

Unit 6 – Mathematics

Key Topic 2: Getting to Know Environments and Materials That Support Mathematics

Focus Statement

Students become familiar with environmental arrangements and materials that can be used to support children’s development and learning in mathematics.

Before You Start

The following are suggested considerations for one of the active learning segments found later in this key topic:

- **Putting it together:** In this segment, students review photographs of preschool classrooms to identify examples of environments and materials that support children’s mathematical development. Video clips could also be used, but photographs might be easier for students who do not have a lot of background or experience in early mathematics.

Information Delivery

The following content from the *California Preschool Curriculum Framework, Volume 1* (PCF, V1) could be used as part of an introduction to or review of mathematics for students when they begin this key topic:

- Overview of how young children construct mathematical knowledge from infancy through their preschool years (pp. 232-233)
- Importance of the teacher’s role in everyday classroom practices, including helping “children build their knowledge and skills of mathematics over time by providing a mathematically rich environment, by modeling mathematical thinking and reasoning, and by introducing children to the language of math” (p. 233)
- Examples of how the physical environment and materials support children’s active construction of mathematical concepts (pp. 232-233)

Active Learning**Getting it started**

Begin by having students review the environments and materials section in the mathematics domain (PCF, V1, pp. 237-239). Explain that there are six major strategies related to environments and materials listed in bold-faced type and that each strategy includes some descriptors and examples. Ask the students to imagine that they are setting up a new preschool classroom. Which strategy should be uppermost in their minds?

Keeping it going

Ask students to group themselves according to the strategy they selected. Explain that the students have 15 minutes to prepare a five-minute presentation explaining how their choice supports children's mathematical development. They are to include concrete examples of what that strategy would look like in a classroom.

If one or more of the strategies were not selected by any students, have a full class discussion about how children's mathematical knowledge and skills are fostered by the strategy and some examples of the strategy.

Taking it further

Have students review the mathematics strands and substrands and list them on one axis of a grid. Then have them write the environments and materials on the other axis and think about which of those might support different substrands. A sample grid is provided following this key topic. Students can then place an "X" on the grid where they see a connection. Make sure students understand that they may see multiple connections for a specific environment or materials. Students can work on the grids individually or in groups.

Review the completed grids with the whole class. As students identify where they saw a substrand supported by a specific environment or material, ask them to explain why.

Putting it together

Show students photographs of different areas of preschool classrooms and ask them to identify examples of any of the mathematical environments and materials described in the PCF, V1. You may choose to show the photographs to the entire class and have students comment on all of them, or you

may provide specific photographs to groups of students to work on together.

Have students summarize examinations of the photographs with the following points:



Slide 2

- Descriptions of the examples of the environmental arrangements or materials they observed
- How these examples demonstrated planning by the teacher
- How these examples promoted children's development of mathematical knowledge and skills
- One or two suggestions for other environments or materials

Reflection

There are two sets of reflective questions offered for this key topic. The first specifically addresses the environment and materials in the mathematics domain:



Slides 3-4

- When thinking about planning the environment and materials for a preschool program to support children's development of mathematical knowledge and skills, which ideas stood out for you?
- Which ones seem to be easier to implement? Which ones might pose more challenges?
- What considerations should you keep in mind for ensuring that the environment and materials support children who are learning English or have disabilities to progress in their mathematical development?
- Where might you find additional support in setting up the environment and materials in a classroom to foster children's mathematical learning?

The second set of questions is more general and can be used in this and other key topics:



Slide 5

- What ideas stood out most for you today?
- Which ones reinforced what you have already learned or experienced? Which ones gave you a new perspective or insight?

- How might you apply a new perspective to your work now or in the future?
- What further information or support do you need?
- What first step do you need to take?

Deeper Understanding

Discuss with students the importance of ensuring that all children in their classrooms have access to mathematics learning experiences and the critical role that language plays in children’s development of a conceptual framework of mathematics. Have students write a short paper on what teachers should plan in the environment and materials to support children who are English learners. Students may use two of the mathematics guiding principles as starting points (i.e., “Provide an environment rich in language, and introduce preschool children to the language of mathematics” and “Support English learners in developing mathematical knowledge as they concurrently acquire English,” PCF, V1, p. 235).

Students might also use one or more of the following resources:

- “Teacher Resources” (PCF, V1, p. 297)
- “References” (PCF, V1, pp. 298-299)
- Interviews with preschool teachers
- The resource guide *Preschool English Learners: Principles and Practices to Promote Language, Literacy, and Learning (Second Edition)*

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Environments and Materials →	Enrich the environment with objects and materials that promote mathematical growth	Integrate math-related materials in all interest areas	Provide real-life settings to investigate	Use materials and objects that are relevant and meaningful to the children in your group	Use children's books to explore mathematics with children	Be intentional and mindful in setting up and using the physical environment
Strands and Substrands ↓						
Strand: Number Sense						
1.0 Understanding Number and Quantity						
2.0 Understanding Number Relationships and Operations						
Strand: Algebra and Functions						
1.0 Classification						
2.0 Patterning						
Strand: Measurement						
1.0 Compare, Order, and Measure Objects						
Strand: Geometry						
1.0 Shapes						
2.0 Positions in Space						
Strand: Mathematical Reasoning						
1.0 Promoting Mathematical Reasoning and Problem Solving						

Mathematics:
Handout 1 – Getting to Know Environments and Materials That Support Mathematics