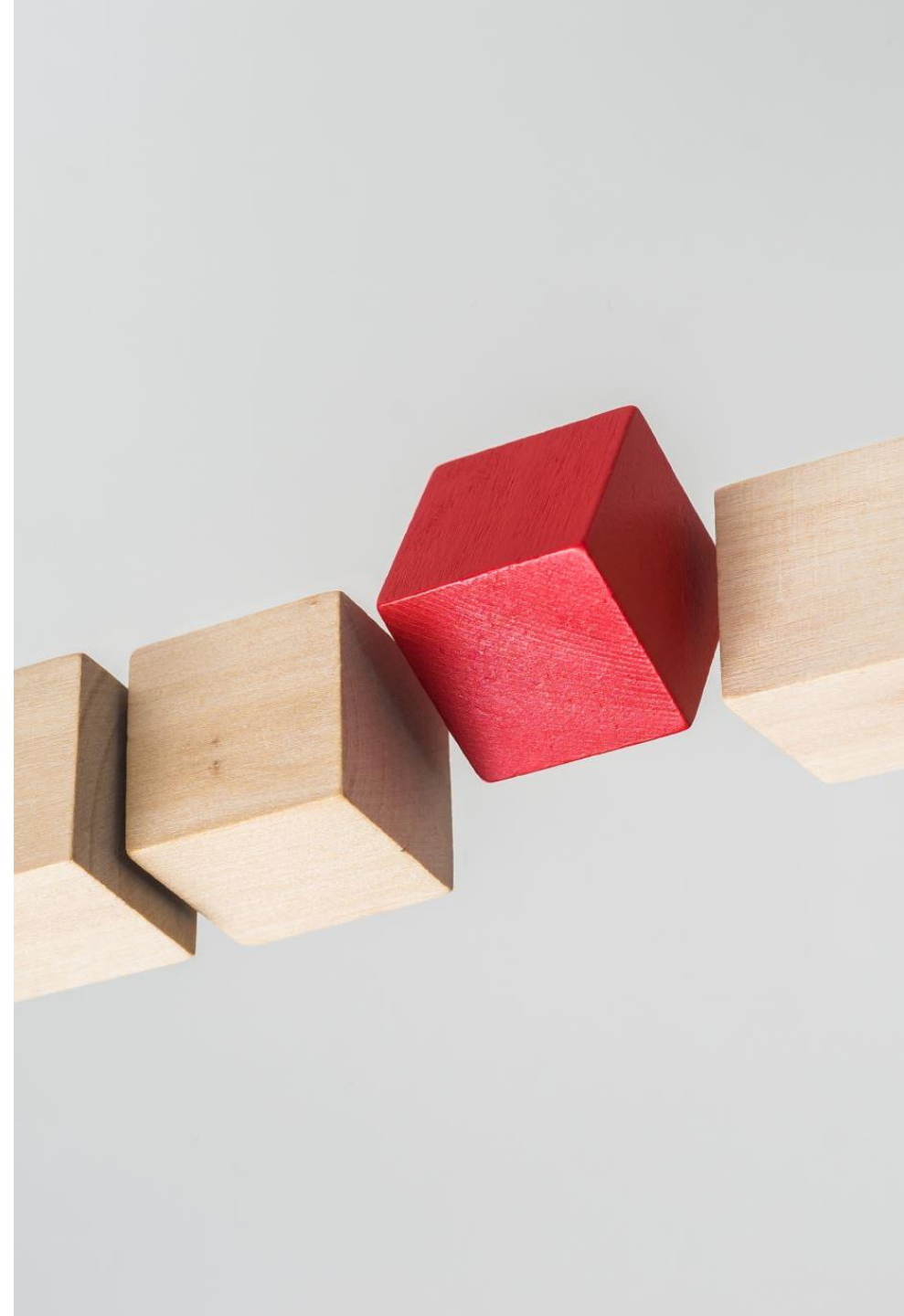


# CD-4

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**ROKEYA RAHMAN**

**TOPIC: MATH INTEGRATION IN ECE**



# Agenda

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- Welcome
- Math in Early Childhood Classroom
- Developmental Stages of Math
- Integrating Math Activities into the Curriculum
- Creating partnership with Families
- The Teacher's Role
- Individual Activity
- Upcoming Assignment

# Learning Objectives

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The student will be able to:

- ✓ Define key terms related to math
- ✓ Discuss math for young children and relate stages of child development to math learning
- ✓ Plan and prepare environment that support early mathematics
- ✓ Integrate and create math activities appropriate for young children
- ✓ Create math activities appropriate for children
- ✓ Analyze the teacher's role in promoting math experiences in the classroom.

# Review ECE Domains

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According to Preschool Learning Foundation, Vol # 1,2,3 – There are several standards/domain in ECE field in California:

- Social-Emotional Development
- Language and Literacy
- English Language Development (for English Learner)
- Mathematics
- Visual and Performing Arts
- Physical Development
- Health
- History and Social Science
- Science

# Curriculum Area

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- Language and Literacy
- Art and Music
- Social studies and Dramatic Play
- Sensor Play
- Science
- Math
- Fine motor and Manipulatives
- Gross motor and outdoor Play
- Construction: Blocks and Wood Working
- STEAM education

# Early Math in the ECE

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- Math is everywhere
- Daily living provides a math-rich environment
- Math must be hands-on and DAP
- Teach math in a context that has a purpose to the child
- Focus on conceptual math, not pencil-and-paper
- Not limited to a specific period or time of day
- Relationships and repetition are key to math learning

(Beaver, Wyatt, and Jackman, 2017, p. 261)

# Math Defined

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## □ Early Mathematics:

- It refers to exposure to and interaction with materials that contribute to the acquisition of knowledge about the underlying concept of mathematics.
- When child development and mathematics are mentioned together, Jean Piaget, Lev Vygotsky, and Howard Gardner come to mind.

(Beaver, Wyatt, and Jackman, 2017, p. 262)

# Math Defined (continued)

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□ **Jean Piaget** mentioned about two types of knowledge children learn:

1. **Physical Knowledge:** Learning about objects in the environment and their characteristics, such as color, weight, and size.
2. **Logico-Mathematical Knowledge:** Includes relationships everyone constructs to make sense out of the world and to organize information.

(Beaver, Wyatt, and Jackman, 2017, p. 262)



# Math Defined (continued)

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## □ Lev Vygotsky

- ✓ Skills learned from those who have more skills
- ✓ Zone of proximal development

## □ Howard Gardner

- ✓ Logical-mathematical intelligence

(Beaver, Wyatt, and Jackman, 2017, p. 249)

# Developmental Stages of Math

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- ❑ Young children understand math in relationship to how it affects them.
- ❑ Infant discovers the shape of the object by putting it into their mouth.
- ❑ Toddler can let you know his/her age by showing two fingers.
- ❑ Three-years-old likes to sing a number song.
- ❑ Four-years-old counts 1,2,3,4,5,6.
- ❑ Five-years-old show his/her block building is.

(Beaver, Wyatt, and Jackman, 2017, p. 249)

# Developmental Stages of Math

(continued)

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□ Early Math Knowledge includes skills and concepts related to

- Number and Operations
- Geometry & Spatial Sense
- Measurement
- Patterns, Functions, and Algebra
- Data Analysis and Probability
- Problem Solving (Beaver, Wyatt, and Jackman, 2017, p. 263-269)

# Math Concept

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## ☐ Numbers and Operations

1. Number sense
2. One-to-one correspondence
3. Cardinality

(Beaver, Wyatt, and Jackman, 2017, p. 265)

## ☐ Rational Counting

- ✓ rote counting
- ✓ rational counting

## ☐ Classifying and sorting

- ✓ Grouping objects by a common characteristic or attribute— size, shape, or color

# Math Concept (continued)

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## □ Patterns, functions, and algebra

### ➤ Pattern:

- Sequence of numbers, colors, objects, sounds, shapes, or movements that repeat in the same order over and over

### ➤ Seriation

- Seriation or ordering of objects is based on the ability to place them in logical sequence, such as smallest to largest, or shortest to tallest.

(Beaver, Wyatt, and Jackman, 2017, p. 266)

# Math Concept (continued)

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## □ Early geometry and spatial sense

### ➤ Geometry:

- The area of mathematics that involves shapes, size, space, position, direction, and movement.

### ➤ Spatial Sense:

- Comparisons that help children develop an awareness of themselves in relation to people and objects in space, such as exploration using boxes.

(Beaver, Wyatt, and Jackman, 2017, p. 267)

# Math Concept (continued)

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## ➤ Measurement:

- Finding the length, height, and weight of an object using units like inches, feet, and pounds.

## ➤ Data analysis and probability

- Graphs and charts

## ➤ Problem solving

- The process of mathematics Involves finding a solution for a problem that is not known in advance. (Beaver, Wyatt, and Jackman, 2017, p. 267)

# Planning and Preparing Environment

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## ❑ Materials for Developing Math

### Concepts:

- Balance
- Bingo card
- Blocks
- Calendar
- Calculators
- Clock with numbers
- Puzzles

- Geometric shapes
- Magnetic Board
- Table games
- Board games
- Objects to count: seashells, bottle caps, paperclips, pennies, nuts and bolts, craft sticks.

(Beaver, Wyatt, and Jackman, 2017, p. 270)



# Integrating Math Activities into the Curriculum

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## □ Math and Science:

- ✓ Sort collections of shells, magnets, leaves, seeds, and rocks.
- ✓ Make graph with children, such as – graph daily temperature
- ✓ Have Children count the number of legs on insects.
- ✓ Use children's literature to integrate math and science concepts in the curriculum.
- ✓ Observe and graph plants growth and make a water chart.

(Beaver, Wyatt, and Jackman, 2017, p. 272)

# Integrating Math Activities into the Curriculum (continued)

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## ❑ Math and Cooking:

- ✓ Have cooking activity and measure and count ingredients.
- ✓ Extend dramatic play and Math by adding different materials.
- ✓ Involve children in counting, one-to-one correspondence, pattern, measurement, reading a recipe, temperature, weight, height, etc.
- ✓ Baking activity with safety precaution.

(Beaver, Wyatt, and Jackman, 2017, p. 272)

# Integrating Math Activities into the Curriculum (continued)

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## ❑ Math and Art

✓Teacher may add art project to the math activities. For example- Make an “All About Me” book, where children will include their weight, height, shoe size etc.

✓Teacher may draw outline around children’s body, compare their sizes, and draw other features.

(Beaver, Wyatt, and Jackman, 2017, p. 272)

# Integrating Math Activities into the Curriculum (continued)

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## □ Math and Language and Literacy:

- ✓ Teacher may select math books or types of genres to read to the children.
- ✓ Have the children read and discuss during the group time.
- ✓ Teacher may offer other math related activities such flannel board story, finger plays, music and movement, such as- five little monkeys.

(Beaver, Wyatt, and Jackman, 2017, p. 272)

# Diversity in Math Play

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❑ Many different disabilities can affect children's math learning and performance.

❑ **Four methods of instruction are suggested:**

1. Systematic and explicit instruction uses a detailed approach
2. Prompting children by using solution-oriented questions and rebus charts.
3. Peer tutoring
4. Use visual representation such as manipulative, pictures, graphs, and number lines etc. to teach mathematical concepts.

(Beaver, Wyatt, and Jackman, 2017, p. 277)

# Diversity in Math Play (continued)

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## □ Strategies to provide accommodation and modification:

- ✓ Block distractions with partitions or place children facing the wall instead of busy classroom.
- ✓ Place the activity on a tray with a smaller container.
- ✓ Tape a pegboard against the wall to strengthen arm and shoulder muscles.
- ✓ Glue knob handles on top of puzzle pieces to make them easier to grip.

(Beaver, Wyatt, and Jackman, 2017, p. 278)

# Creating Partnerships with Families

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- ❑ Encourage your child to sort and classify objects with you, such as laundry, dishes, fruits and vegetables etc.
- ❑ Children can learn math concepts during setting up table for dinner, organize dishes, such as how many forks and spoons?
- ❑ Children also can learn spatial concepts, sequencing and patterning by setting the table.

(Beaver, Wyatt, and Jackman, 2017, p. 278)

# The Teacher's Role

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## □ Guidance in Math Play:

- ✓ Let children know that there may be more than one way to problem solve in math.
- ✓ Break down a project when a child is overwhelmed.
- ✓ Describe the steps in clear terms.
- ✓ Hand pieces of manipulative toy one by one to a child who is easily distracted.
- ✓ Allow time for math discovery
- ✓ Plan appropriate activities
- ✓ Allow materials to be used in all areas (Beaver, Wyatt, and Jackman, 2017, p. 278)



# Review: Lesson Plan (Preschool age: 3–5)

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## □ Curriculum Areas:

- Language & Literacy
- Dramatic Play
- Visual Art
- Music and Movement
- Math
- Social Science
- Social Studies
- Nutrition
- Science

## □ Domains:

- Social-Emotional Development
- Language and Literacy
- English-Language Development
- Mathematics
- Visual and Performing Arts
- Physical Development
- Health
- History-Social Science

# Upcoming Assignments

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- ☐ Read PowerPoint Presentation Slides on Math Integration in ECE
- ☐ Read and Explore other Recourses
- ☐ Visit Canvas Modules for Updates and Announcements
- ☐ Complete Weekly Assignments