

TESSELLATIONS:

MATHS, ART & ARCHITECTURE

DESIGNED FOR YEARS 5-6 • ADAPTABLE FOR YOUNGER COHORTS

CONTEXT

This lesson introduces students to tessellations as a connection between mathematics, visual arts, and cultural pattern-making in architecture. Tessellations have been used across cultures for thousands of years:

- Ancient Greek mosaics used repeated geometric tiles to decorate homes
- Persian and Islamic art used intricate repeating patterns and geometric symbolism in architecture
- M.C. Escher explored mathematical tessellations using interlocking figures

These patterns often carried symbolic meaning, representing ideas such as infinity, order, and connection. Students explore how simple shapes and transformations can create complex visual patterns, linking cultural design traditions with mathematical thinking.

ACARA ALIGNMENT (YEARS 5-6)

VISUAL ARTS

Developing practices and skills

- AC9AVA6D01 – experiment with, document and reflect on ways to use a range of visual conventions, visual arts processes, and materials

Creating and making

- AC9AVA6C01 – use visual conventions, visual arts processes and materials to plan and create artworks that communicate ideas, perspectives and/or meaning

MATHEMATICS

Space

- AC9M6SP03 – recognise and use combinations of transformations to create tessellations and other geometric patterns, using dynamic geometric software where appropriate

This resource was developed by Archi ED, Archi ED - Australian Institute of Architects an initiative of the Australian Institute of Architect's SA Chapter, based on a workshop designed by Brychan Asaris (committee chair), Senior Architect, Russell and Yelland SA, and mapped to curriculum by Ella Camporeale (committee member), Curriculum Leader for Art, Design and Digital Technologies, Westminster School, SA.

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LESSON OVERVIEW

LEARNING INTENTIONS

Students will be able to:

- Understand what a tessellation is and how it has been used across cultures
- Apply transformations to create repeating patterns
- Use materials and processes to construct a tessellated design
- Recognise how mathematical ideas are used in art and architecture

SUCCESS CRITERIA

Students can:

- Create a shape that tessellates without gaps or overlaps
- Repeat a shape to fully cover a surface
- Apply translation, reflection or rotation
- Produce a completed tessellated artwork using given materials

TOOLS/MATERIALS REQUIRED

- A4 paper **cut into 9 rectangles (template provided)**
- A3 paper (or larger)
- Scissors
- Sticky tape
- Pencils and pens

TASK

Create a tessellated pattern using a self-designed shape that repeats to completely cover a page without gaps or overlaps.

Constraints:

- Must use A4 sheet cut into 9 rectangles
- Shape must be created through cutting and rearranging
- Pattern must tile across the entire page
- No gaps or overlaps permitted

Assessment Criteria

Criterion	ACARA Link
Use of materials and visual arts processes	AC9AVA6D01
Creation of a resolved tessellated artwork	AC9AVA6C01
Application of transformations in pattern design	AC9M6SP03

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LESSON PLAN

LESSON OVERVIEW

45 MINUTES

INTRODUCTION | 10 MINUTES

Focus: Cultural and mathematical understanding of tessellations

- Define tessellation as a pattern of shapes that **repeat with no gaps or overlaps**
- Show and discuss examples:
 - Checkerboard patterns (squares)
 - Brick walls (rectangles)
- Introduce cultural context:
 - Greek mosaics (decorative tiling)
 - Islamic geometric patterns (symbolic repetition and symmetry)
 - Escher's interlocking designs
- Emphasise that patterns can represent **structure, symbol, and design in architecture**

STUDENT ACTIVITY | 30 MINUTES

Focus: Constructing a tessellating shape and pattern

Students follow the full process (next page)

VARIATION | IF TIME PERMITS

- Create a **reflection tessellation**
- Create a **rotational tessellation**

EXIT | 5 MINUTES

- Students review their pattern:
 - Does it tessellate (no gaps or overlaps)?
 - How was the shape repeated?
- Quick reflection:
 - Where might we see patterns like this in buildings or art?

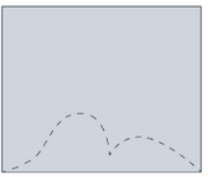


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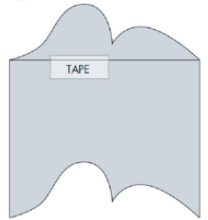
INSTRUCTIONS

STEP 1



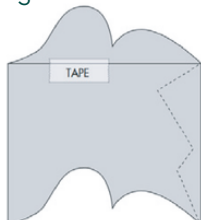
1. Draw a line between two adjacent corners on one of the long sides of the rectangle. The line can be straight or curved but must connect those two corners.

STEP 2



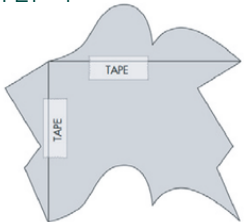
2. Cut along the line. Take the cut piece and slide it straight across to the opposite long side of the rectangle. Align edges and tape together.

STEP 3



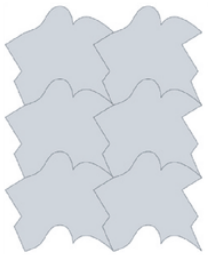
3. Draw another line connecting two adjacent corners on one of the short sides of the new shape.

STEP 4



4. Cut along this new line. Slide the cut piece straight across to the opposite side and tape it in place.

STEP 5



5. The new shape is now a tessellation template. Place it on A3 paper and trace around it. Move the shape across, up, or down, aligning edges each time, and continue tracing until the page is filled. This creates a translation tessellation.

EXTENSION

- 1. Create a **reflection tessellation** | 2. Create a **rotational tessellation**