St. Xavier's School, Bathinda

Term-II (2025-26)

Art-Integrated Activity

Subject: Mathematics (Quadrilaterals)

Class: 9

Paired States: Punjab & Odisha

Activity Title:

"Weaving Geometry: The Quadrilaterals of Phulkari & Ikat/Pattachitra"

Objective:

- To understand the properties of various quadrilaterals (Square, Rhombus, Parallelogram, Trapezium).
- To explore the geometric intricate textile patterns of Odisha (Sambalpuri Ikat/Pattachitra borders) and Punjab (Phulkari/Bagh) through mathematics.

Materials Required:

- A4 size sheets / Graph Paper
- Pencil, Eraser, Ruler, Protractor
- Sketch Pens, Watercolours, Crayons (for artwork)
- Printed images of Phulkari embroidery (Punjab) and Sambalpuri Ikat fabrics or Pattachitra borders (Odisha).
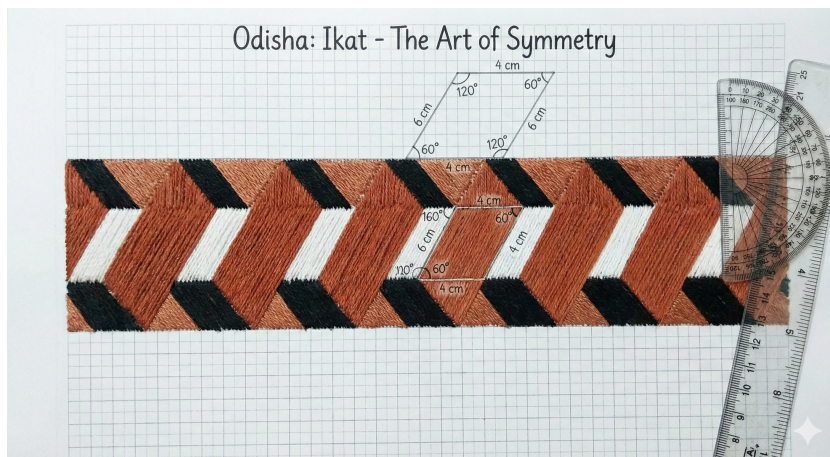
Steps to Conduct the Activity:

1. Take 2 A4 sheets (or one large chart divided in half):

   - Side One: Punjab (Phulkari: The World of Rhombuses)
   - Side Two: Odisha (Ikat & Pattachitra: Parallelograms & Trapeziums)

2. Punjab Side (Phulkari - The Geometric Garden):

   - Draw a grid on the sheet.
   - Create a traditional Phulkari motif. Phulkari heavily utilizes the Rhombus and Square shapes tessellated together.
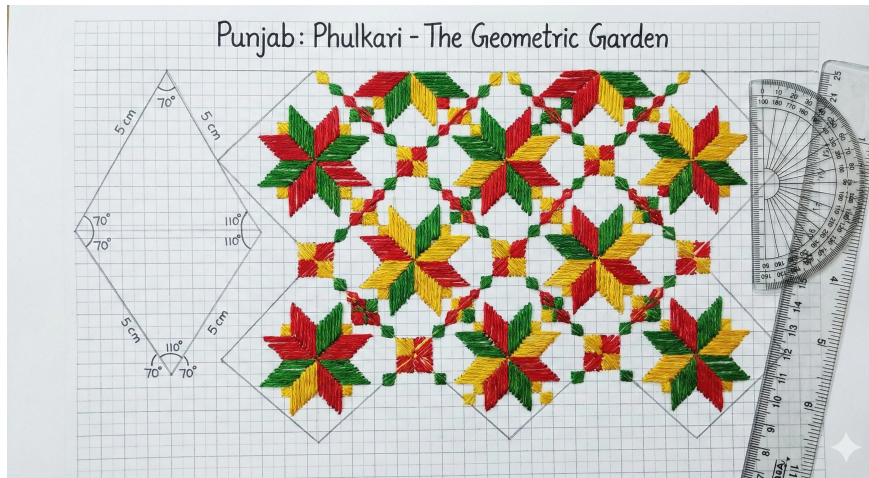
- **Mathematical Task:**

  - Identify a specific quadrilateral in your design (e.g., a Rhombus).
  - Verify Properties: Measure the sides and angles to verify that:

  1. All sides are equal.
  2. Diagonals bisect each other at 90° (Right angles).

  - Optional: Show how joining the mid-points of a rectangle design forms a rhombus (Mid-point Theorem application).

3. Odisha Side (Ikat/Pattachitra - The Art of Symmetry):

- Draw a traditional Pattachitra border or a Sambalpuri Ikat design. These often feature repeating chains of Parallelograms or Isosceles Trapeziums.
- **Mathematical Task:**

  - Select one repeating quadrilateral unit from the border.
  - Verify Properties:

  3. Sum of adjacent angles = 180° (for Parallelogram).
  4. Measure the diagonals to see if they are equal (if drawing a Rectangle/Square border) or unequal (if Parallelogram).

- Art Integration: Color the patterns using traditional Odia earth tones (rust, black, white) to highlight the distinct quadrilaterals.

Punjab: Phulkari – The Geometric Garden

4. Art Reflection Section:

- Write a short paragraph explaining the role of Quadrilaterals in textile design.
- Reflect on how Symmetry and Tessellation (fitting shapes together without gaps) are used in both Phulkari (Punjab) and Ikat (Odisha) to create visual harmony.

Assessment Criteria

Total marks : 10

A. Mathematics Content (5 Marks)

Correct identification and construction of specific quadrilaterals (Rhombus, Parallelogram). Accurate measurement and verification of properties (side lengths, angles, diagonals) as per the mathematical tasks.

B. Art Integration & Presentation (5 Marks)

Creative blending of Phulkari geometric motifs & Ikat/Pattachitra patterns. Visual appeal, neatness, and artistic innovation. Insightful explanation of how symmetry and tessellation create the textile designs.