

What's Your Angle?

Parallel Lines Cut by a Transversal

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Grade Level	9th – 10th Grade	**Time Frame**	4-5 class period(s)
Subject	Mathematics	**Duration**	200 minutes
Course	Geometry		

Essential Question

In what ways can data be communicated clearly to all audiences?

Summary

Students will explore specific angle pair relationships that are created between a set of parallel lines and a transversal. After an understanding of the angle pairs is developed, students will then create a city map that demonstrates their ability to apply these angle pairs.

Snapshot

Engage

Engage students with a slide showing how parallels and transversals appear in real life.

Explore

Allow students to explore angle pair relationships through measuring different angles that are created by a transversal and finding the angle pairs similarities/characteristics.

Explain

Show a video to attach the special angle pair relationships to a specific vocabulary word.

Extend

Allow students to create a city or neighborhood that demonstrates these special angle pair relationships in real life.

Evaluate

Standards

ACT College and Career Readiness Standards - Mathematics (6-12)

G401: Use properties of parallel lines to find the measure of an angle
G405: Use geometric formulas when all necessary information is given

Oklahoma Academic Standards Mathematics (Geometry)

G.2D.1.1: Use properties of parallel lines cut by a transversal to determine angle relationships and solve problems.

Attachments

- City Project Critique - Spanish.docx
- City Project Critique - Spanish.pdf
- City Project Critique.docx
- City Project Critique.pdf
- City Project Example.docx
- City Project Rubric - Spanish.docx
- City Project Rubric - Spanish.pdf
- City Project Rubric.docx
- City Project Rubric.pdf
- Questions - Comments - Spanish.docx
- Questions - Comments - Spanish.pdf
- Questions - Comments.docx
- Questions - Comments.pdf
- What's Your Angle - Spanish.docx
- What's Your Angle - Spanish.pdf
- What's Your Angle.docx
- What's Your Angle.pdf

Materials

- Writing utensil
- Protractors
- Rulers (straight edge)
- Poster board or sticky easel pad paper (one for each group of four)
- Markers, colored pencils, crayons, etc.
- Timers

Engage

Have the "Real World Parallels and Transversals" slide pulled up on the screen as the students walk in. As a Bell Ringer, direct students to look at the pictures and write down what they see. Once the bell rings or class starts, ask students to share out what they've written. Listen for key words like "parallel lines" and "transversals" or at least phrases that function as the definitions of those words.

Explore

Have students partner up (you can put them in pairs or let them decide). Pass out the worksheet titled "What's Your Angle" Students will draw a transversal using a ruler. Once they have drawn their lines, they will use their protractors to measure each angle (all 8) to the nearest degree. Once they have measured all 8 angles, have them answer the questions. This worksheet is designed for students to notice different angle pair relationships (alternate interior, alternate exterior, corresponding, consecutive interior, vertical, linear pair).

Note

As partners are working through the questions, you can walk around the room and facilitate. If a group is struggling to notice any angle relationships, you can ask probing questions to direct them. If you have some quick-finishers in the room, they can always draw another set of lines and measure the angles again. It's best if every student answers the questions on their papers, but if they only want to measure the angles on one worksheet, that is fine.

Explain

After each pair has had a chance to answer all of the questions, use Think-Pair-Share and have two pairs join to create groups of 4. Once students are in their group of 4, ask them to answer the question: "How would you describe the relationship between . . . " Select two angles to compare for angles 5-8 and have them describe the relationship between those angles using ONLY 2 WORDS for each angle pair. Have them write those two words on their worksheet next to the corresponding number. After each group has their two words, come together as a class and have each group share what they came up with. See if, as a class, you can all agree on the names of these special angle pair relationships. Follow the discussion with the Parallel Lines and Transversals video.

Note

The goal is for them to use words like opposite/alternate, inside/interior, same-side/consecutive, outside/exterior. If they are really struggling, you can offer them the correct words for angles. Although complementary and supplementary angles do exist on the diagram, try to emphasize that they are looking at the angles compared to the entire system of lines.

Extend

In this portion, students will choose a group of 4 and create a city, neighborhood, zoo, etc., with roads and walkways as their parallels and transversals. Any building or enclosure would be used to describe an angle pair relationship. Print off 1 rubric for each group, and project the "City Project Example" on your board as an example.

Teacher's Note

You can give the students as much time as you see fit to work on this in class. Two and a half days are suggested. The document with the example project will give students a visual of what is expected, but if you want to show them other similar project examples, you can find more examples online.

Evaluate

Teacher's Note: Timing

To help students manage their pace as they complete the Gallery Walk, have them use timers as they visit each project.

Students will be performing Gallery Walk to display their work and also critique others'. Have the students set their projects up around the room and number each project. Alongside each project, have the students set out a copy of the "Questions - Comments" handout (located under Attachments). The students will each need a copy of the "City Project Critique" handout (also located under Attachments). Have students travel around the room with their group, visiting other groups' projects. At each project, have a member from each group leave a question and a comment. After all groups have had a chance to see every project, they can return to their own projects and read the feedback.

Resources

- ELEDIX432. (2015). Honors geometry city project [Image]. Elena's Blog [Web log]. http://blogs.fairview.k12.oh.us/eledix432/2015/11/01/honors-geometry-city-project/
- K20 Center. (n.d.). Bell ringers and exit tickets. Strategies. https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505d6f2
- K20 Center. (n.d.). Gallery walk / carousel. Strategies. https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505a54dq=parallel+lines+and+transversals+real+life&tbm=isch&source=lnms&sa=X&ved=0ahUKEwjno5e0vrTV
- K20 Center. (n.d.). Think-pair-share. Strategies. https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f5064b49
- Shmoop. (n.d.). Parallel lines and transversals [Video file]. https://www.shmoop.com/video/parallel-lines-transversals