03. Measurement and Geometry

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **4 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In this unit, students will represent and interpret data, and understand concepts of area, and relate area to multiplication. Students will use appropriate scales to represent and interpret data. Students will also explore geometric attributes of polygons and classify quadrilaterals based on their attributes.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Essential Questions:

- Why do we need to measure the area of a surface?
- How do we find areas of irregular shapes?
- How can one use the relationship between multiplication and division t find products and quotients?

Enduring Understandings:

- Different scales are needed to represent various data.
- Area measurement involves covering a surface.
- Areas is measured in Square units.
- Area is related to the operations of multiplication and division.

CONTENT AREA STANDARDS

3.OA

A. Represent and solve problems involving multiplication and division

B. Understand properties of multiplication and the relationship between multiplication and division

C. Multiply and divide within 100

D. Solve problems involving the four operations, and identify and explain patterns in arithmetic

3.NBT

A. Use place value understanding and properties of operations to perform multi-digit arithmetic

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.3.OA.C.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
MA.3.OA.D.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
MA.3.MD.B.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.
MA.3.MD.C.5	Recognize area as an attribute of plane figures and understand concepts of area measurement.
MA.3.MD.C.5a	A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.
MA.3.MD.C.5b	A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
MA.3.MD.C.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard units).
MA.3.MD.C.7	Relate area to the operations of multiplication and addition.
MA.3.MD.C.7a	Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
MA.3.MD.C.7b	Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
MA.3.MD.C.7d	Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.
MA.3.MD.D.8	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.
MA.3.G.A.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

LA.K-12.NJSLSA.R1	Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
LA.K-12.NJSLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
LA.K-12.NJSLSA.SL4	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
CS.K-12.3	Recognizing and Defining Computational Problems
CS.K-12.5	Creating Computational Artifacts
CS.K-12.6	Testing and Refining Computational Artifacts
TECH.9.4.5.CT	Critical Thinking and Problem-solving
TECH.9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
TECH.9.4.5.IML.2	Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).

STUDENT LEARNING TARGETS

- I can assess the reasonableness of answers using mental computation and estimation strategies including rounding.*Analysis*
- I can draw examples of quadrilaterals that do not belong to any of the subcategories of quadrilaterals.*Comprehension*
- I can find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts.*Comprehension*
- I can multiply whole-number side lengths to find areas of rectangles in the context of solving real world and mathematical problems.*Comprehension*
- I can recognize rhombuses, rectangles, and squares as examples of the larger category of quadrilaterals.*Comprehension*
- I can show measurement data by making a line plot. *Comprehension*
- I can show that the area of a rectangle is the same as would be found by multiplying the side lengths.*Comprehension*
- I can solve real world and mathematical problems exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.*Comprehension*
- I can solve real world and mathematical problems involving perimeters of polygons.*Comprehension*
- I can solve real world area problems by decomposing rectlinear figures and adding the areas of the non-overlapping parts.*Comprehension*
- I can solve two-step word problems using equations with a letter standing for the unknown quantity.*Comprehension*
- I can understand a plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.*Comprehension*
- I can understand that a unit square can be used to measure area. *Comprehension*
- I can understand that shapes in different categories may share attributes and that the shared attributes can define a larger category.*Comprehension*
- I can find the area of a rectangle with whole-number side lengths by tiling it. *Retrieval*
- I can generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch.*Retrieval*
- I can know from memory all products of two one-digit numbers (by the end of third grade).*Retrieval*

- I can measure areas of plane figures by counting unit squares. *Retrieval*
- I can multiply and divide within 100 fluently. *Retrieval*

Declarative Knowledge

Students will understand that:

- Multiply whole number side lengths to find areas of rectangles in the context of solving real world mathematical problems
- Recognize rhombuses, rectangles, and squares as examples of the larger category of quadrilaterals
- Show measurement data by making a line plot
- Show that the area of a rectangle is the same as would be found by multiplying the side lengths
- Solve real world and mathematical problems exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters
- Solve real world and mathematical problems involving perimeters of polygons
- Find the area of a rectangle with whole-number side lengths by tiling it
- Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch
- Know from memory all products of two one-digit numbers (by the end of third grade)
- Measure areas of plane figures by counting unit squares
- Multiply and divide within 100 fluently

Procedural Knowledge

Students will be able to:

- Assess the reasonableness of answers using mental computation and estimation strategies including rounding
- Draw examples of quadrilaterals that do not belong to any of the subcategories of quadrilaterals
- Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non overlapping parts
- Solve real world problems by decomposing rectilinear figures and adding and adding the areas of the non-overlapping parts
- Solve two step word problems using equations with a letter standing for the unknown quantity
- Understand a plane figure which can be covered without gaps or overlaps can be covered by n unit squares is said to have an area of n square units
- Understand that a unit square can be used to measure area
- Understand that shapes in different categories may share attributes and that the shared attributes can define a larger category

EVIDENCE OF LEARNING

Refer to the 'Formative Assessments, Summative, and Benchmark Assessments' sections.

Alternate Assessments

- Portfolios
- Verbal Assessment (instead of written)
- Multiple choice
- Modified Rubrics
- Performance Based Assessments

Formative Assessments

- EDM math boxes
- Student proficiency scales
- Exit tickets (ticket out)
- Check lists
- Performance tasks
- Teacher observation

Summative Assessments

- EDM Unit assessments
- Projects

Benchmark Assessments

- IXL Screener / Diagnostic Snapshot BOY
- Interim Assessment 1
- IXL Diagnostic Snapshot MOY
- Interim Assessment 2

- IXL Diagnostic Snapshot EOY

RESOURCES (Instructional, Supplemental, Intervention Materials)

- Core Instructional Materials:
    - Everyday Math Unit 3 Resources
        - Math Masters
        - Student Journal Volume 1
        - ConnectED

  Supplemental Materials:
    - IXL
    - Illustrative Math Tasks
    - EM Games

EM Lessons

- 4.1
- 4.2
- 4.3 (a and c)
- 4.4
- 4.5
- 4.6
- 4.7
- 4.8
- 4.9
- 4.10
- 4.11
- 4.12

INTERDISCIPLINARY CONNECTIONS

Science:
building and planning (engineering)

Social Studies:
creating timelines

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

- Repeat directions
- Provide scaffolds
- Use graphic organizers
- Use wait time
- Provide manipulatives, grid paper
- Provide additional time

See link to Accommodations & Modifications document in course folder.