MATHEMATICS COMMON CORE CURRICULUM UNIT
North Smithfield School Department

UNIT 5: Points and plots on the coordinate plane, decimal arithmetic, and two dimensional figures **GRADE: 5**

DATE PRESENTED: _____DATE DUE: _____ LENGTH OF TIME: Several Weeks

OVERVIEW OF UNIT:

In this unit, students will understand that the Cartesian Coordinate System is a scheme that uses two perpendicular number lines intersecting at zero to tell the location of the points in the plane. A graph of a linear equation contains all of the points on the coordinate grid whose x- and y-coordinates satisfy the equation. Plane shapes have many properties that make them different from one another. Polygons can be described and classified by their sides and angles. Commonalities in attributes of objects or situations can be found and used to make generalizations about relationships.

ESSENTIAL QUESTIONS:

With any two values (x,y) how can you locate the point? How can shapes be described in terms of their location in plane or in space? How do we apply these ideas to real-world context? What are the attributes of this figure (what is this figure?) How do you know? Every quadrilateral is a polygon, but not every polygon is a quadrilateral. Why is this true?

STANDARDS: Common Core Math Standards – Grade level domains K-5

Counting and Cardinality CC	Operations and Algebraic Thinking OA	Number and Operations in Base Ten NBT	Number and Operations – Fractions NF	Measurement and Data MD	Geometry G
☐	☐ OA.3	☐ NBT 5	☐	☐	☐ G 1-4
☐	☐	☐ NBT 7	☐	☐	☐
☐	☐				
☐	☐				

STANDARDS: Mathematical Practices grades K-12

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics ★
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

FOCUS MATHEMATICS STANDARDS: see curriculum for specific standards, e.g.

- Analyze patterns and relationships. 5.OA.3
- Perform operations with multi-digit whole numbers and with decimals to hundredths. 5.NBT.7
- Represent and interpret data. 5.MD.2
- Graph points on the coordinate plane to solve real-world and mathematical problems. 5.G.1, 2
- Classify two-dimensional figures into categories based on their properties. 5.G.3, 4
- Perform operations with multi-digit whole numbers and with decimals to the hundredths. 5.NBT.5

Applied Learning Standards:

problem solving communication critical thinking research reflection/ evaluation

ENDURING UNDERSTANDING:

A point can be located using any two values (x,y). Shapes can be described in terms of their location in a plane or in space. These ideas can be applied to the real world. The attributes of a figure can be identified and explained.

PRIOR KNOWLEDGE: (from grade 4 CCSS)

- Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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. (4.OA.3)

*Referenced templates from *Common Core Curriculum Maps, English Language Arts* and *The Understanding By Design Guide to Creating High Quality Units*

- Fluently add and subtract multi-digit whole numbers using the standard algorithm. (4.NBT.4)
- Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.5)
- Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4.G.1)
- Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. (4.G.2)
- Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4.G.3)

STUDENT OBJECTIVES, SKILLS and/or NEW KNOWLEDGE:

- OA.3: Read and write integers and represent them on a number line.
- OA.3: Identify and graph points on a coordinate plane.
- OA.3: Use number line and the coordinate plane to find distances involving positive numbers.
- OA.3: Make a table of x- and y-values for an equation. Students then use the ordered pairs to graph the equation.
- NBT.5: Use partial products or the traditional algorithm to multiply multi-digit numbers by a one-digit number.
- NBT.5: Multiply two-digit numbers by two-digit numbers.
- NBT.5: Multiply two-digit numbers by factors with nor then two digits.
- NBT.5: Use diagrams and write equations to solve problems.
- NBT.5: Find the hidden question or questions to solve multiple-step problems.
- NBT.5: Use the Distributive Property to simplify expressions and solve equations.
- NBT.7: Compute sums and differences of decimals involving tenths, hundredths, and thousandths.
- NBT.7: Use a standard algorithm to multiply a whole number and a decimal.
- NBT.7: Use rounding and compatible numbers to estimate products of whole numbers and decimals.
- NBT.7: Use the standard algorithm to multiply decimals by decimals.
- NBT.7: Mentally divide decimals by 10, 100 or 1000.
- NBT.7: Use the standard algorithm to divide a decimal by a whole number.
- NBT.7: Use compatible numbers to estimate quotients of decimals and whole numbers.
- NBT.7: Use the standard algorithm to divide decimals by decimals.
- G.1: Complete a table of values for an equation or write an equation to describe the relationship between pairs of numbers in a table.
- G.2: Identify and graph points on a coordinate plane.
- G.2: Make a table of x- and y-values for an equation, then use the ordered pairs to graph the equation.
- G.3,4: Identify and classify polygons (triangles, quadrilaterals).
- G.3,4: Make and test generalizations of patterns in different examples.

SUGGESTED PROBLEMS:

ASSESSMENT PROBLEMS

5.OA.3 Advanced

- https://docs.google.com/a/bryantschools.org/file/d/0By53YArZ6amaRXd0QXYweXVUTFdMNlVKUi1vdmJodw/edit?pli=1
- https://docs.google.com/a/bryantschools.org/file/d/0By53YArZ6amaclpGc3M2TTNTRENLXzRpSEJaQ1FDUQ/edit?pli=1

5.NBT.5 Basic

- www.nj.gov (#24-26)

5.NBT.7 Basic

- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/292/original/illustrative_mathematics_292.pdf?1357225040

5.G.1 Advanced

- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/489/original/illustrative_mathematics_489.pdf?1343856881

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5.G..2 Basic

- http://www.p12.nysed.gov/assessment/common-core-sample-questions/math-grade-5.pdf (#5)
- https://docs.google.com/a/bryantschools.org/file/d/0By53YArZ6amaMDB2MS1qb09SWHF1S0M2UnVVeWJUZw/edit?pli=1

5.G.3 Basic

- https://docs.google.com/a/bryantschools.org/file/d/0By53YArZ6amaYmU0OTM5M2EtNjgwNi00MDYxLThmYzgtOTA0MjA5NjlmZGNi/edit?pli=1
- https://docs.google.com/a/bryantschools.org/file/d/0By53YArZ6amaWUdydzRXVnlUazZMdGhzaF9fNER3Zw/edit?pli=1
- https://docs.google.com/a/bryantschools.org/file/d/0By53YArZ6amaWlVzVWtzNE9TdTZvTDFzblFQcHhNZw/edit?pli=1

5.G.4 Basic

- https://docs.google.com/a/bryantschools.org/file/d/0By53YArZ6amaNzRhMjcwZjktYTE3Ni00YTExLWJmNDMtMjZhNzZhZjc2MDVh/edit?pli=1
- https://docs.google.com/a/bryantschools.org/file/d/0By53YArZ6amaOGI4Njc0YjctODQ2YS00OWNhLTlkNjItYmMxOGJlNTBiMjEz/edit?pli=1
- https://docs.google.com/a/bryantschools.org/file/d/0By53YArZ6amaYjQwNmVmNDMtYTM1Mi00YzIyLWE1MzAtNDJlMmIwMTNkOTE4/edit?pli=1

ACTIVITIES, PRODUCTS, PERFORMANCE, and ASSESSMENTS:

1. Application to real world problems
2. Creating charts/collecting data
3. Collaboration - interpersonal
4. Conferencing
5. Exhibits
6. Graphic organizers
7. Graphing
8. Interviews
9. Journals
10. KWL charts
11. Mathematical Practices
12. Modeling ★
13. Oral presentations
14. Problem/Performance based/common tasks
15. Real-life applications involving graphing
16. Represent numbers
17. Rubrics/checklists (mathematical practice, modeling)
18. Technology
19. Summarizing and note-taking
20. Tests and quizzes
21. Writing genres
    Arguments/ opinion
    Informative

- OA.3: Once students can describe a sequence of numbers, the terms can be written in ordered pairs and then graphed on a coordinate grid. They should recognize that each point on the graph represents two quantities.

- NBT.5: In prior grades, students used various strategies to multiply. Students can continue to use these different strategies as long as they are efficient, but must also understand and be able to use the standard algorithm. In applying the standard algorithm, students recognize the importance of place value.

- NBT.7: This standard requires students to extend the models and strategies they developed for whole numbers in grades 1-4 to decimal values. Before students are asked to give exact answers, they should estimate answers based on their understanding of operations and the value of the numbers. Students should be able to express that when they add decimals they add tenths to tenths and hundredths to hundredths. So, when they are adding in a vertical format (numbers beneath each other), it is important that they write numbers with the same place value beneath each other. This understanding can be reinforced by connecting addition of decimals to their understanding of addition of fractions. Adding fractions with denominators of 10 and 100 is a standard in fourth grade.

- G.1: Students can use a classroom size coordinate system to physically locate the coordinate point (5, 3) by starting at the origin point (0,0), walking 5 units along the x axis to find the first number in the pair (5), and then walking up 3 units for the second number in the pair (3).

- G.2: Students will analyze the graph by interpreting the coordinate values in the context of the situation.

- G.3: In Grade 4 students built, drew and analyzed two-dimensional shapes to deepen their understanding of the properties of two-dimensional shapes. They looked at the presence or absence of parallel and perpendicular lines or the presence or absence of angles of a specified size to classify two-dimensional shapes. Now, students classify two-dimensional shapes in a hierarchy based on

properties. Details learned in earlier grades need to be used in the descriptions of the attributes of shapes. The more ways that students can classify and discriminate shapes, the better they can understand them. The shapes are not limited to quadrilaterals.

- G.4: Students can use graphic organizers such as flow charts or T-charts to compare and contrast the attributes of geometric figures. Have students create a T-chart with a shape on each side. Have them list attributes of the shapes, such as number of side, number of angles, types of lines, etc. they need to determine what's alike or different about the two shapes to get a larger classification for the shapes.

HIGHER ORDER THINKING SKILLS: Web's Depth of Knowledge 2 – 4 or Bloom's Taxonomy

Web's Depth of Knowledge

- skill/conceptual understanding
- strategic reasoning
- extended reasoning

Bloom's Taxonomy

- apply
- analyze
- synthesize/create
- evaluate

ADDITIONAL RESOURCES: see curriculum for specifics

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VOCABULARY

OA

- Algebraic expression
- Braces
- Brackets
- Equation
- Equivalent expression
- Evaluate
- Expression
- Parentheses
- PEMDAS

NBT

- Base
- Base ten number system
- Decimal (read decimal point as "and"
- Digit
- Division – equal parts
- Exponent
- Fraction (1/10, 1/100, 0.1, 0.01)
- Hundredths
- Place value
- Powers of ten
- Round
- Standard form
- Tenths
- Thousandths
- Whole number
- Word form

G

- Acute angle
- Congruent
- Coordinate Plane
- Intersection
- Obtuse angle
- Ordered pairs
- Origin
- Parallel
- Perpendicular
- Point
- Polygon
- Quadrilateral
- Right angle
- Segment
- X axis
- Y axis

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LESSON PLAN for UNIT _____

LESSONS

- **Lesson # 1 Summary:**
- **Lesson #2 Summary:**
- **Lesson #3 Summary:**

OBJECTIVES for LESSON # _____

- **Materials/Resources:**
- **Procedures:**
  - **Lead –in**
  - **Step by step**
  - **Closure**
- **Instructional strategies:** see curriculum introduction
- **Assessments:** see curriculum introduction
  - **Formative**
  - **Summative**

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