Linking SNAP 2006 to the Curriculum
Numeracy is the ability to effectively use the mathematics required to meet the general demands of life at home and at work, and for participation in community and civic life. Numeracy is a fundamental component of learning across all areas of the curriculum. The role that teachers in visual arts play in the development of numeracy is to identify the specific numeracy skills that are needed to achieve the syllabus outcomes and to plan explicit teaching activities to assist students in their learning. These activities provide students with opportunities to select, use, evaluate and communicate mathematical ideas in a range of situations.

The numeracy demands placed on students in the visual arts classroom are identified in the Visual Arts Years 7–10 Syllabus as:

‘… students explore aspects of numeracy, specifically number, measurement, data and space, and they engage in mathematical problems when negotiating the size, specifications and proportions of their artworks.

In the mandatory and elective courses students estimate, measure, compare, draw lengths, areas, volumes and angles in their artmaking. The basic numerical skills of addition, subtraction, division and multiplication are frequently used. In making, and in critical and historical studies, students may be required to read, interpret and make judgements about data including graphs, tables, charts, diagrams and timelines.’

Numeracy skills required in visual arts and assessed in SNAP

**Working Mathematically**
- Asking appropriate numeracy questions
- Using strategies to solve problems
- Communicating with appropriate numeracy terminology
- Relating numeracy skills in one situation to the numeracy skills in another situation

**Number**
- Using number facts
- Calculating with whole numbers
- Calculating with decimals and fractions

**Patterns and Algebra**
- Identifying and describing patterns in observations

**Data**
- Identifying data in tables, charts and graphs
- Organising data in tables, charts and graphs
- Interpreting data in tables, charts and graphs

**Measurement**
- Estimating, measuring, comparing and drawing lengths
- Estimating, measuring, comparing and drawing areas
- Estimating, measuring and comparing volumes, capacity and mass
- Understanding time

**Space and Geometry**
- Recognising and drawing three-dimensional objects
- Drawing lines and angles
- Recognising and drawing two-dimensional shapes
- Recognising and developing patterns and designs
- Using precise terminology to give position
- Using scale

The syllabus referred to is Visual Arts 7–10 Syllabus, Board of Studies, June 2003.
Questions 7, 18, 32 and 42

In these questions students are required to visualise and identify a three-dimensional object from its properties as well as from a net and to measure and calculate a length using a scale.

In visual arts, students are often required to recognise, measure, draw and construct three-dimensional objects. Students need to be familiar with key terms used to describe lines, two-dimensional shapes and three-dimensional objects.

Teaching strategies

When making artworks, it is important that students are able to recognise, visualise and draw two-dimensional shapes and three-dimensional objects.

Group sculpture project

Students construct a free-standing sculpture using three-dimensional objects.

3D objects

- Ask students to collect or make a variety of three-dimensional objects (cones, cubes, prisms, pyramids and cylinders). They could collect everyday packaging such as cereal boxes or toilet rolls.
- Have students identify and classify the objects according to their properties. Ask students to compare the objects in terms of the number and shape of the faces, and the number of corners and edges. Ensure that students use correct terminology such as prism, pyramid, cylinder, cone, cube, face, edge, corner, angle, vertex, flat, parallel, circular, square and rectangular.
- Ask students to visualise and draw the nets of several objects.

To check the accuracy of the students’ drawings, demonstrate by cutting along edges of the everyday packaging to show the net, then re-form the objects.
Teaching strategies (cont'd)

Drawing
Students make linear (using only line) drawings of several objects from observation.

Students imagine, then draw the ‘invisible’ edges of these objects.

To emphasise the three-dimensional qualities of the objects, add shadows and shading.

Group sculpture
Groups of 3–5 students each select 4–8 objects and cooperatively plan joining them together into a three-dimensional sculpture. The sculpture may represent a theme such as space technology or machinery, or a concept such as power, dynamics or balance. Have each student sketch their proposed sculpture.

Have each group:
• construct their sculpture and paint it using one light colour (eg white, yellow or light blue)
• measure and record the dimensions of their sculpture.
Teaching strategies (cont'd)

- Make three scale drawings of the sculpture on grid paper. The drawings should show a front, side and top view. Demonstrate to students how to select a suitable scale for the drawings by following these steps:
  1. Measure and record the length, width and height of their sculpture in centimetres.
  2. Measure and record the length and width of the grid paper.
  3. Determine how many times the dimensions of the sculpture need to be reduced to fit the paper whilst remaining in proportion. The length, width and height of the sculpture must be reduced by the same amount.
  4. Use this ratio of sculpture to paper to determine the scale (e.g., 1 cm on the paper = 5 cm on the sculpture, a ratio of 1:5).

Students then compare their drawings to the actual views of the sculpture in small groups.

Drawing light and dark

- Select some sculptures and arrange them in the centre of the room. Use a strong directional light such as an OHP to emphasise the form of the sculptures.
- Have students move around the works, making quick sketches using soft drawing media to record the shadows.
- Repeat the exercise on black paper using white or yellow chalk, crayon or pencil to record the lightened areas.
- Display and compare the two works.

Additional strategies

- In groups, students decide on a potential location within the school to build a large scale model of their sculpture. The proposed site should be accurately measured and a plan drawn to scale.
- Include accurate measurements for someone else to construct the sculpture. Show front, side, rear and top views.
- Use the detailed plan and measurements to develop a list of materials needed. For example, from the scale drawings students could calculate the amount of timber required for the framework by converting the scale drawings to the actual lengths of timber.
- Have students present their proposed sculpture to the rest of the class, explaining the design, its dimensions and materials.

Syllabus reference

4.1 uses a range of strategies to explore different artmaking conventions and procedures to make artworks
4.4 recognises and uses aspects of the world as a source of ideas, concepts and subject matter in the visual arts
4.5 investigates ways to develop meaning in their artworks
4.6 selects different materials and techniques to make artworks