CBC Grade 10 Mathematics

Step-by-Step Presentation Script

Area of Squares and Rectangles

Pre-Class Preparation

Before students arrive, ensure the following materials and setup are ready:

- Materials Needed:
- • Grid/graph paper (multiple sheets per group)
- • Rulers (one per group)
- • Pencils and erasers
- • Calculators (optional, for verification)
- • Chart paper for displaying formulas
- • Pre-drawn rectangles and squares on grid paper (for struggling learners)
- • Exit tickets (one per student)
- Classroom Setup:
- • Arrange desks for group work (groups of 2-3 students)
- • Prepare board space for drawing shapes and writing formulas
- • Have grid paper templates ready to distribute
- • Display key inquiry question: "How do we work out the area of polygons?"

Lesson Overview (40 Minutes)

Phase	Duration
Phase 1: Problem-Solving and Discovery	0-15 minutes
Phase 2: Structured Instruction	15-25 minutes
Phase 3: Practice and Application	25-37 minutes
Phase 4: Assessment (Exit Ticket)	37-40 minutes

Minute-by-Minute Presentation Guide

Minutes 0-2: Introduction and Engagement

[SAY] "Good morning, class! Today we are going to explore one of the most practical topics in mathematics—calculating the area of squares and rectangles. This skill is used everywhere: when buying floor tiles, planning a garden, or even determining how much paint you need for a wall."

[ASK] "Can anyone tell me what area means? How is it different from perimeter?"

[LISTEN] Allow 2-3 students to share. Acknowledge responses.

[SAY] "Excellent! Area measures the space inside a shape, while perimeter measures the distance around it. Today, we'll discover how to calculate area by exploring rectangles and squares."

[WRITE] On the board: "Area of Squares and Rectangles"

[WRITE] Key inquiry question: "How do we work out the area of polygons?"

Minutes 2-17: Phase 1 - Anchor Activity (Discovery)

[DO] Organize students into groups of 2-3.

[SAY] "You will now work in groups to discover how to find area. Each group will receive grid paper and a ruler. Your task is to count squares and find patterns."

[WRITE] Display the anchor activity instructions on the board:

- Task 1: Count squares in a rectangle (6 units × 4 units)
- Task 2: Count squares in a square (5 units × 5 units)
- Task 3: Find the relationship between side lengths and number of squares

[SAY] "For Task 1, I want you to draw or look at a rectangle that is 6 units long and 4 units wide on your grid paper. Count how many unit squares fit inside it."

[DO] Distribute grid paper and rulers to each group.

[SAY] "After counting, verify your answer using multiplication. What calculation gives you the same result?"

[DO] Circulate among groups (Minutes 2-12). Observe their work and ask probing questions:

- • "How many rows of squares do you see?"
- • "How many squares are in each row?"
- • "Can you find a quicker way than counting one by one?"
- • "What happens when you multiply the length by the width?"

[TEACHING TIP] If groups struggle with counting, guide them to count by rows: "Count the squares in one row, then multiply by the number of rows."

[SAY] "Now move to Task 2. Draw a square that is 5 units by 5 units. Count the squares inside and verify using multiplication."

[DO] At minute 12, bring the class together for sharing.

[SAY] "Let's share what you discovered. Group 1, how many squares did you count in the rectangle?"

[LISTEN] Expected answer: 24 squares.

[ASK] "What multiplication gave you the same answer?"

[LISTEN] Expected answer: 6 × 4 = 24.

[SAY] "Excellent! Now for the square. Group 2, how many squares did you count?"

[LISTEN] Expected answer: 25 squares.

[ASK] "What multiplication gave you this answer?"

[LISTEN] Expected answer: 5 × 5 = 25.

[ASK] "What relationship do you observe between the side lengths and the number of square units?"

[LISTEN] Guide students to articulate that multiplying the dimensions gives the total number of squares.

[SAY] "Wonderful discovery! You've just found the formula for area. Let's make this official."

Minutes 17-25: Phase 2 - Structured Instruction

[SAY] "You've discovered something very important. The number of unit squares inside a shape is called its area. Area is measured in square units like cm^2 or m^2."

[WRITE] Definition: "Area = the amount of surface a shape covers, measured in square units"

[SAY] "Let's formalize what you discovered. For a rectangle, we multiply length by width."

[WRITE] Draw a rectangle on the board with length and width labeled.

[WRITE] Formula: "Area of rectangle = length × width"

[SAY] "This works because when we arrange unit squares in rows and columns, the total number equals rows times columns."

[POINT] "In your example, 6 units long means 6 columns, and 4 units wide means 4 rows. So 6 × 4 = 24 square units."

[SAY] "Now, what about squares? A square is a special rectangle where all sides are equal."

[WRITE] Draw a square on the board with all sides labeled as "side".

[WRITE] Formula: "Area of square = side × side = $side^2$"

[SAY] "The small 2 above side means we multiply the side by itself. For example, if a square has side 5 cm, its area is 5 × 5 = 25 cm^2."

[ASK] "Why do we write cm^2 instead of just cm?"

[LISTEN] Guide students to understand that cm² means "square centimeters"—we're counting squares, not lines.

[SAY] "Remember: area measures the inside of a shape in square units. Perimeter measures around the shape in linear units."

[WRITE] Create a summary table:

- Shape | Formula
- Rectangle | Area = length × width
- Square | Area = side × side = side²

[TEACHING TIP] Keep this table visible throughout the lesson for student reference.

Minutes 25-37: Phase 3 - Practice and Application

[SAY] "Now that we understand the formulas, let's apply them to solve problems."

[EXAMPLE] Example 1: Simple Calculations

[WRITE] "Find the area of: (a) A square with side 9 cm, (b) A rectangle with length 12 m and width 7 m"

[SAY] "Let's solve part (a) together. We have a square with side 9 cm. Which formula do we use?"

[LISTEN] Students should say: Area = side × side.

[WRITE] Area = 9 × 9 = 81 cm²

[SAY] "Notice I wrote cm², not just cm. Always include square units!"

[SAY] "Now part (b). We have a rectangle with length 12 m and width 7 m."

[WRITE] Area = length × width = 12 × 7 = 84 m²

[EXAMPLE] Example 2: Real-World Application

[SAY] "Here's a practical problem: A rectangular field has length 120 m and width 75 m. Find the area."

[ASK] "Which formula should we use?"

[LISTEN] Students should identify: Area = length × width.

[WRITE] Area = 120 × 75 = 9,000 m²

[SAY] "This field covers 9,000 square meters. That's a very large area—about the size of a football field!"

[EXAMPLE] Example 3: Working Backwards

[SAY] "Sometimes we know the area and need to find a side length. The area of a square is 196 m². Find the side length."

[WRITE] Area = side²

[WRITE] 196 = side²

[SAY] "To find the side, we need to find what number times itself equals 196. This is called finding the square root."

[WRITE] side = √196 = 14 m

[SAY] "We can verify: 14 × 14 = 196. Correct!"

[EXAMPLE] Example 4: Finding Missing Dimension

[SAY] "The area of a rectangle is 150 cm² and its width is 10 cm. Find the length."

[WRITE] Area = length × width

[WRITE] 150 = length × 10

[SAY] "To find the length, we divide both sides by 10."

[WRITE] length = 150 ÷ 10 = 15 cm

[DO] Give students 5 minutes (minutes 32-37) to work on individual practice problems:

1. 1. Find the area of a square with side 8 cm
2. 2. Find the area of a rectangle 15 m by 9 m
3. 3. A square has area 144 m². Find the side length

[DO] Circulate to check understanding and provide support.

[TEACHING TIP] For struggling students, remind them to identify the shape first, then choose the correct formula.

Minutes 37-40: Phase 4 - Assessment (Exit Ticket)
[SAY] "Excellent work today! To check your understanding, you'll complete a short exit ticket individually."

[DO] Distribute exit tickets to each student.

[SAY] "You have 3 minutes to complete these questions. Remember to show your work and include units in your answers."

[WRITE] Display exit ticket questions on the board:

4. 1. Find the area of a square with side 15 cm
5. 2. Find the area of a rectangle 8 m by 5 m

6. 3. A rectangular field is 120 m by 75 m. Find the area
7. 4. A square has area 196 m². Find the side length
8. 5. A rectangle has area 150 cm² and width 10 cm. Find the length
9. 6. Which has greater area: a square with side 14 cm or a rectangle 18 cm by 10 cm?

[DO] Students work silently on exit tickets (minutes 37-40).

[DO] Collect exit tickets as students finish.

[SAY] "Thank you for your excellent work today! You now know how to calculate the area of squares and rectangles. Tomorrow we'll explore other shapes like parallelograms and triangles. For homework, practice the exercises on page [X] of your textbook."

Teaching Tips and Strategies
- Emphasis Points:
- • Always distinguish between area (inside, square units) and perimeter (around, linear units)
- • Emphasize that multiplication is faster than counting individual squares
- • Connect formulas to the visual representation on grid paper
- • Stress the importance of including units (cm², m²) in answers
- • Use real-world contexts to make area meaningful
- Differentiation in Action:
- • For struggling learners: Provide pre-drawn shapes and allow continued use of grid paper
- • For advanced learners: Introduce algebraic dimensions and composite shapes
- • Use manipulatives (square tiles) for kinesthetic learners
- • Allow calculators for students who struggle with multiplication
- Common Student Errors to Watch For:
- • Confusing area with perimeter (adding instead of multiplying)
- • Forgetting to include square units in answers
- • Using the wrong formula (square formula for rectangle or vice versa)
- • Mixing up length and width (though it doesn't affect the answer)
- • Writing linear units (cm) instead of square units (cm²)
- Engagement Strategies:
- • Use real-world examples: floor tiles, garden plots, sports fields
- • Ask students to estimate areas before calculating
- • Create competition: which group can find the area fastest?
- • Connect to students' lives: "How big is your bedroom floor?"

Assessment Guidance
Exit Ticket Evaluation Criteria:

- • Correct use of formulas (area = length × width or side²)
- • Accurate calculations
- • Proper inclusion of square units in answers

- • Ability to work backwards from area to find dimensions
- • Clear working shown for comparison problems

Mastery Indicators:

- • Student can identify whether a shape is a square or rectangle
- • Student can select and apply the correct formula
- • Student can calculate area with accuracy
- • Student can find missing dimensions when given area
- • Student can compare areas of different shapes

Follow-Up for Students Who Struggle:

- • Provide additional grid paper practice
- • Use physical manipulatives (square tiles)
- • Create formula reference cards
- • Schedule small group intervention
- • Pair with peer tutors

Post-Lesson Reflection Questions

After teaching this lesson, reflect on the following:

- • Did students successfully discover the area formula through counting?
- • Were students able to distinguish between area and perimeter?
- • How well did students apply formulas to real-world problems?
- • What misconceptions emerged, and how were they addressed?
- • Did students understand when to work backwards from area?
- • What percentage of students demonstrated mastery on the exit ticket?
- • What adjustments would improve this lesson for next time?