Lesson plan: Identify public and private space in math

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Note: This tool needs your expertise to be excellent. Be sure to adapt this lesson plan as you see fit for accuracy and relevance!

Learning objective

Students will classify spaces within geometric figures as public or private by analyzing their properties and relationships. They will justify their classifications using mathematical reasoning.

Student-facing objective: By the end of this lesson, I'll be able to determine which parts of geometric figures are public or private spaces and explain why using math.

Standards: Identify public and private space but in math class

Learning activities

Warm-up

True or false: Display the following statements one at a time on the board:

- "The interior of a circle is a private space."
- "The area outside a rectangle but inside a classroom is a public space."

Students will signal true or false. Discuss their reasoning briefly, focusing on their understanding of public and private spaces in geometric contexts. This activity primes them for deeper analysis in the main lesson.

Direct instruction

Begin by defining **public** and **private space** in a mathematical context. Explain that in geometry, a **public space** within a figure is accessible or shared among different parts, while a **private space** is restricted or exclusive to a part of the figure.

Introduce a simple geometric figure, such as a rectangle divided into smaller rectangles or squares. Describe the figure verbally, specifying dimensions and how divisions are made. For instance, a rectangle divided into four smaller rectangles of equal size.

Guide students through identifying which parts of the figure are public or private. Ask questions like:

- "Which parts of this figure can be accessed from multiple other parts?"
- "Are there any parts of this figure that are isolated or exclusive to one area?"

Use a common example, such as a park (public) and a private garden (private), to draw parallels between real-world concepts and geometric figures.

Move to a slightly more complex figure, such as a circle within a square, where the circle does not touch the square's sides. Describe this setup and ask students to identify the public and private spaces. Questions to pose include:

- "Is the area inside the circle private or public?"
- "What about the space between the circle and the square?"

Encourage students to justify their answers based on the accessibility or exclusivity of the spaces within these figures.

Conclude this section by summarizing the key points and emphasizing the importance of understanding the relationship between different parts of geometric figures to classify spaces as public or private.

Guided practice

- **Think, pair, share**: Pair students and assign each pair a different geometric figure (e.g., triangle within a rectangle, two overlapping circles). Each student individually thinks about and writes down which areas they consider public or private. They then share their thoughts with their partner and together, they must come to a consensus. Each pair shares their figure and reasoning with the class.
- **Clarify, Critique, Correct mathematical writing**: After the think, pair, share activity, collect students' written justifications. Display several examples anonymously. As a class, critique the reasoning and clarity of the justifications. Guide students to correct any mathematical inaccuracies or unclear explanations, emphasizing precise mathematical language and logical reasoning.

Independent practice

Provide each student with a worksheet containing various geometric figures, each divided into multiple sections. Instruct students to:

- Identify and label each section as either **public** or **private**.
- Write a brief justification for each classification, using terms like "accessible," "exclusive," "shared," and "isolated."

Encourage students to consider the relationships between different parts of the figures and how these relationships influence their classifications.

Circulate throughout the class to observe students as they work and provide support as needed. Direct students to practice a related exercise by placing placeholders where I should link to said exercise.

Exit ticket

Provide students with a small card containing a single geometric figure (e.g., a hexagon divided into various regions). Ask them to:

- Identify one **public** and one **private** space within the figure.
- Write a one-sentence justification for each choice.

Collect these exit tickets to assess individual understanding and identify any misconceptions to address in the next lesson.

Teacher resources

Differentiation guide

For **advanced learners**:

- Challenge them to create their own geometric figures with complex divisions and classify the spaces. They should also provide a mathematical proof for their classifications.
- Encourage these students to explore the concept of public and private spaces in three-dimensional figures.

For **striving learners**:

- Provide simpler figures with clear, distinct areas to classify.
- Offer step-by-step guided worksheets that break down the reasoning process into smaller, manageable parts.
- Pair them with peers for collaborative problem-solving, ensuring they engage actively with the material.

Notable definitions

- **Public Space**: In a mathematical context, a public space within a geometric figure is an area that is accessible or shared among different parts of the figure.
- **Private Space**: In a mathematical context, a private space within a geometric figure is an area that is restricted or exclusive to a part of the figure.
- **Geometric Figure**: A shape or form that consists of points and lines, including shapes like circles, triangles, rectangles, and more complex forms.

Required materials

- Whiteboard and markers
- Projector or smartboard for displaying figures and examples
- Worksheets with geometric figures for independent practice
- Small cards for exit tickets
- Colored pencils for marking public and private spaces on worksheets
- Rulers for students to use in drawing and dividing geometric figures

Lesson summary

- Warm-up (5 min)
- Direct instruction (15 min)
- Guided practice (20 min)
- Independent practice (15 min)
- Exit ticket (5 min)