Measure It! Name It!

Angles and Quadrilaterals

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Grade Level	4th – 5th Grade	**Time Frame**	2-3 class period(s)
Subject	Mathematics	**Duration**	120 minutes
Course	Elementary Mathematics		

Essential Question

Why do we measure and name angles?

Summary

Students will use protractors to discover, identify, and define angles and lines. Using vocabulary developed through this activity, students will identify different types of quadrilaterals.

Snapshot

Engage

Students use a Card Sort to talk about different angles.

Explore

Students learn how to use a protractor and begin measuring angles.

Explain

Students engage in a Think-Pair-Share activity to define types of angles and lines. With their new vocabulary, students reorganize their angle sorts.

Extend

Students use their understanding of angles and lines to match quadrilateral descriptions with their pictures.

Evaluate

Students write a short paragraph comparing two quadrilaterals.

Standards

Oklahoma Academic Standards for Mathematics (Grade 4)

4.GM.1.1: Identify points, lines, line segments, rays, angles, endpoints, and parallel and perpendicular lines in various contexts.
4.GM.1.2: Describe, classify, and sketch quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms, and kites. Recognize quadrilaterals in various contexts.
4.GM.2.1: Measure angles in geometric figures and real-world objects with a protractor or angle ruler.

Oklahoma Academic Standards for Mathematics (Grade 4)

5.GM.3.1: Measure and compare angles according to size.

Attachments

- Angles Card Sort.docx
- Angles Card Sort.pdf
- Quadrilaterals Card Sort.docx
- Quadrilaterals Card Sort.pdf
- Quadrilaterals and Angles Notes Page.docx
- Quadrilaterals and Angles Notes Page.pdf

Materials

- Protractors
- Rulers
- Angles Card Sort cards
- Quadrilaterals and Angles Notes Page
- Quadrilaterals Card Sort cards

Engage

Before The Lesson

There are two Card Sort activities in this lesson. Before the lesson, print and cut out copies of both card sorts for each group of two or three students.

Organize students into groups of two or three and pass out one set of the Angles Card Sort cards per group. Have students look at the pictures and organize the cards using whatever rules they think make sense.

As a class, discuss the different ways in which groups sorted their cards.

Teacher's Note

Groups might have organized by facing direction, from smallest to largest, or based on their previous knowledge of angle names. If any groups organized by angle names, wait until the end to discuss those.

Introduce the essential question: "Why do we measure and name angles?"

Explore

Introduce the protractor as a tool to use to measure angles. Talk about different tools used to measure and the units used to describe those measurements. Explain that degrees are used in measuring angles and show the degree symbol.

Instruct students to use protractors to measure the Card Sort angles. Model measuring with an example angle. Be sure to demonstrate by doing the following:

1. Line up the protractor with the angle's vertex and one of the line segments.
2. Follow the second line segment out to the protractor's circular edge.
3. If the line segments are too short, use the edge of the ruler to extend the lines out. (This might prompt a discussion on rays.)

Teacher's Note

Students might wonder which measure to write down. Help guide their thinking by asking them if the angle is small or big. Should they use the big or small number?

Video Resource

How to Measure Angles (Khan Academy)

Explain

Using the Quadrilaterals and Angles Notes Page, have students complete a Think-Pair-Share activity to create definitions and examples of the following terms:

- Acute
- Right
- Obtuse
- Equivalent
- Perpendicular
- Vertices

Ask students to reorganize their angle card sorts based on their definitions of "acute," "right," and "obtuse."

Extend

Pass out the Quadrilaterals Card Sort. Have groups label the angles for each quadrilateral image as acute, obtuse, or right. Encourage them to look for parallel lines and lines that are “equivalent” in length.

As a class, engage in an I Notice, I Wonder conversation. Encourage students to use their new vocabulary in the discussion. As part of the conversation, discuss parallel lines and add this to your definitions.

Sample Responses

“I notice that squares and rectangles both have 4 right angles. I wonder why windows and buildings are often rectangles." "I notice that kites and rhombuses look alike. I wonder if that shape helps a kite fly.”

Ask students to take out the written descriptions from the Quadrilaterals Card Sort. Have them match the descriptions to the pictures.

Optional: Students can glue the pictures of the quadrilaterals next to their paired descriptions in an interactive notebook or on a sheet of paper to use as a resource.

Evaluate

Have students choose two quadrilaterals to compare. Using the Two-Minute Paper strategy, have them explain how the two are different and how they are the same.

Optional Scaffolding

Have students complete a Venn diagram first to help them compare their two quadrilaterals.

Resources

- K20 Center. (n.d.). Card sort. Strategies. Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f506976b
- K20 Center. (n.d.). I notice, I wonder. strategies. Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f507d1a7
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- K20 Center. (n.d.). Two-minute paper. Strategies. Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f506cf73
- Khan Academy (n.d.). Measuring angles using a protractor [Video file]. Retrieved from https://www.khanacademy.org/math/basic-geo/basic-geo-angle/measure-angles/v/using-a-protractor