



Bridging for Math Strength Resources

Standards of Learning Curriculum Framework

Standard of Learning (SOL) 5.12 Classify and measure right, acute, obtuse, and straight angles.



Student Strengths	Bridging Concepts	Standard of Learning
Student will have experience estimating and measuring length, weight/mass, and volume within U.S. customary units. Students will understand that one must use a specific tool to measure an attribute of an object. Students will be able to identify an angle.	Students will be able to classify an angle as acute, right, obtuse, or straight.	Students can classify and measure right, acute, obtuse, and straight angles.

Understanding the Learning Trajectory

Big Ideas:

- MEASUREMENT: Some attributes of objects are measurable and can be quantified using units. Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against a unit of the same attribute (Charles, 2005).
- An angle is a two-dimensional representation of a rotation or the space between two rays/lines.
- A number of degrees can be used to describe the size of an angle's opening (Charles, 2005).
- All angles can be categorized based on the size of their angle: acute, right, obtuse, or straight. (Note that higher grades/levels of math will discuss zero, reflex, and full rotations.)
- Some angles have special relationships based on their position or measures (e.g., complementary angles) (Charles, 2005).

Formative Assessment:

- VDOE Just in time Quick Check SOL 5.12 [PDF](#) / [Google slides](#)

Important Assessment Look Fors:

- The student names the appropriate tool utilized to draw and measure an angle.
- The student can accurately align, extend, estimate, and measure an acute, right, obtuse and straight angle using a protractor.
- The student notes an angle measurement with the symbol for degrees (°).
- When given the measure of one angle in a pair of supplementary angles (angles that measure to 180° - or a straight line), the student uses addition or subtraction to determine the missing angle.

Purposeful Questions:

- How are the tools we use to create an angle similar or different to the tools that we use to measure an angle?
- What steps do we need to remember in order to align our protractor correctly to measure an angle?
- How can estimation help you check the reasonableness of your answer?
- What is special about a straight angle that can help you find the missing angle pictured?

Bridging Activity to Support Standard	Instructional Tips
Routine: Collaborative Estimates: How big is the angle?	In this activity you show students an angle and have them each estimate the angle's measure. Then, on the next slide you create a line plot of students' answers and discuss reasonability, patterns/trends. Students are then given an opportunity to revise their answers. The discussion should incorporate the vocabulary acute, right, obtuse, or straight.
Rich Tasks: What Time Is It? Angle Design (advanced VDOE rich task to be used after introduction to angle types)	In this task, meant to address naming angles, students are given presorted clocks whose hands make acute, right, obtuse or straight angles. Students are asked to determine how the clocks have been sorted and describe them. Students with no prior knowledge may say things like "Small angle, makes an L, or a straight line." In this advanced task, students will create, measure and classify angles within a student-created geometric design.
Games: Angle Tangle	In this game, students take turns drawing, estimating, and measuring angles with a partner. They must also find the difference between their estimate and the actual measure.
Other Resources: • Intro to Angles Video from Generation Genius • Interactive angle creator and protractor • VDOE Mathematics Instructional Plans (MIPS) ◦ 5.12 - Exploring Angles (Word) / PDF • VDOE Algebra Readiness Remediation Plans ◦ Estimate Angle Measures (Word) / PDF ◦ Measuring Angles (Word) / PDF • VDOE Word Wall Cards: Grade 5 (Word) (PDF) ◦ Acute Angle ◦ Obtuse Angle	

- Right Angle
- Straight Angle
- Desmos Activity
 - [Angle Measure Activity](#)
 - [5.12 Measuring Angles](#)
- [Sentence Stem Support](#)
- [Study Jams: Measuring Angles](#)

Learning Trajectory Resources:

- Charles, R. (2005). Big ideas and understandings as the foundation for elementary and middle school mathematics. *Journal of Mathematics Education Leadership*, 7(3), NCSM.
- Clements, D. H., & Sarama, J. (2019). Learning and teaching with learning trajectories [LT]2. Marsico Institute, Morgridge College of Education, University of Denver. <https://www.learningtrajectories.org/>
- Common Core Standards Writing Team. (2019). [Progressions for the Common Core State Standards for Mathematics](#). Tucson, AZ: Institute for Mathematics and Education, University of Arizona.
- Richardson, K. (2012). How Children Learn Number Concepts: A Guide to Critical Learning Phases. Bellingham: Math Perspectives Teacher Development Center.
- Van De Walle, J., Karp, K. S., & Bay-Williams, J. M. (2018). *Elementary and Middle School Mathematics: Teaching Developmentally*. (10th edition) New York: Pearson (2019:9780134802084)
- VDOE Curriculum Framework for All Grades - [Standard of Learning Curriculum Framework \(SOL\)](#)