

SC READY Math Grades 3-5
2021 Data Review Report

In fall 2021 the South Carolina Department of Education convened a panel of experts to review item data on the SC READY Grades 3-5 Math Assessment. The panel looked at items and data from spring 2021 assessments. There were no state assessments in 2020 due to the global pandemic, thus there is no Data Review Report for spring 2020. However, there are still reports from previous years that contain relevant and useful suggestions for improving instruction. The discussions of this year's panel yielded the recommendations that follow. The panel recognizes the hard work of SC educators over the past two years and offers these suggestions as an addendum to those from previous years.

Students are not performing well on the tracked measurement concepts in grades 3-5. More specifically, the Data Review Committee looked at the progression of area, perimeter, and volume across grades 3-5 and provided this feedback to support instruction.

Grade 3 Standard(s):

- 3.MDA.5- Understand the concept of area measurement.
 - a. Recognize area as an attribute of plane figures;
 - b. Measure area by building arrays and counting standard unit squares;
 - c. **Determine the area of a rectilinear polygon and relate to multiplication and addition.**
- 3.MDA.6-Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

Grade 4 Standard(s):

- 4.MDA.3- Apply the area and perimeter formulas for rectangles.

Grade 5 Standard(s):

- 5.MDA.4- Differentiate among perimeter, area and volume and identify which application is appropriate for a given situation.

When beginning the concept of area in Grade 3, begin concretely by using square tiles. Standards 3.MDA.5.a and 3.MDA.5.b prepare students for 3.MDA.5.c. Be intentional about the use of concrete models to build student understanding. As students demonstrate readiness for abstract models, be sure to include rectilinear polygons when moving into Standard 3.MDA.5.c. For 3.MDA.6, support students as they experience this standard with and without visuals.

Grade 4 students should review the Grade 3 standards prior to discovering the formulas for area and perimeter. Use the correct terminology when teaching all standards. Stay away from labeling each side of the shapes with lengths each time. Also, give students items with context. Have them discover if they will need to use the formula for area or use the formula for perimeter.

Grade 5 students need a strong foundation in area and perimeter in addition to learning volume. Remember that volume is a new concept here. You could ensure students have a concrete experience by filling up different size boxes with cubes. Once students are comfortable with the concrete models, you can move to more abstract thinking. Also, be sure that students have experiences with area, perimeter, and volume through real-world context. For example, teachers can pose a situation for students. I want to cover the floor with carpet. Which measurement will I need to use? Or I need to put a fence around my yard. Which measurement will I need to use?

Students are not performing well on the tracked geometric concepts in grades 3-5. More specifically, the Data Review Committee looked at the progression of shapes across grades 3-5 and provided this feedback to support instruction.

Grade 3 Standard(s):

- 3.G.1- Understand that shapes in different categories (e.g., rhombus, rectangle, square, and other 4-sided shapes) may share attributes (e.g., 4-sided figures) and the shared attributes can define a larger category (e.g., quadrilateral). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

Grade 4 Standard(s):

- 4.G.2- Classify quadrilaterals based on the presence or absence of parallel or perpendicular lines.
- 4.G.3- Recognize right triangles as a category and identify right triangles.

Grade 5 Standard(s):

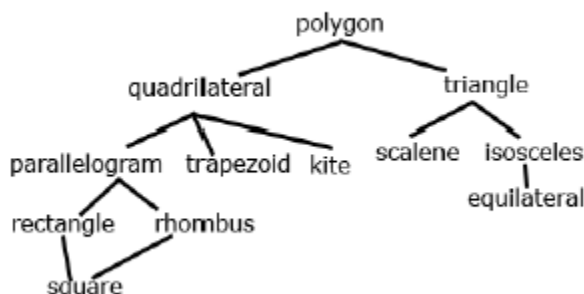
- 5.G.4- Classify two-dimensional figures in a hierarchy based on their attributes.

When beginning shapes in Grade 3, clarify the definition of each shape for students. Students should understand the attributes (angles, sides, etc.) A suggested activity is to use straws to create a square, move around those same straws to create a new shape. The committee suggested changing only one attribute at a time and to have the students thoroughly explore the shapes.

Grade 4 students should continue building on their knowledge from Grade 3, but additionally classify quadrilaterals based on parallel and perpendicular lines.

In Grade 5, consider this re-wording; Students should understand that a geometrical hierarchy categorizes shapes based on common attributes. Common attributes include the number and type of angles, number of vertices and edges, and the presence of parallel and perpendicular lines. Teachers can have students sort shapes based on their attributes and create their own categories. Asking students clarifying questions will help both the teacher and student find any misunderstandings.

The Hierarchy Diagram included here comes from the Grade 5 Support Document in Unit 7 on page 125. Here you can take students through the hierarchy of polygons.



In all grades, students should have flexibility within shapes.

Additionally, the committee made the following suggestions based on SC READY items. The feedback that is provided is from items that appear to have more concerning statistics. Therefore, not all Key Concepts are represented for each grade level.

Key Concept(s):

Grade 3

Number Sense- Fractions

3.NSF.2.b-

This standard requires students to represent fraction equivalence using set, area, and linear models. Students should be comfortable using each model. Also, students should be able to connect a set model to a linear model or an area model.

Geometry

3.G.1-

Students should have multiple opportunities to experience four-sided shapes.

3.G.2-

Students should have understanding that a shape can be partitioned in different ways and can still be equal. For example, students can think about two sandwiches beside each other. The first sandwich is cut in half vertically and the second sandwich can be cut diagonally. Both sandwiches are the same size even after they are cut.

Measurement and Data Analysis

3.MDA.6-

Ask about the process that students go through to solve each question. This is a lengthy standard, so determining the process that students are using will allow teachers to support student needs.

Grade 4

Measurement and Data Analysis

4.MDA.1-

Students must know their conversions. The Grade 4 standard places emphasis on converting from a larger unit to a smaller unit.

4.MDA.3-

Here students are applying the formulas for area and perimeter. Work on estimation as a strategy and reasonableness when students are considering if their answer is accurate. Also, emphasize real-world context for students with and without using visuals. This will allow students to bring their own visual to the problem.

Algebraic Thinking and Operations

4.ATO.3-

Consider instructing students to first represent a multi-step, real-world problem as an expression and then using the written expression to solve for the unknown.

4.ATO.5-

When thinking about patterns, ensure that students understand that each object is a term. For example, if the pattern is 8, 5, 7, 4, 6, 3 Which term comes next? Be intentional about using correct math vocabulary during instruction.

Geometry

4.G.2-

Students need support with the definition of shapes. Ensure that students understand the terms parallel and perpendicular in reference to lines. For SC READY, a trapezoid is defined as having one pair of parallel lines. Also, ensure that students understand the previous grade-level expectations for the classification of quadrilaterals.

Grade 5

Number Sense- Fractions

5.NSF.4.b-

Include models during instruction to ensure that students have a strong understanding of the multiplication of fractions.

Algebraic Thinking and Operations

5.ATO.3.b.-

Remind students that they are to look at two sets of ordered pairs. They will need to look at all parts of the answer options to ensure that they are selecting the correct response.

5.ATO.3.d.-

Ensure that students are familiar with corresponding terms as they are having conversations about patterns.

Geometry

5.G.1.a-

Students should be familiar with the terminology (origin, axis, perpendicular, intersect, etc.) and the application of the terminology.

5.G.4-

Students should be able to connect shapes based on their attributes. Also, students should understand that shapes fit into multiple categories.

General Notice(s):

- Students are having a difficult time with items that are DOK 3. Having a range of DOK items allows students to explore concepts at different levels.