

GRADE K • MODULE 3

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

In Module 2, students observed, analyzed, and categorized geometric shapes by focusing on their attributes; they now launch into the process of recognizing and comparing these attributes. In Module 3, comparisons of length, weight, and volume lead into comparisons of number: longer than, shorter than, as long as; heavier than, lighter than, as heavy as; more than, less than, the same as. For example, “Eight is more than 5. Five is less than 8. Five is equal to 5.”

Terminology

- 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)

Topic A: Comparison of Length and Height

In Topic A, students begin by identifying the attribute of length by determining that a book and a ribbon can be compared in different ways: as longer than, heavier than, or taking up more space. This occurs within the natural context of the lesson, which then proceeds to comparing length and height when endpoints are aligned and not aligned. Jan is shorter than Pat when they are standing next to each other with one of their endpoints automatically aligned. But, what if Jan is standing on a step ladder? Now, the endpoints are not aligned, and students, faced with this complexity, understand that Jan is still shorter than Pat though her head may be higher because she is standing on a step ladder.

In Lesson 2, students compare the length of their strings to the length of various objects within the classroom. “My string is longer than the marker.” “My string is shorter than my friend’s shoe.” They know to line up the endpoints or the comparison is not valid.

In Lesson 3, students make a series of comparisons: the pencil is longer than the marker; the eraser is shorter than the marker. They directly compare only two objects, but in doing so, potentially see more relationships. Then, they engage in drawing a magical world where, for example, a flower is taller than a house.

Topic B: Comparison of Length and Height of Linking Cube Sticks Within

In Topic A, students compared length and height of different objects when their endpoints were aligned and not aligned. Topic B continues with informal comparison of length with students comparing the lengths and heights of linking cube sticks within 10 with a color change at 5. In

Lesson 4, to reinforce the importance of the 5-group, they compare multi-unit linking cube sticks to a 5-stick. “My 4-stick is shorter than my 5-stick.”

In Lesson 5, they compare lengths with endpoints that are aligned and not aligned. “My 7-stick is longer than my 4-stick. When I push my 4-stick up or turn it on an angle, it is still shorter than my 7-stick.”

In Lesson 6, students compare their linking cube sticks to objects. “My 4-stick is shorter than my pencil. My 4-stick is longer than my eraser.” Using linking cubes to directly compare different objects is a precursor to being able to compare the length of two objects using a third object, as well as being able to order the lengths of different objects in later grades, and gives students a practical context for solidifying their developing number sense.

In Lesson 7, the students break their 5-stick into two parts. “I broke my 5-stick into two parts. My 5-stick is longer than my 3- or 2-sticks. Together my 3- and 2-sticks are the same as my 5-stick.” This is an extension of their decomposition work from Module 1. This provides the foundation for the number work coming in Module 4 wherein they decompose all numbers to 10. This also encourages their fluency with facts to 5.

Topic C: Comparison of Weight

In Topics A and B, students compared length and height, and now, in Topic C, they compare the weight of objects, progressing from informal comparisons of objects (comparing the weight of a book to that of a pencil by picking them up) to using balance scales when greater precision is necessary or desired (comparing the weight of a pencil to a marker by using a scale).

In Lesson 8, students compare the weight of a book to the weight of an eraser and other objects they find. Students then use the weight of the book as a benchmark and find other objects to compare with the weight of the book. “This eraser is lighter than my book. The bag of blocks is heavier than my book.”

In Lesson 9, students use a balance scale as a tool to compare the weights of objects that are approximately the same, and thus more difficult to compare. For example, “My pencil is lighter than this marker.”

In Lesson 10, the measurement becomes more precise as a set of pennies is used to directly compare the weight of objects. Students use a balance to determine that the pencil weighs the same as a set of 5 pennies. The marker weighs the same as a set of 9 pennies. The students are comparing one object to another, a set and a solid object. They stay within kindergarten standards by not comparing the number of pennies each weighs, instead simply enjoying the exploration of finding the set of pennies that weighs as much as an object.

In Lesson 11, students observe conservation of weight, for example, by placing two balls of clay of equal weight on either side of their balance scale. They break one of the balls into two smaller balls and observe the two sides of the scale still balance. They then break the single ball into three smaller balls and observe the same thing. The lesson continues with a sequence leading back to the two balls once again balancing after all the permutations.

In Lesson 12, they extend their learning to use different units to compare the weight of the same item using different objects. “The pencil weighs the same as a set of 5 pennies. The pencil weighs the same as a set of 10 little cubes.”

Topic D: Comparison of Volume

In Topic D, students compare volume in the same progression as that of weight in Topic C.

In Lesson 13, they see that one container holds more rice than another by pouring the rice from the first container into a smaller empty one. “It is overflowing! The bowl holds more rice than the cup.”

In Lesson 14, students explore how volume is conserved by pouring rice from a cup to a bowl, then to a tall container, and then back into the original cup. They discover that while the quantity of rice may look very different when poured into different size and shape containers, it remains the same amount.

In Lesson 15, students count the number of small cups of rice within a larger amount. “The bowl holds 10 little cups of rice. I wonder how many little cups of rice this mug holds?” Before the Mid-Module Assessment, students consider the different measurable attributes of single items such as a water bottle, dropper, and juice box. They consider what tools they might use to compare those attributes.

Topic E: Is There Enough

After the Mid-Module Assessment, the module shifts towards comparison of number, opening in Topic E with four lessons in which students consider, “Is there enough?” in a variety of contexts. Students explore and compare area by participating in everyday activities such as comparing two pieces of paper to see which one will allow them to make a bigger drawing.

In lesson 16, students consider and establish that a square has enough space to fit a circle inside it, and then discover that the same square fits many little squares perfectly if they are arranged in rows.

In Lesson 17, they work to see if there are enough forks for every plate, enough chairs for every child, and enough pails for every shovel.

In Lessons 18 and 19, the language of enough shifts to the language of more than and fewer than. There are more forks than plates. There are fewer chairs than children. There are the same number of pails and shovels.

Topic F: Comparison of Sets Within 10

Topic F opens with students shifting from comparison of lengths to comparison of number. As students build their confidence by directly comparing the lengths of a pencil and a crayon, they are increasing their readiness in later grades to indirectly compare using length units. “The pencil is longer than the crayon because 7 cubes is more than 4 cubes.”

In Lesson 20, students relate more and less to length: “A stick of 7 cubes is longer than a stick of 3 cubes; 7 is more than 3. A stick of 3 cubes is shorter than a stick of 7 cubes; 3 is less than 7.” In Lesson 21, students take two sticks, break them into cubes, and compare the sets. “Which set has more objects? This set has more than that set.”

Lessons 22 through 24 have students making and identifying sets that have the same number of objects, sets that have 1 more object, and sets that have 1 fewer object.

Topic G: Comparison of Numerals

Topic G is a bridge that enables students to compare numerals by connecting number to length.

In Lessons 25 and 26, they work with linear configurations to match and count to see that “7 is more than 3, 3 is less than 7, and 5 is equal to 5.”

In Lesson 26, students look for and find strategies to compare sets of objects in all different configurations.

Finally, in Lessons 27 and 28, they visualize as they compare numerals without using materials, a skill which will be fine-tuned throughout the balance of the kindergarten year

Topic H: Clarification of Measurable Attributes

The module culminates with a series of three measurement and comparison exploration tasks.

In Lesson 29, students compare volume by moving a constant amount of colored water between containers of different shapes.

In Lesson 30, students use balls of clay that weigh the same amount, as measured in cubes on the balance scale, to make different sculptures. They see the various forms the same amount of clay can take.

Students are challenged to draw a building or a tree in Lesson 31. They compare the height of their building to their peers' and to a linking cube stick of 10. Students then arrange their buildings to make a classroom city. As they complete the lesson, they have a new awareness of the constructions in their community.

In Module 2, they explored shapes; in Module 3, they explore the heights of those shapes. In the final lesson before the End-of-Module Assessment, students consider the different measurable attributes of single items such as a water bottle, a dropper, and a juice box and consider what tools they might use to measure those attributes.