <i>the same as</i> a group of objects.	4
PK.CC.5 PK.CC.3a PK.CC.3b	G Comparison of Sets Including Numerals Up to 5 Lesson 23: Compare a number of objects using <i>more than</i> or <i>the same as</i> statements. Lesson 24: Compare numbers using <i>greater than</i> and <i>equal to</i> statements. Verify with materials. Lesson 25: Compare a number of objects using <i>less than</i> or <i>the same as</i> statements. Lesson 26: Compare numbers using <i>less than</i> and <i>equal to</i> statements. Verify with materials. Lesson 27: Count and match to compare two sets of linking cube towers.	5
	End-of-Module Assessment: Topics D–G (Interview style assessment: 4 days)	4
Total Number of Instructional Days		35

New Fluency Topics Appearing in Module 4 Instruction

- Rote count to 20
- Decompose numbers up to 5
- Tally numbers up to 10
- Compare quantities up to 5
- Form numerals 0–5
- Matching count to abstract numeral

Familiar Fluency

- Rote count to 10
- Count one-to-one within 10
- Count 0–10 in different formations
- Make a group of 0 to 8 objects

Terminology

New or Recently Introduced Terms

- About the same length/height/weight as (way to compare measureable attributes)
- Are there enough...? (comparative question)
- Balance scale (tool for weight measurement)
- Bigger than (volume or size comparison)
- Compare (specifically using direct comparison)
- Empty (volume comparison)
- Equal to (e.g., 5 is *equal to* 5.)
- Exactly enough/not enough (comparative term)
- Extra (leftovers)
- Fewer/fewer than (way to compare numbers of objects, e.g., “There are fewer apples than oranges.”)
- First (comparing numbers related to order or position)
- Full (volume comparison)
- Greater/greater than (number comparison)
- Heavy/heavier/heavier than (weight comparison)
- Height (measurable attribute of objects, described as tall or short)
- Last (comparing numbers related to order or position)
- Length (measureable attribute of objects, described as long or short)
- Less than (with reference to volume, numbers of objects, or numbers, e.g., 3 is *less than* 4.)
- Light/lighter/lighter than (weight comparison)

- Long/longer/longer than (length comparison)
- More than (with reference to volume and numbers of objects)
- Same (with reference to volume, holding the same amount)
- Set (group of objects)
- Short/shorter/shorter than (length comparison)
- Smaller than (volume or size comparison)
- Tall/taller than (height comparison)
- Weigh/weight (measurable attribute of objects, described as heavy or light)

Familiar Terms and Symbols³

- Big (comparative term)
- Counting the Math Way (count fingers from left pinky to right pinky)
- Exactly the same (way to analyze objects to match or sort)
- Group (objects sharing one or more attributes)
- How many (with reference to counting quantities or sets)
- Line (with reference to counting configuration)
- Match (group items that are the same or that have the same given attribute)
- Mark (with reference to starting point for count)
- More/less (with reference to number or volume comparisons)
- Position words (down, up)
- Shapes (rectangle, triangle, circle, square)
- Size (measurable attributes of objects, described as big or small)
- Small (comparative term)
- Sort (group objects according to a particular attribute)
- The same as (way to analyze objects to match or sort)
- Zero (number word)

³These are terms and symbols students have seen previously.

Suggested Tools and Representations

- 10-frames
- 5-frames
- Balance scale
- Baseball cutouts, scoreboard, small cutouts (Lesson 23 Templates 1–3)
- Big/medium/small containers (tall and short pint-sized, bucket, pitcher, bowls)
- Building blocks (various colors, rectangular, wooden or foam)
- Canoe and rowboat templates (Lesson 14 Templates 1–2)
- Chairs (Lesson 16 Template)
- Circle of rocks (Lesson 15 Template)
- Concrete materials (e.g., game pieces, pennies, paper clips, pom-poms, plastic kitchen food, pebbles, colored craft sticks, straws, cups, large/small plates, napkins, etc.)
- Creek mat (Lesson 3 Template)
- Fish-shaped crackers
- Flat shapes or paper cutouts (Fluency Practice)
- Heavy/light objects
- Hula hoops (or circles of string) for sorting
- Linking cubes
- Modeling clay
- Movie theater chairs (Lesson 18 Template)
- Dot and numeral cards 1–5
- Numeral cards (5 index cards with numbers 1–5 written on them with marker)
- Numeral formation cards (Lessons 19, 20, 22, 24, 26 Fluency Templates)
- Personal white boards with dry erase markers
- Round counters
- Sand/water/rice or beans for volume lessons
- Seesaw picture (Lesson 6 Template 1)
- Shopping bags of various sizes
- Stars and stripes (Lesson 27 Fluency Template)
- Stickers (5 different types)
- Straight object (straw, coffee stirrer, chopstick, or strip of paper)
- String (approximately 7 ft long)
- Stuffed animals
- Tall/short objects
- Teddy bear counters
- Weight collage (Lesson 6 Template 2)

Suggested Methods of Instructional Delivery

Materials Needed for Personal White Boards

- 1 heavy duty clear sheet protector
- 1 piece of stiff red tag board $11 \text{ inch} \times 8 \frac{1}{4} \text{ inch}$
- 1 piece of stiff white tag board $11 \text{ inch} \times 8 \frac{1}{4} \text{ inch}$
- 1 3 inch $\times$ 3 inch piece of dark synthetic cloth for an eraser
- 1 dry erase crayon

Directions for Creating Personal White Boards

Cut your white and red tag to specifications. Slide into the sheet protector. Store your 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, then 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 a hole in student understandings and skills. “Let’s draw some more of these addition stories on our personal white boards.”
- Students can erase quickly so that they do not worry about their mistakes..
- 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 number formation sheets, can be stored between the two pieces of tag for easy access and reuse.
- Number formation sheets and other problem sets can be done without marking the paper so that students can work on the problems independently at another time.
- The red versus white side distinction clarifies your 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 sheet protector can be removed so that student work can be projected or shared.

Scaffolds⁴

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*.”

Assessment Summary

Type	Administered	Format	Standards Addressed
Mid-Module Assessment Task	After Topic C	Constructed response with rubric	PK.MD.1
End-of-Module Assessment Task	After Topic G	Constructed response with rubric	PK.CC.5 PK.CC.6 PK.CC.3a PK.CC.3b PK.CC.4

⁴Students with disabilities may require Braille, large print, audio, or special digital files. Please visit the website www.p12.nysed.gov/specialed/aim for specific information on how to obtain student materials that satisfy the National Instructional Materials Accessibility Standard (NIMAS) format.