Proportion: The Vitruvian Man

Key Learning Content

This film examines The Vitruvian Man – the sketch of a man drawn by the Renaissance artist Leonardo da Vinci, based on proportions described by the Roman architect Vitruvius. The body is contained within a square and a circle, and Leonardo's skill in positioning the centres of these shapes to best effect is explained. Examples of common ratios between parts of the body are illustrated. No prior knowledge is required by students watching the film, although familiarity with ratio notation would be useful.

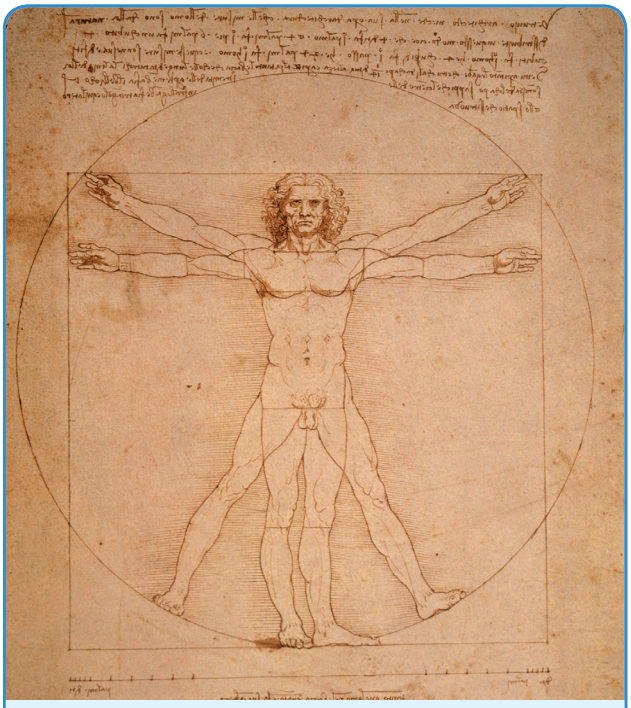
Core Outcomes

Learning Points

- Be able to use ratio notation including reduction to its simplest form and its various links to fraction notation, expressing it in the form $1:n$.
- Be able to produce accurate scale drawings.

Suggested Activities

- Produce a sketch of the human body using Vitruvius' original ratios.
- Measure your own body dimensions and see how closely they fit Vitruvius' ratios.



Da Vinci's drawing of the Vitruvian Man uses Vitruvius's observation that parts of the body are geometrically proportioned.

Extension Outcomes

Learning Points

- Be able to calculate the ratio between A:C given ratios for A:B and B:C.
- Be able to use geometrical properties of circles and squares to solve problems.

Suggested Activities

- Calculate ratios between different parts of the body without using height.
- Calculate the radius of the circle in The Vitruvian Man construction using both geometry and measurement and trigonometry and algebra.

Related Films

To use before the lesson plan:

Maths and the Mona Lisa	This film demonstrates that the Golden Ratio principle underpins the enigmatic beauty of the Mona Lisa.

To use after the lesson plan:

Polyhedra: Platonic Solids	This film discusses Plato's categorisation of solid shapes based on their regular geometric properties.
Painting By Numbers	This film shows how mathematics can help artists produce realistic impressions of depth and perspective in their work.
Where Is the Centre of a Triangle?	This film gives a geometrical analysis of all the possible points for the centre of a triangle.
Aiming for the Outer Planets	This film explains how physicists used the gravitational pull of planets to send probes far into space.

Guide Lesson Plan

Introduction

Using either photoediting software or images from the internet, show distorted images of people, such as those produced in curved mirrors. Ask the students: How far can you change the proportions of the human body so that they no longer seem correct. What are 'ideal' proportions?

Show Film

Proportion: The Vitruvian Man

Main Activity

Foundation

Give the students a list of the body ratios used in drawing The Vitruvian Man, and get them to sketch as best as they can a human body based on these ratios. Compare drawings at the end of the lesson.

Advanced

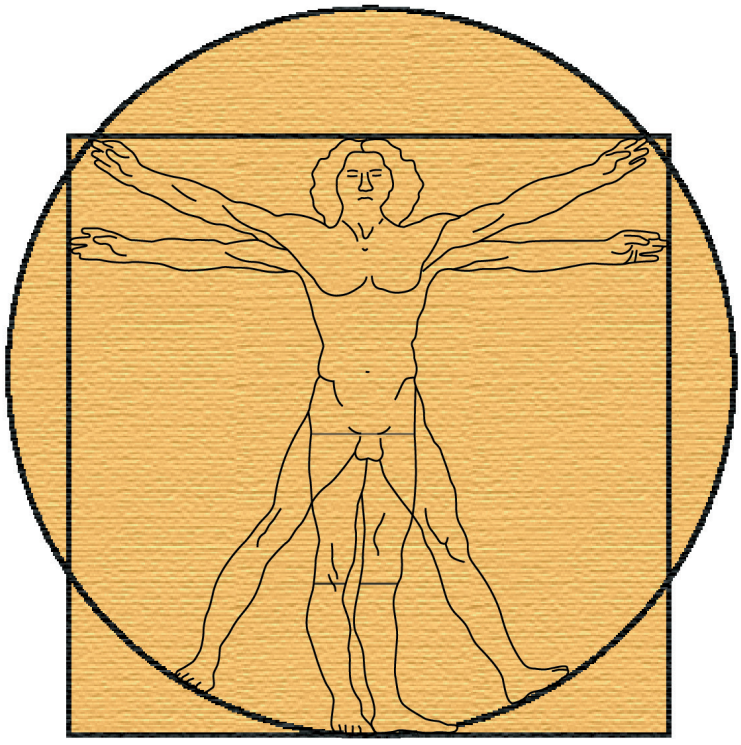
Show how to find the ratio A:C given ratios A:B and B:C. Hand out a square grid with all the body parts used in Vitruvius' ratios listed across the top and down the side. Fill out one half of the grid with ratios between the corresponding body parts, using the original ratios used by Vitruvius.

Extension Activity

Show how to find the centre of a circle by drawing perpendicular bisectors to chords. Give out copies of the drawing and get the students to work out where the centres of the circle and square are in the drawing. If time allows, use trigonometry to find the circle centre on the assumption that the lowest point of the circle is on the baseline of the square, and the highest point of the circle is the highest point of the square when rotated through 45 degrees.

Optional Extra

Get students to find images of famous athletes and use these to estimate their Vitruvian ratios.



The Golden Ratio helped inform da Vinci's diagram of human anatomy through the visualisation of a perfectly proportioned man.