Grade 10 Mathematics Presentation Script

Area of Rhombuses

Pre-Class Preparation

Materials Checklist:

- Graph paper (one sheet per group)
- Rulers (one per group)
- Protractors (one per group)
- Pencils
- Scissors (optional, one per group)
- String or thread (optional, one per group)
- Colored pencils (one set per group)
- Calculators (one per group)
- Chart paper for recording key takeaways
- Markers

Room Setup:

- Prepare board space for diagrams and formula derivation
- Arrange desks for group work
- Have extra materials available in case of breakage
- Prepare examples on chart paper for display

Phase 1: Problem-Solving and Discovery (15 minutes)

Opening Hook (2 minutes)

[DO] Display a picture of rhombus-shaped objects (diamond playing card, floor tiles, logo).

[SAY] "Look at these shapes. What do you notice about them?"

[WAIT] Expected: "They have four sides!" "They look like diamonds!"

[ASK] "What makes these shapes special?"

[WAIT] Expected: "All the sides look equal!"

[SAY] "Exactly! These are rhombuses. Today we will learn about the properties of rhombuses and how to find their area."

[SAY] "We will explore rhombuses by drawing and measuring them."

Anchor Activity Launch (3 minutes)

[DO] Distribute graph paper, rulers, protractors, pencils, scissors, and colored pencils to each group.

[SAY] "Here is your challenge: You will draw a rhombus, measure its properties, and discover what makes it special."

[SAY] "Here is what you will do:"

[SAY] "Step 1: Draw a rhombus with all sides equal. Label the vertices A, B, C, D."

[SAY] "Step 2: Measure all four sides to confirm they are equal."

[SAY] "Step 3: Measure the angles using a protractor. What do you notice about opposite angles?"

[SAY] "Step 4: Draw both diagonals AC and BD."

[SAY] "Step 5: Measure the diagonals and the angle where they intersect."

[SAY] "Step 6: Optional - Cut out the rhombus and fold it along the diagonals to see the symmetry."

[SAY] "Work with your group. You have 10 minutes."

Student Work Time (8 minutes)

[DO] Circulate among groups.

[ASK] To a group struggling with drawing: "Remember, all four sides must be equal. Use your ruler to measure."

[WAIT] Expected: Students draw the rhombus correctly.

[SAY] "Good! Now measure the angles."

[ASK] To another group: "What do you notice about the diagonals?"

[WAIT] Expected: "They cross in the middle!" "They make right angles!"

[SAY] "Excellent! Measure the angle at the intersection."

[WAIT] Expected: "It is 90 degrees!"

[SAY] "Perfect! What else do you notice?"

[WAIT] Expected: "The diagonals are not equal!"

[DO] For struggling groups: "Let us draw the rhombus together. All sides must be the same length."

[DO] For early finishers: "Can you find a formula for the area using the diagonals?"

Class Discussion (2 minutes)

[DO] Call on 2-3 groups to share their findings.

[ASK] "What did you discover about the rhombus?"

[WAIT] Expected: "All sides are equal!" "Opposite angles are equal!" "Diagonals bisect at 90 degrees!"

[SAY] "Excellent! Did everyone notice that the diagonals are perpendicular?"

[WAIT] Check for understanding.

[SAY] "Today we will learn how to use these diagonals to find the area."

Phase 2: Structured Instruction (10 minutes)

Formalizing the Formula: Area = (1/2) x d1 x d2 (10 minutes)

[SAY] "Now that you have explored rhombuses, let us formalize what we learned."

[WRITE] On the board: "Area of a Rhombus"

[SAY] "A rhombus is an equilateral quadrilateral. All its sides are equal."

[ASK] "Which other quadrilateral has all its sides equal?"

[WAIT] Expected: "A square!"

[SAY] "Correct! A square is a special type of rhombus where all angles are also equal."

[WRITE] "Properties of a Rhombus:"

[WRITE] "1. All sides are equal in length."

[WRITE] "2. Opposite angles are equal."

[WRITE] "3. Diagonals bisect each other at right angles."

[WRITE] "4. Diagonals bisect the interior angles."

[SAY] "Examples of rhombuses: floor tiles, diamond playing cards, logos."

[WRITE] "Formula: Area = (1/2) x d1 x d2"

[SAY] "where d1 and d2 are the lengths of the two diagonals."

[DO] Draw a rhombus on the board with both diagonals labeled.

[SAY] "The diagonals must be perpendicular for this formula to work."

[SAY] "Let us try an example."

Addressing Misconceptions:

[SAY] "Let me address some common mistakes:"

[SAY] "Mistake 1: Using the side length to find the area directly. You need the diagonals to use the formula."

[SAY] "Mistake 2: Thinking the diagonals are equal. In a rhombus, the diagonals are not equal unless it is a square."

[SAY] "Mistake 3: Thinking you need all four sides to find the area. You only need the two diagonals."

[SAY] "Mistake 4: Confusing the rhombus formula with the parallelogram formula. For a rhombus, we use the diagonals."

[ASK] "Does everyone understand when to use this formula?"

[WAIT] Check for nods or questions.

Phase 3: Practice and Application (10 minutes)

Worked Example (10 minutes)

[SAY] "Let us work through an example together."

[WRITE] "Example: A rhombus has a diagonal of 10 cm and another diagonal of 24 cm. Find: i) The area ii) The side length"

[DO] Draw a rhombus on the board with diagonals labeled.

[SAY] "First, let us find the area using the formula."

[WRITE] "Area = (1/2) x d1 x d2"

[WRITE] "Area = (1/2) x 10 x 24"

[WRITE] "Area = 120 cm^2"

[SAY] "Now let us find the side length."

[SAY] "The diagonals bisect each other at 90 degrees. This creates four right triangles."

[WRITE] "Half of d1 = 10/2 = 5 cm"

[WRITE] "Half of d2 = 24/2 = 12 cm"

[SAY] "Each side is the hypotenuse of a right triangle with legs 5 cm and 12 cm."

[WRITE] "Side = $\sqrt{(5^2 + 12^2)}$"

[WRITE] "Side = $\sqrt{(25 + 144)}$"

[WRITE] "Side = $\sqrt{169}$"

[WRITE] "Side = 13 cm"

[SAY] "The side length is 13 cm."

[ASK] "Does everyone understand?"

[WAIT] Check for understanding.

Phase 4: Assessment (5 minutes)

Exit Ticket

[SAY] "Before we finish, I want to check your understanding. Please complete the exit ticket individually."

[DO] Display questions on the board or distribute exit ticket.

[SAY] "You have 5 minutes to complete the questions."

Exit Ticket Questions:

1. A rhombus has diagonals measuring 16 cm and 30 cm. Find the area.

2. A diamond-shaped road sign is a rhombus with diagonals of 40 cm and 60 cm. Find the area.

3. A car logo is shaped like a rhombus. The diagonals measure 14 cm and 10 cm. Find its area.

Differentiation Notes

For Struggling Learners:

- Provide pre-drawn rhombuses with diagonals already marked.
- Use simpler numbers for diagonal lengths.
- Pair with confident problem solvers.
- Provide step-by-step calculation templates.

For Advanced Learners:

- Challenge with deriving the formula themselves.
- Explore real-world applications: interior design, architecture.
- Investigate the relationship between rhombus and square areas.

Post-Lesson Reflection Prompts

- Did students successfully draw the rhombus and measure the diagonals?
- Were students able to discover that the diagonals bisect at 90 degrees?
- What misconceptions emerged, and how were they addressed?
- Did students understand when to use the diagonal formula versus the Pythagorean theorem?
- What adjustments would improve this lesson?