Overview

1. Sources and observations
2. Early mathematical ideas and processes
3. The role of the early childhood educator
4. Learning opportunities for numeracy - play spaces
Disposition of adults...

- Early childhood educators are often not comfortable talking about ‘mathematics’
- Many EC educators have difficulty in ‘seeing’ the mathematics in their everyday interactions with children
- There is a need for greater guidance and professional learning around early mathematics

Disposition of EC educators

Common misconceptions....

- Young children are not ready for mathematics education
- Mathematics is for some bright kids with mathematical genes
- Simple numbers and shapes are enough
- Language and literacy are more important than mathematics
- Teachers should provide an enriched physical environment, step back, and let the children play

Common misconceptions cont.

- Mathematics should not be taught as stand-alone subject matter
- Assessment in mathematics is irrelevant for young children
- Children learn mathematics only by interacting with concrete material
- Computers are inappropriate for teaching and learning mathematics

Numeracy or mathematics?

- “Numeracy is the capacity, confidence and disposition to use mathematics in daily life”

(BBB: EYLF, 2009 p38)

Disposition of children

"Encourage young children to see themselves as mathematicians by stimulating their interest and ability in problem solving and investigation through relevant, challenging, sustained and supported activities". (AAMT & GCA 2006)

"Outcome 4: Children are confident and involved learners.
- Children develop dispositions for learning such as curiosity, cooperation, confidence, creativity, commitment, enthusiasm, persistence, imagination and reflexivity
- Children develop a range of skills and processes such as problem solving, inquiry, experimentation, hypothesising, researching and investigating". (BBB: EYLF, 2009)

2. Early mathematical ideas and processes

Outcome 5: Children are effective communicators

- Spatial sense, structure and pattern, number, measurement, data argumentation, connections and exploring the world mathematically are the powerful mathematical ideas children need to become numerate. (BBB: EYLF, 2009 p38)

Research...
Perry, Dockett & Harley (2007) - powerful ideas and professional development
Papic & Muligan (2007) - Pattern & structure

Early Mathematics Project

- Patterning
- Counting
- Measurement
- Spatial thinking

Mathematical Thinking of Preschool Children in Rural and Regional Australia: Research and Practice

Some very early mathematical concepts

- Same and different (colour, size, shape, quantity)
- Order (before/after in space and time)
- Location (inside/outside, near/far, up/down, direction)
- Number (sense of one, two, three, subitising, more/less)

Subitising

The process of instant recognition of small quantities and patterns without counting

Counting - 5 skills

- Know the number names in sequence – (rote counting)
- 1 to 1 correspondence - matching each number name with one item
- The last number name gives the total – it tells ‘how many’
- Different sets of items can be ‘counted’ and so can represent the same number
- The items can be counted in any order
Spatial Awareness and Shapes

Babies notice basic features of objects - size, some shape.
Relationships seen in terms of - order, near/far, together/apart, inside/outside.
Location in relation to the infants body

Young children’s drawings show how they view the world....

Inside, enclosed, separate

3 yrs 6 months

Older children can...
- visualise different points of views

Dogs playing soccer. 7yrs

Front and back of bear from memory

5 years

Front and back of bear while looking
3. Role of the EC educator

Role of adult

- Planning and resourcing challenging learning environments
- Ensuring continuity and progression (Wood, 2005)
- Supporting children’s learning through planned play activity
- Extending and supporting children’s spontaneous play
- Extending and developing children’s language and communication through play

Role of educator

- Model mathematical language
- Ask challenging questions
- Build on children’s interests and natural curiosity
- Provide meaningful experiences
- Scaffold opportunities for learning & model strategies
- Monitor children’s progress and plan for learning (Early Mathematics Project)

Thoughts from EC students

- Need to know the maths further ahead to know what direction to steer children
- EYLF seems largely focused on older children (3 yrs +)
- Using all the sense to engage with mathematical ideas
- The role of rhythm, beat, sound and music
- Storytelling and drama about maths
- Using picture books for mathematical contexts
- Problem solving - what does it look like with young children?
4. Types of activity & play spaces

- **Play spaces**
  - **Outdoors** (climbing, tunnels, tents, riding, construction, sand & water, gardening, dance and gymnastics)
  - **Puzzles** (spatial puzzles, number games, sorting)
  - **ICT** (computer games, creative graphics software, programmable toys, digital cameras, calculators, interactive whiteboard)

- **Play trays**
  - (sand, water, multiple objects e.g. buttons, pasta, shells, leaves)

- **Mini-worlds** (story/drama, cloth or sand tray environments, small toy animals, people, vehicles)

- **Role play** (home, shop, dress-up, puppets)

- **Construction** (blocks, tracks, linking materials)

- **Display area** (peg line, pin boards, stands, magnet board)

- **Making dragons**

- **Modelling & painting** (dough, sculpture, craft materials, printing)

- **Graphics** (drawing, writing, recording, tracing, numbers, shapes)

- **Reading and listening areas** (story-telling, picture books, rhymes, songs, CDs, music & percussion)
References


