11: Two-Dimensional Geometry continued

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **2 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

The expectation is that students will have many opportunities to develop fluency with rational number arithmetic and solving multi-step problems (including those involving positive and negative rational numbers and word problems leading to one variable equations) throughout the school year. Integer and Rational Numbers builds on the students' understanding of rational number concepts to develop fluency with addition, subtraction, multiplication and division of rational numbers and to use these skills in a problem-solving context. Success with problem solving and developing fluency with rewriting linear expressions and solving linear equations presented in Linear Relationships will be dependent upon the completion of the work with rational numbers and Understanding Similarity. The standards in Ratios, Rates, Precents, and Proportions require the students to analyze proportional relationships and use them in problem solving. The students will continue to use ratios and proportional reasoning in multi-step ratio and percent problems. The standards in both Probability and Expected Value and also Making Comparisons and Predictions will support the use of proportional reasoning in context. The 2-D Geometry and 3-D Geometry units will provide opportunities for the students to use proportional reasoning in real life situations.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Objectives:

Properties of Polygons:

- Explore the ways that polygons are sorted into families according to the number and length of their sides and the size of their angles
- Explore the patterns among interior and exterior angles of a polygon
- Explore the patterns among side lengths in a polygon
- Investigate the symmetries of a shape–rotation or reflection
- Reason about and solve problems involving various polygons

Relationships Among Angles:

- Investigate techniques for estimating and measuring angles
- Use tools to sketch angles
- Reason about the properties of angles formed by parallel lines and transversals
- Use information about supplementary, complementary, vertical, and adjacent angles in a

shape to solve for an unknown angle in a multi-step problem

<u>Constructing Polygons:</u>

- Draw or sketch polygons with given conditions by using various tools and techniques such as freehand, use of a ruler and protractor, and use of technology
- Determine what conditions will produce a unique polygon, more than one polygon, or no polygon, particularly triangles and quadrilaterals
- Recognize the special properties of polygons, such as angle sum, side-length relationships, and symmetry, that make them useful in building, design, and nature
- Solve problems that involve properties of shapes

Essential Questions:

- How can lines, angles, and shapes be described, analyzed, and classified?
- Why are geometry and geometric figures relevant and important?
- What are the major classifications and relationships of angles, polygons and solids?
- How can a shape that meets given conditions be drawn?
- How can you determine when it is possible to draw a triangle given certain conditions?
- When two parallel lines are cut by a transversal, what can be said about the eight angles that are formed?
- How are angles formed by intersecting lines related?
- How can you use algebra to find missing angles?

Enduring Understandings:

- The sum of the interior angles of a polygon relates to the number of triangles that are formed by drawing diagonals from one vertex.
- Triangles have 3 sides, but not every combination of 3 side lengths will make a triangle.
- As with triangles, specific combinations of side lengths of a polygon can produce congruent copies of the polygon.
- Angles can be classified by their size, their location in relation to each other in a figure or design, and their combined angle measure. Angle classification by location or combined angle measure can help you write equations to find unknown angle measures.

CONTENT AREA STANDARDS

6.G

A. Solve real-world and mathematical problems involving area, surface area, and volume

6.SP

A. Develop understanding of statistical variability

B. Summarize and describe distributions

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.7.G.A.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
MA.7.G.A.2	Draw (with technology, with ruler and protractor, as well as freehand) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
MA.7.G.B.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

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

WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

RESOURCES (Instructional, Supplemental, Intervention Materials)

Instructional Materials:

- CMP3 - Shapes & Designs (Online link - teacher and student resources)
- Resources for Unit 1 Google Drive Folder

Supplemental/Intervention Materials:

- Desmos - Interior Angles of a Triangle, Discovering the Triangle Inequality Theorem
- MathXL
- Khan Academy
- NCTM Illuminations

- [Illustrative Math](#)
- [Illustrative Math Tasks](#)

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will understand:

- Supplementary, complimentary, vertical and adjacent angles.

Procedural Knowledge

Students will be able to:

- Reproduce a scale drawing of a geometric figure at a different scale.
- Solve problems involving scale drawings of geometric figures.
- Construct triangles given three measures of angles or sides.
- Draw geometric shapes with given conditions.
- Write and solve simple equations to find unknown angles in figures in multi-step problems.
- Recall facts about supplementary, complimentary, vertical and adjacent angles to find the measure of missing angles
- Solve for unknown angle measures created by parallel lines cut by a transversal.

EVIDENCE OF LEARNING

Benchmark Assessments

- BOY Diagnostic Snapshot Assessment
- MP1 Quarterly Assessment
- MP2 Quarterly Assessment
- MP3 Quarterly Assessment

- MP4 Quarterly Assessment
- EOY Diagnostic Snapshot Assessment

Alternate Assessments

- Portfolios

- Verbal Assessment (instead of written)

- Multiple choice

- Modified Rubrics

- Performance Based Assessments

Formative Assessments

- MathXL Assignments
- Two-Dimensional Geometry Proficiency Scale
- Do Now Check ins
- Formative Assessments - exit tickets, student-friendly proficiency scales, skill checklists ([Google Drive Folder](#))

Summative Assessments

- Summative Assessment [Google Drive Folder](#)
- OnCourse Assessments

INTERDISCIPLINARY CONNECTIONS

- Computations
- Architecture
- Engineering
- Construction

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.