

Wild Angles: Acute, and Obtuse, and Right, Oh My!

Geometry and Measurement

Lindsey Link
Published by *Oklahoma Young Scholars/Javits*

This work is licensed under a Creative Commons CC BY-SA 4.0 License

Grade Level	3rd – 5th Grade	**Time Frame**	1-2 class period(s)
Subject	Mathematics	**Duration**	90 minutes
Course	Elementary Mathematics, Geometry		

Essential Question

How does geometry help us describe objects all around us?

Summary

During this lesson, students will explore and learn about different types of angles. They will practice using a protractor to measure angles and classify angles based on their measurements.

Snapshot

Engage

Students participate in a Card Sort game to classify angle types.

Explore

Students collaborate on a Strategy Harvest activity to solve a multiple-step word problem.

Explain

Students complete STAR notes to define and illustrate several angle-related terms, and then revisit the Card Sort.

Extend

Students identify and label the different angles that are formed by the letters in their names.

Evaluate

Students select an activity to complete from a choice board.

Standards

Oklahoma Academic Standards for Mathematics (Grade 3)

3.GM.1.3: Classify angles as acute, right, obtuse, and straight.

Oklahoma Academic Standards for Mathematics (Grade 3)

4.GM.2.1: Measure angles in geometric figures and real-world objects with a protractor or angle ruler.

Attachments

- Card-Sort-Wild-Angles.docx
- Choice-Board-Wild-Angles.docx
- Exploration-Story-Problems-Possible-Student-Responses-Wild-Angles.docx
- Lesson-Slides-Wild-Angles.pptx
- STAR-Notes-Teacher-s-Guide-Wild-Angles.docx
- STAR-Notes-Wild-Angles.docx

Materials

- Lesson Slides (attached)
- Card Sort cards (attached; one set per pair of students)
- Envelopes or paper clips
- STAR Notes handouts (attached; one per student)
- Math notebooks (optional)
- Pencils
- Paper
- Protractors
- Dried spaghetti noodles
- Mini marshmallows
- Student tablets with Internet access

Engage

Teacher's Note: Lesson Preparation

Before the lesson, print and cut out the Card Sort cards. Keep them organized in sets using envelopes or paper clips.

Display **slide 2**. Organize students into pairs, and pass out a set of Card Sort cards to each pair. Give students 10-15 minutes to sort the words, definitions, and examples of different angles.

Display **slide 3**. Have students move around the room to view how their classmates sorted their cards, looking for any differences.

After students have returned to their seats, have them share out what they noticed about how their classmates sorted the cards. Is there anything they noticed that was different? Similar?

Display **slide 4,** and share the Essential Question with students: How does geometry help us describe objects all around us?

Display **slide 5,** and share the learning objectives. By the end of this lesson, students will be able to:

- Classify and sort shapes based on their angle measurements.
- Measure the size of angles in various objects.

Explore

Display **slide 6,** and inform students that they are going to explore different ways to solve a problem using a Strategy Harvest. Display **slide 7, 8, or 9** to share one of the three multiple-step word problem options described below.

Addition Option (Slide 7)

Your bedroom door is open 66 degrees. To get your new bed inside, you need it to be open an additional 31 degrees. To get your new dresser in, you need it to be open another 24 degrees beyond what you need for the bed. How wide, in degrees, does your door need to be open in order to get both your bed and your dresser in your room?

Subtraction With Extra Information Option (Slide 8)

Your bedroom door is open 66 degrees, but in order to get your new bed inside you need it to be open to 99 degrees. To get your new dresser in, you need it to be open to 127 degrees. How much farther do you need to open your door to get your new bed and dresser inside?

Subtraction With A Missing Variable Option (Slide 9)

Your bedroom door is open 66 degrees, but in order to get your new bed inside you need it to be open to 99 degrees. To get your new dresser in, you need it to be open to 127 degrees. How much farther will you need to open your door for it to make a straight angle? (Note: This question has extra variables included within it, making it more challenging. In order to solve the problem, students must already know that a straight angle is 180 degrees.)

Provide students with time to think about the problem on their own before they begin the Strategy Harvest. Then have them briefly discuss their problem-solving strategies with a series of different partners.

Come back together as a class and have volunteers share out how they would solve the problem. As they are sharing, solve the problem based on their directions. Continue solving until students arrive at the correct answer. Refer to the Exploration Story Problems attachment for notes about various correct and incorrect student responses.

Teacher's Note: Cubes Squared

If students are having a difficult time getting started or struggle with word problems in general, consider introducing them to the CUBES Squared strategy. CUBES Squared can help students dissect questions in both math and English language arts (ELA). Students encounter a problem and use the CUBES acronym as a guide to solve it. C-circle key numbers and units; U-underline the question; B-box math action words; E-evaluate and eliminate; S-show your work and check it.

Explain

Display **slide 10**. Pass out copies of the **STAR Notes** handout, or have students set up a new page in their math notebook. The page should contain three columns, labeled "terms," "definitions," and "examples." In the "terms" column, students should list the following terms, allowing sufficient space for notes after each one: "right angle," "acute angle," "obtuse angle," "straight angle," and "protractor."

Teacher's Note: Star Notes Handout

The STAR Notes handout has the vocabulary terms already filled in. You might choose to use the handout if you have a younger class or if your students need additional support. If this is the case, give students time to review the STAR Notes handout to familiarize themselves with the terms and the what they will need to add for each one in the upcoming activity.

Inform students that they will now be watching a music video that contains some important information about angles. Prepare students by telling them that you are going to play the video three times. The first time, they will listen for key information. The second time, they will begin filling in the information on their STAR Notes handout. The third time, they will listen for enjoyment.

Display **slide 11** and show the video for the first time, asking students to put down their pencils and listen closely.

Tell students that as they watch for the second time they should raise their hands when they hear information related to one of the terms from their list. Pause the video each time and ask students to share what they heard. Give the class a minute or two to add this information to their notes before resuming the video.

Teacher's Note: Learner Styles

Having a class set of notes projected or completed on the board will provide support for students who are visual learners and need to see the information. To extend the lesson and provide more support for students who are primarily kinesthetic learners, have them stand up and create each of the angle shapes with their arms. As they do so, have them verbalize what they are doing. (" An acute angle is so CUTE, it's the smallest angle of them all and measures between 0 and 90 degrees!")

As a class, review your notes. Students should have definitions similar to the following:

- Right Angle - When an angle measures 90 degrees **(slide 12)**
- Acute Angle - Measures between 0 and 90 degrees **(slide 13)**
- Obtuse Angle - Measures between 90 and 180 degrees **(slide 14)**
- Straight Angle - An angle that is exactly 180 degrees, as in a straight line **(slide 15)**
- Protractor - Tool used to measure the degrees of the angle **(slide 16)**

Teacher's Note: Straight Angles

The term *straight angle* is not mentioned in the video. Take a moment after you have shown the video for the second time and discuss this term with your class. See if they are able to come up with a definition on their own. If they are struggling, help guide them to the correct definition.

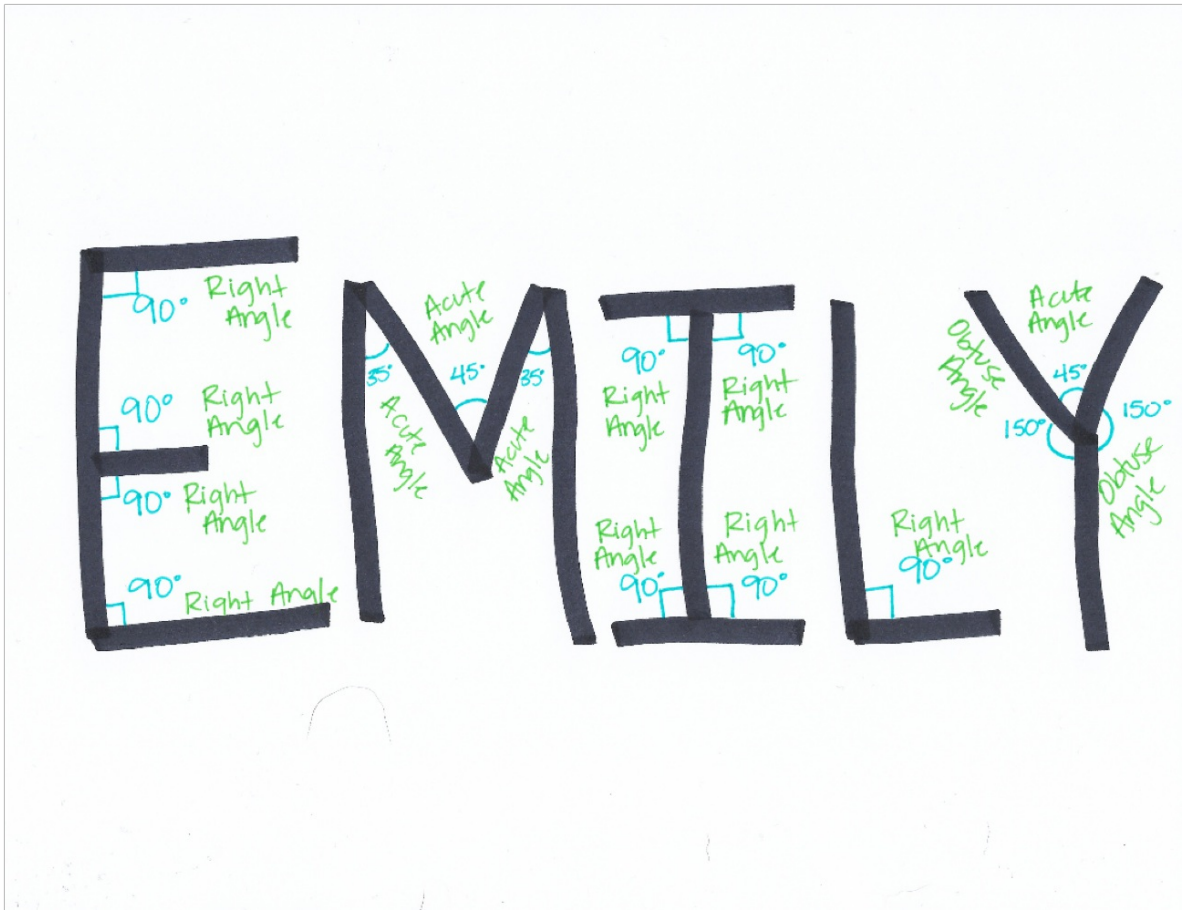
Have students check their notes and add an image and an example for each term.

Watch the video for a third time so students can just watch and enjoy it. Students can also use this time to fill in any missing information or add to their images or examples.

Display **slide 17**. Tell students to keep their notes nearby to refer to as they complete the upcoming activities.

Extend

Display **slide 18**. Students will now use their own names to practice using a protractor, measuring angles, and labeling angles. Make sure each student has a blank sheet of paper and a protractor. Ask students to write their names in large capital letters on the paper. Then, students should use their protractors to measure each angle that is formed by the letters. Have students label the angle measurement and the angle type.



Sample student name with angle measurements and types labeled

When students finish work on their names, have them revisit the Card Sort activity to test their knowledge of angles.

Evaluate

Display **slide 19**. Tell students that they'll be picking their own evaluation activity from a Choice Board. Display slide 20 and share a brief summary of each choice:

- Spaghetti Geometry: Make a model of each type of angle using spaghetti noodles and marshmallows. Label each angle with its measurement and type.
- Angles of a Home: Draw a house that includes each angle type. Provide a separate answer sheet that has each angle labeled with its measurement and type.
- Chant It, Sing It, Rap It: Write a song that you will perform for the class that describes each of the different angles and their measurements.
- Scavenger Hunt: Search for each type of angle in the classroom. With your tablet, take a photo and create a presentation. In the presentation, label each angle's measurement and type.
- Create-A-Test: For each type of angle, write a test question. It can be fill-in-the-blank, multiple-choice, matching, etc. Create a separate answer sheet.

Provide students time to complete their individual projects, and then give them an opportunity to share their work with the class.

Resources

- K20 Center. (n.d.). Card sort. Strategies. https://learn.k20center.ou.edu/strategy/147
- K20 Center. (n.d.). Chant it, sing it, rap it. Strategies. https://learn.k20center.ou.edu/strategy/143
- K20 Center. (n.d.). Choice boards. Strategies. https://learn.k20center.ou.edu/strategy/926
- K20 Center. (n.d.). CUBES squared. Strategies. https://learn.k20center.ou.edu/strategy/70
- K20 Center. (n.d.). STAR notes. Strategies. https://learn.k20center.ou.edu/strategy/69
- K20 Center. (n.d.). Strategy harvest. Strategies. https://learn.k20center.ou.edu/strategy/135
- Math Songs by NUMBEROCK. (2015, Sept. 17). Angles song | Acute, obtuse, & right angles | 3rd & 4th grade [Video]. YouTube. https://www.youtube.com/watch?v=NVuMULQjb3o&feature=emb_err_woyt