Shape and Space

Day One:
Spatial Awareness, 3-D Shape, Lines and Angles
Overview

Day One: Shape and Space

- Instructional Framework
- PDST Manual
- CPA Approach
- Spatial Awareness
- 3-D Shapes
- Lines and Angles
- Reasoning and Communicating and Expressing

Day Two: Shape and Space

- 2-D Shape
- Symmetry
- Co-ordinates
- Assessment
Session One Objectives

- to provide participants with a clear understanding of the learning trajectory for shape and space
- to promote a variety of child-centered approaches to the teaching and learning of spatial awareness, 3-D shapes and lines and angles
- to support teachers in developing pupils’ higher order skills of reasoning and communicating and expressing
Key Messages

A variety of learning experiences enhances the understanding of mathematical concepts/skills and allows for differing abilities and learning styles.

Mathematical thinking is developed by eliciting, supporting and extending children’s mathematical ideas.

By constructing ideas and communicating them to others, pupils develop mathematical concepts.
Developing Mathematical Skills

- Applying & Problem-Solving
- Communicating & Expressing
- Integrating & Connecting
- Reasoning
- Implementing
- Understanding & Recalling

(PSMC:1999: 68)
Reflection on Current Practice

• How do your pupils experience shape and space in your classroom?

• How are higher order skills developed?
Why Shape and Space?

- 24% of the curriculum objectives are shape and space
- On average 8% of the content of textbooks pertains to shape and space
- 11% questions related to shape and space on Sigma T 5th/6th class (9.3% Drumcondra)
- Particular weakness in girls in relation to shape and space
Suggested teacher language

To be aware of

Geog. Shape Space

Differentiation

Assessment Pack

Consolidation Activities

ICT

www.pdst.ie

Shape & Space: Teacher’s Handbook
A GUIDE TO TEACHING & LEARNING IN IRISH PRIMARY SCHOOLS

www.pdst.ie

Primary Resource Handbook

www.pdst.ie
Concrete – Pictorial - Abstract

Concrete

Pictorial

Abstract

Learning Trajectory

Differentiation
Instructional Framework for supporting and developing mathematical thinking

- Child-centred
- Language-based
- Strategy-sharing
- Teacher as Facilitator
- Assessment including Pupil self-reflection
- Eliciting
- Extending
- Revoicing
- Teacher not sole validator of mathematical knowledge
- Higher-order skills
Shape and Space Trajectory

Developmental

Based on PSC

Concrete Pictorial Abstract

4 levels

Spatial Awareness
- 3-D Shapes
- 2-D Shapes
- Lines and Angles
- Symmetry

p.19
Instructional Framework

Sort 3-D shapes in a variety of ways

Teacher *elicits* properties of 3-D shape and language of sorting from the children
Spatial Awareness p.24

- Oral Language Based- Positional and Directional Language.
- Taught in Context – Activity Based
- Skills Transfer – Cross Curricular
- Spatial sense can be developed through meaningful activities
## Meaningful Integration - Spatial Awareness

**Level A.1**

Using Stories, *Rosie’s walk*, *We are Going on a Bear Hunt* p.27/28

<table>
<thead>
<tr>
<th>Geography</th>
<th>Mathematics</th>
<th>English</th>
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<tbody>
<tr>
<td>Record places in stories using simple labelled maps</td>
<td>Explore, discuss, develop and use the vocabulary of spatial relations – over, under, up, down, on, beside, in, above, below, near, far, right, left, through, behind.</td>
<td>Listen to stories, descriptions and directions and respond Tell and retell a story in sequence</td>
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<tr>
<td>Discuss and record simple journeys</td>
<td></td>
<td>Draw pictures and write about them</td>
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<tr>
<td>Refer to simple locational terms</td>
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Carousel

- Barrier Game
- 3D Shape Construction
- Making Cube Nets
- Lines and Angles
Barrier Game using Attribute Blocks

• Level A.1  p 32

• ‘Grid’ barrier game

• Consolidation activity
3-D Shape Construction

• Level C.3 p.103

• Constructing Polyhedrons (Shapes).
  o Skeleton Model – Toothpicks & Marshmallows
  o Solid Model – Play Dough
  o Hollow Model - Polydrons
Nets for a Cube

- Level D.2 p.138

- CPA trajectory

- Construct one cube using polydron, unfold to create a net

- Represent this net using squared paper/dot paper
  - Repeat to construct as many nets as possible
  - Record all nets

- Can you spot any patterns in how the cubes are constructed?
Lines and Angles

Level B.7 p.87
Investigating Angles as Corners
Rotating Angles
Turns

Level C.8 p.128
Experimenting and Discovering Different Angles
Shape & Space Activities

p. 32

p. 87

p. 103

p. 104

p. 128
Skills Activity

• Teachers work at a station

• Consider the higher order skills of Reasoning and Communicating and Expressing from the curriculum checklists

• Feedback
Developing Mathematical Skills

1. Applying & Problem-Solving
2. Communicating & Expressing
3. Integrating & Connecting
4. Reasoning
5. Implementing
6. Understanding & Recalling

(PSMC:1999: 68)
Focus for Day 2

- 2-D Shapes
- Symmetry
- Co-ordinates
- Assessment Opportunities