



**SC READY**

**Mathematics Grades 3 through 5**

***2024 Data Review Report***

Data Recognition Corporation and the South Carolina Department of Education Office of Assessment and Standards (OAS) convened a panel of content experts to review item data from the SC READY assessment of the 2015 South Carolina College- and Career-Ready Math Standards. The panel of experts discussed and analyzed items from the 2024 assessment, including information about how students performed on each item. The panel recognizes the hard work of South Carolina educators and offers these relevant and useful suggestions for improving instruction as an addendum to those from previous years.

### **General Observations and Comments**

- Mathematical vocabulary should be taught and reinforced. Students need practice using and hearing/reading terms and phrases.
- Familiarize students with a variety of representations and model types; practice solving problems using multiple strategies.

### **Grade 3**

#### *Number Sense and Base Ten*

- When teaching students to round numbers, work with number lines to ensure that students know which digits to focus on, rather than teaching “tricks.”
- Have students practice rounding “backwards” (i.e., provide a number that has been rounded and ask students to identify what the unrounded number could have been.)
- Teach students the symbols for comparing numbers. Use symbols to order numbers from least to greatest. Practice comparing or ordering more than two numbers.

#### *Number Sense – Fractions*

- Have students practice modeling problems on their own so that they can see the total number of items.
- Allow students to practice drawing models when comparing fractions, as models are not always provided for them.
- Use a variety of model types (e.g., rectangles/bars, number lines, shapes other than circles).
- Provide opportunities to practice placing fractions greater than one on a number line. Focus on parts between numbers and not just integers.
- Use manipulatives to help students see equivalencies.

*Algebraic Thinking and Operations*

- Ensure students are familiar with both the commutative property and multiplication modeling.
- Use multiple representations throughout the year.
- Teach the difference between an “expression” and an “equation.”
- Represent different terminology in the classroom (e.g., “groups” could also be called “bunches”).
- Ask students to practice making their own models. Have them create models in multiple ways for the same problem. Students should see multiple representations of models and formats (e.g., vertical vs. horizontal tables).
- Teach the distributive property as decomposing or breaking apart.
- Ensure students know property names and understand why each property can be applied.
- Reinforce multiplication facts throughout the year.
- Show students many representations of patterns. Teach students to look at the relationships between all numbers, not just the first two items.
- Teach students to think about what the person in the test item is doing rather than focusing on key words. Read story items as a story.
- Students need to have a good working knowledge of grade-level mathematical vocabulary.

*Geometry*

- Use Venn diagrams to teach students that shapes can fall into more than one category.
- Provide hands-on opportunities for students to break apart and build shapes and nets.
- Ensure students know that all plane figures (2D shapes) have area. Include practice with pentagons, trapezoids, hexagons, octagons, etc.

*Measurement and Data Analysis*

- Ensure students understand equivalent fractions. Students may need help seeing that  $\frac{1}{2}$  has many equivalent fractions. Provide experience using number lines, and have students practice counting fractions as iterations.
- Ask students to decompose rectilinear polygons in different ways and help them understand that their equations may look different.

- Ensure students know and can apply formulas for area and perimeter of polygons.
- Provide hands-on opportunities to manipulate arrays using square tiles.
- Provide students with partially filled in area models. Give students only the length and width of the rectangle filled in with unit squares leaving the rest of the model blank. Then ask them questions about the model.

## Grade 4

### *Number Sense and Base Ten*

- Clarify the difference between rounding and estimating. Discuss that rounding should be to a place value.
- Use number line modeling to teach estimation.
- Ensure students know the difference between place value and periods of numbers. Continue to spiral throughout the year.
- Continue to have students practice rounding “backwards” (i.e., provide a number that has been rounded and ask students to identify what the unrounded number could have been.)

### *Number Sense and Operations – Fractions*

- Ensure students know that answers or fractions aren’t always in their simplest form. Teach that there are multiple ways to show a whole number.
- Relate fractions to benchmark fractions when comparing. Use number lines and modeling.
- Ensure students can explain or justify their answer when comparing fractions.
- Ensure students know what decomposition means.
- Teach addition and subtraction with fractions with and without regrouping. Relate the model for this type of problem to the expression or equation for the problem.
- Teach fraction operations conceptually and not just procedurally.
- Ensure students have a solid understanding of unit fractions. Use this understanding to help students understand the iterations of fractions and perform operations.
- Practice with problems that use whole numbers and fractions, not just one or the other.
- Teach that 1 is the denominator of a whole number when written as a fraction.

- Reinforce the relationship between tenths and hundredths to make equivalent fractions for operations. Practice comparing place value (e.g., teach that 6 tenths is the same as 60 hundredths).

### *Algebraic Thinking and Operations*

- Use manipulatives and hands-on work to teach words and numbers (e.g., magnets with the words “is” and “more than”, etc.).
- Provide examples and practice with real-world problems, especially those with multiple steps.
- Teach students to write their own equations, including variables, rather than only solving provided equations.
- Ask students to unpack problems and provide reasoning or justification for their answers.
- Teach the difference between factors and multiples.
- Provide patterns and sequences and ask students to find missing numbers within them. Ask students to recognize and extend patterns too.
- Practice with patterns using more than one operation.

### *Geometry*

- Use manipulatives or paper folding to practice creating and working with shapes, rather than looking only at pictures. Give students attributes and allow them to create shapes.
- Use paper folding to practice symmetry of figures including investigating figures that have more than one line of symmetry.
- Ensure that students have seen common figures rotated in many ways. For example, students should see right triangles with the right angle in many different orientations.
- Students should understand that the sides of polygons are segments. In addition, students should understand that the segment (side) that is part of a polygon is also part of an extended line.

### *Measurement and Data Analysis*

- Practice working with abbreviations and word form for units and their equivalencies. Ensure students know equivalencies when converting units.

- Use number lines to help teach calculations involving time (i.e., going from hour to hour). Teach that a clock is a number line.
- Practice drawing rectangles and labeling them so that students understand where each measurement belongs. Ensure students understand that area is the inside of the rectangle.
- Provide opportunities for students to work “backwards” (e.g., find the length when given the width and area).
- Include examples of number lines that do not have labels or tick marks. Ensure students can construct their own number lines and be able to identify fractions between whole numbers.
- Provide opportunities for students to identify “how many plants are more than 4 inches,” “...between 1  $\frac{1}{4}$  inches and 3 inches,” “...less than 9 inches.” Additionally ask how many plants are not a specific height. Use the aspects that students notice to create interpretation questions.
- Ensure students are familiar with “benchmark” angles.
- Practice identifying whether an angle is acute, obtuse, or right before measuring it with a protractor.
- Provide hands-on opportunities with money. Ensure students understand the value of coins.

## Grade 5

### *Number Sense and Base Ten*

- Use place value mats, including decimals. Ask students to draw their own place value chart.
- Teach that the decimal is at the end (i.e., at the right) of a whole number.
- Teach that numbers shift according to their place value, not that the decimal point is shifting.
- Practice going from word form to numerical form. Use the word “and” to identify where the decimal point will be.
- Allow students to see numbers represented correctly in expanded form, but not necessarily in ascending order.

- Continue to have students practice rounding “backwards” (i.e., provide a number that has been rounded and ask students to identify what the unrounded number could have been.)
- Practice drawing arrays or the area model. Use manipulatives to represent units.
- Show students many representations of decimal and fraction multiplication. Use a variety of models and discuss connections between them. Consider card sorting activities where students sort or match expressions and models.

### *Number Sense and Operations – Fractions*

- Use models to represent fractions and operations to promote conceptual understanding of least common multiples (LCM).
- Practice adding and subtracting fractions with regrouping. Reinforce understanding of equivalent fractions.
- Represent division problems in more than one way, including using models.
- Ensure students are comfortable with vocabulary (“ $\frac{1}{2}$ ” is “one-half”; “times two” can be “double,” etc.)
- Standard 5.NSF.5b can be taught for more than one number (e.g., dimensions of a polygon).
- For 5.NSF.5b have students explain why a missing factor would be greater than or less than one (1), when a factor and product are given.
- Teach 5.NSF.5b and 5.NSF.5c with a context, so students understand the difference between the two indicators. Consider, “Winston has one-and-a-half times as many pencils as Jared,” or “Sue has half the number of erasers as Lori.” Practice with items that use word and numerical form for numbers. Use context to distinguish between these standards and 5.NSF.5d.
- Ask students to model problems using unit fractions and non-unit fractions when multiplying.
- Ensure students can recognize the numerator and the denominator in a division problem. Teach that a fraction is a representation of a division problem.

### *Algebraic Thinking and Operations*

- Use examples with brackets and braces, not just parentheses. Students should work with a variety of problems.

- Students should have practice translating “quantity of” into parentheses when writing numerical expressions from verbal expressions.
- Provide examples of ordered pairs when teaching patterns, not only when teaching coordinate planes. Ensure students are comfortable with different types of charts (e.g., vertical and horizontal).

### *Geometry*

- Teach the relationship between the x- and y-axis and the usefulness of the coordinate plane. Ensure students understand “horizontal” and “vertical.”
- When teaching ordered pairs, include examples where the coordinate plane is not provided.
- Teach coordinate planes in context to help students understand how to interpret x- and y-values. Practice constructing a table using a coordinate plane.
- Use attribute charts, flow charts, or Venn diagrams to help teach shape characteristics and ask students to construct their own.
- Ensure students can explain or justify the classification for a shape, and that shapes may be classified in more than one way. Include less common pictures or manipulatives. Use counterexamples to help teach classification.
- Teach students multiple ways to show the hierarchy of two-dimensional figures. Students should understand shapes without needing a visual.

### *Measurement and Data Analysis*

- Ensure students understand abbreviations and words for units.
- Teach that the marks on a line plot are the data points. Students should understand the purpose of a line plot.
- Reinforce that all numbers on a number line may not be marked or labeled.
- Represent perimeter, area, and volume in multiple ways, and include counterexamples.
- Students should be familiar with the word “by” as an important operational word when working with volume.
- Represent problems as equations with missing variables. Practice with problems where, for example, not all side lengths are given for a square.
- Students should recognize key words for calculating area, perimeter, or volume (e.g., “fill,” “around”). Associate length, width, and height with finding volume.