Lesson 4: The Shape of Buildings

This lesson explores the use of geometric shapes in buildings.

Support material: Information Sheet 22 "Greek and Roman Temples", Information Sheet 23 "Classical Portico", Information Sheet 24 "Shapes in Doors and Windows", Information Sheet 25 "Shapes in Buildings".

Spotlight

Geometrical influences

Key Concepts

Shape and Form

Review of work

- Award a point for each correct answer on Worksheet C3.
- Discuss the new architectural terms learned in Lesson 3. What do these terms describe?

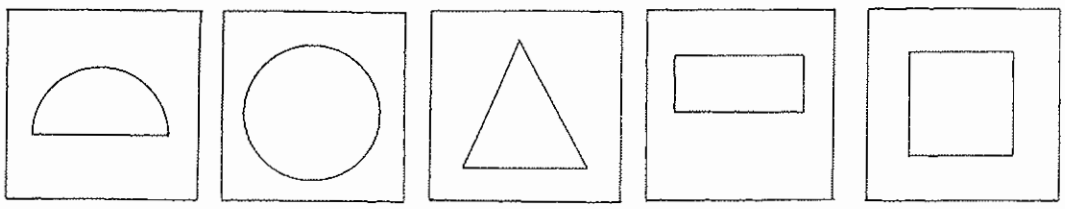
Answers for Worksheet C3

1. Red House (Uniacke House), Youghal. Load-bearing brick walls.
2. Casino at Marino, Dublin: Load-bearing stone walls. The columns hold up the cornice, pediments etc., but these are all decorative. They do not support the roof.
3. Curvilinear Range, Botanic Gardens, Dublin: Cast-iron frame with cast-iron and glass skin.
4. Busaras, Dublin: Reinforced concrete frame with Portland stone and glass skin.
5. Carroll's Factory, Dublin: Steel frame, brick and glass skin.
6. Holiday House, Killykeen Forest Park, Co. Cavan: Wooden frame with wood skin.
7. Children's Courthouse, Dublin: Load-bearing concrete walls with a non load-bearing stone and brick outer skin.
8. Tourist Office, Limerick: Tubular steel mast and "arms" hold the roof up. The steel columns and concrete wall hold it down (otherwise the roof could blow off). The rest of the skin is aluminium and glass.

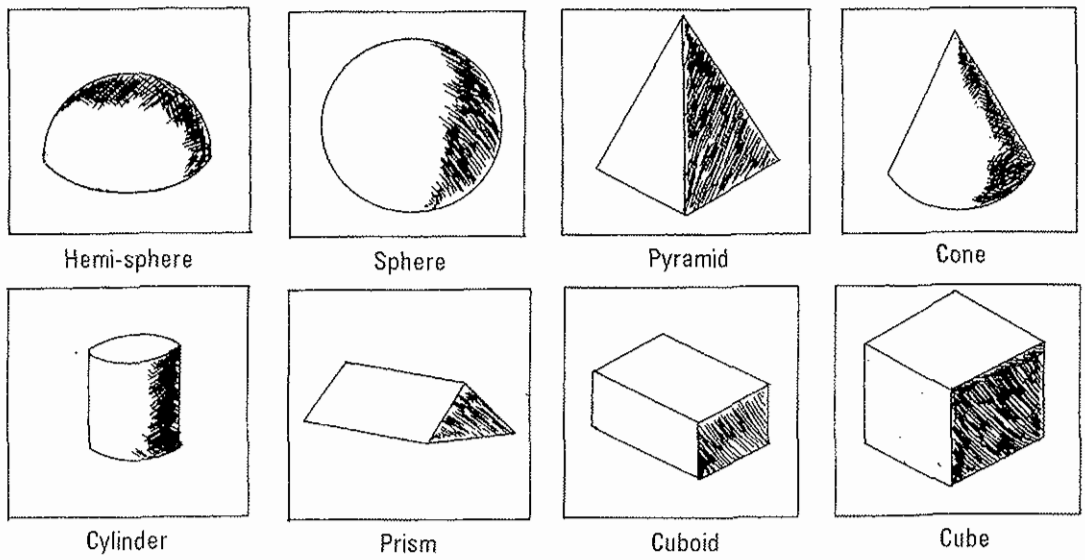
Discussion — Geometrical shapes in Buildings

Teacher preparation

Draw and cut out these 2-dimensional geometrical shapes — semi-circle, circle,triangle, rectangle, square .



Collect or make a set of 3-dimensional geometrical shapes — hemisphere, sphere, pyramid, cone, cylinder, prism, cuboid, cube.

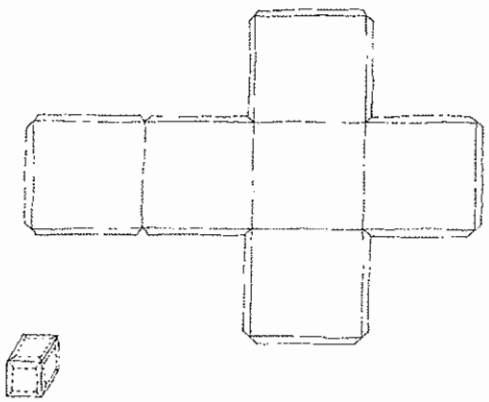


1. Distribute Information Sheet 22 "Greek and Roman Temples" and Information Sheet 23 "Classical Portico". Use the 2-dimensional cut-outs and 3-dimensional models of geometrical shapes to discuss the Parthenon and Pantheon. Information Sheet 23 "Classical Portico", shows the terms used for different parts of the facade
   - Looking at the illustrations of the Parthenon, ask the students to identify as many 2-dimensional shapes as they can — triangle, circle, semi-circle, square, rectangle.
   - Identify each of the 3-dimensional geometrical forms in the Parthenon.
   - How were these geometrical forms used in the Parthenon?
   - Now look at the Pantheon.
   - Identify the 2-dimensional and 3-dimensional shapes, as for the Parthenon.
   - How was the design of this Roman building influenced by Greek architecture?
   - Identify the new ideas or innovations. Describe them.

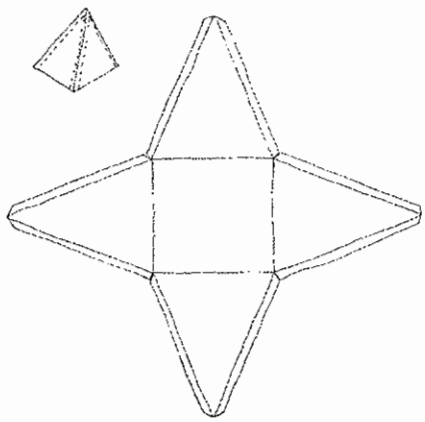
2. Distribute copies of Information Sheet 24 "Shapes in Doors and Windows" and Information Sheet 25 "Shapes in Buildings". Taking the sheets one at a time, guide the discussion with questions such as these.
   - Describe the images in terms of their geometrical shapes.
   - Which have been influenced by Roman or Greek styles? Which ones have not?
   - Do you notice differences and similarities? Name them.
   - Which building have symmetrical facades? Asymmetrical facades?
   - How many "styles" of building are represented on the Information Sheets?

Activity — A paper solid

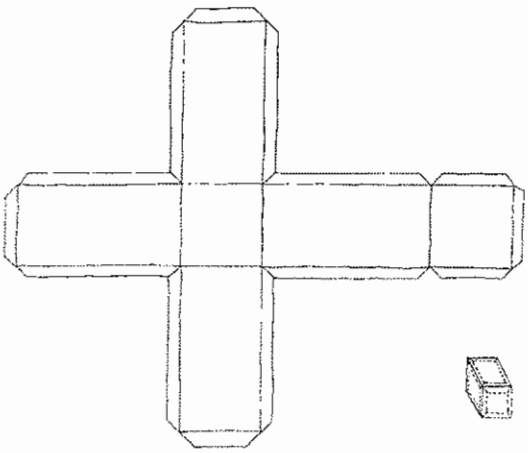
Using a sheet of paper, students construct a pyramid, a cube or a rectangular cuboid. They should try this on their own first. If they are having difficulties, use the patterns here to demonstrate. This exercise will help students develop a sense of form and space.



Pattern for cube



Pattern for pyramid



Pattern for cuboid

Homework

Use a range of 2-dimensional geometric shapes to design the facade of a building. Decide on the function of the building first — library, hotel, restaurant, church etc.

or

Make a drawing of a building which uses any of the 3-dimensional geometric shapes explored in this lesson.

Scrapbook

Students collect samples of buildings which display a range of geometric shapes.

Vocabulary File

Students add new words and definitions to their files.

Cross-Curricular Connections

1. History/Art History and Appreciation — Choose one of the architectural styles referred to in the illustrations on the Information Sheets and Worksheets. Explore it and its historical background in greater detail.
2. History/Architecture — Study the work of an architect (such as James Gandon) who worked in Ireland. Try to visit one of the buildings he designed.
3. Archaeology — Make a detailed study of the Great Pyramid of Giza.
4. Art, Craft, Design — Create a fabric design using Greek architecture as the theme. The fabric will be used for cushion covers, upholstery and curtains.
5. History/Construction Studies — Study the evolution of dome-building techniques from the earliest times to the present day.
6. Languages/Classical Studies — What do the words "Parthenon" and "Pantheon" mean? How many of the new terms you have learned come from the Greek or Latin languages?
7. Art — Make a clay model of one style of Greek column — Doric, Ionic or Corinthian.
8. Aesthetics/Classical Studies — Two thousand years ago, Vitruvius said that the most important things about a building were *Comoditas, Firmitas et Venustas*. What did he mean? Was he right? Try to explain his ideas, using some buildings that you know to illustrate your points.
9. Art/Music/Mathematics — The ancient Greeks believed that music was geometry translated into sound. Renaissance architects believed that architecture was mathematics translated into spatial units. Investigate.