Supporting Infant and Toddler Mathematics

Early mathematical concepts develop over the first three years of life, emerging from children's development and through their interactions with the environment. The table below gives a time line of some of the more important concepts that develop during this time.

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<th>What You Might Observe Children Doing</th>
<th>How It Relates to Mathematics</th>
<th>What Teachers and Parents Can Do</th>
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</table>
| Dumping out a bucket of blocks and putting all of the blue ones in a pile. | • Infants and toddlers look for exact matches when classifying objects. They cannot understand that something can be the same and different at the same time (e.g. round and blue vs. square and blue).  
  • Classification will one day be used for the mathematical content areas of measurement, patterning/algebra, and geometry/spatial sense. | • Provide plenty of blocks and tiles  
  • Play with children; notice what they do and record observations.  
  • Use words that describe attributes such as size, shape, and color. "You made a big pile of blue blocks." |
| Beating on a drum, shaking a tambourine, or playing another concepts of quantity, and other musical instrument. | • Infants and toddlers are slowly constructing number sense, concepts of quantity, and other concepts through their interaction with the environment.  
  • These concepts will one day lead to the ability to use numbers in a conventional sense, for example, in one-to-one correspondence and quantification. | • Provide plenty of sound-makers (e.g., wrist bells, pots and pans, wooden spoons) and rhythm and beat.  
  • Encourage children to play and move along with recorded music.  
  • Talk with children and describe what they are doing. "Shake, shake-shake, shake, shake. You made your own music." |
| Pretending to drink from a cylindrical block, filling and zipping up a backpack, or pushing buttons on a phone. | • To a child, a cylindrical block looks like a cup so he pretends to drink from it. In pretend play children make decisions, solve problems, and notice how objects are related to each other. Encouraging children to compare, contrast, and relate is vital to the construction of future mathematics.  
  • Making relationships will eventually lead to children being able to use numbers to compare and relate groups of objects. This will begin with relationships of "more" and "less" and develop into addition and other mathematical functions. | • Set up a simple dramatic play area with many props that encourage children to compare, sort, manipulate, and explore properties. |
| Stacking rings on a post, matching blocks to the appropriate openings in a shape-sorting box, patting a piece of corduroy in a homemade texture book. | • There are many toys that can promote making relationships. Infants learn through their senses and by using their motor skills. Toys that capitalize on the way infants interact with the world can encourage children to make relationships.  
  • Order and sequence are important concepts that will eventually lead to quantification and numerical comparisons. | • Provide a variety of toys that invite children to explore with their senses and motor skills and allow them to make relationship and compare objects by size, color, texture, and sounds. |
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<th>Holding a piece of apple in each hand, returning books and toys to the shelf, or touching a furry caterpillar crawling up a leaf.</th>
<th>• We use mathematics every day to help make sense of our world, solve small problems, and order our universe. Infants and toddlers do the same thing as they engage in everyday activities such as eating snacks, cleaning up, and taking walks. • It is important for all children as they grow to understand the importance of mathematics in their daily life. Children who relate to math in this way will be more comfortable with mathematics as adults. • Point out mathematical and relational comparisons during daily activities. For example, serve two kinds of fruit and say, “These apples are hard and crunchy. The bananas are soft and mushy.” • Offer several sizes of balls on the playground, or point out the colors, sizes, shapes, and sounds that children experience on a walk.</th>
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<td>Filling and emptying containers at sand and water tables.</td>
<td>• Infants and toddlers do not understand the concept that simply changing the shape or arrangement of an object or group of objects does not change their quantity. This ability is know as conservation and will not begin to emerge until about age four. As with other mathematical concepts, these ideas are constructed slowly over time as children play with objects, containers, and substances such as sand and water. • Offer materials such as sand and water (or other safe materials) and containers of different sizes, shapes and capacities. • Allow children to interact by filling and emptying the containers and noticing what happens. Focus a child's thought by asking questions such as, “What might happen if you pour that into the jug?” or ”Do you think all of the sand will fit in this bucket?”</td>
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<td>Making patterns using blocks or beads and string.</td>
<td>• Patterning activities require children to make and repeat relationships and even use rudimentary number concepts. To create patterns with blocks or beads a child must make specific relationships between the objects. For example, a child might alternate colors (red, blue, red, blue), sizes (large, small, small, large), or numerical patterns (1 block, 2 blocks, 1 block, 2 blocks). Patterning will lead to the ability to serrate (put objects in an order based on number or size). • Observe and comment on the patterns children make. • Engage in patterning with the children. • Make or provide a pattern (e.g. on cardboard) and invite children to make a pattern that looks the same as the model.</td>
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