

## **Mathematics:** **Piecing Together the Mathematics Domain Puzzle**

<b>Strands:</b>	<i>Number Sense</i>	<i>Algebra and Functions</i>	<i>Measurement</i>	<i>Geometry</i>	<i>Mathematical Reasoning</i>
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### **GETTING READY**

**Instructional Component(s):** In-Class Activity; Assessment

**Strands:** This activity can be used to develop familiarity with and deepen understanding of all math strands or of individual strands.

**Focus:** Students become familiar with the organization and content of the mathematics foundations.

### **AFTER PARTICIPATING IN THIS ACTIVITY**

Students will demonstrate **knowledge** and **skills** that are consistent with an increased understanding and application of the concepts addressed in this activity.

**Students will demonstrate an understanding of:**

- The foundations in mathematics, including strands, substrands, foundations, and examples of foundations (introductory understanding) (*Standards 1, 5, & 6*)\*

**Students will be able to:**

- Demonstrate and discuss the different knowledge and skills contained in the foundations in mathematics, including identifying examples of the foundations at different ages in preschool development (*Standards 1, 5, & 6*)\*

\*See Appendix A

## **Mathematics: Piecing Together the Mathematics Domain Puzzle**

### **Before you start**

This activity is designed to help students become familiar with the content and organization of the mathematics domain of the foundations. This exercise is useful as a beginning exploration of these foundations or at the end of study as an assessment. It also could be used at any point in the process of familiarization as a self-assessment.

Create puzzles for your students by pulling the foundations apart. One way to make your own puzzle is to make a large card for each strand: *Number Sense, Algebra and Functions, Measurement, Geometry, and Mathematical Reasoning*. Then make a paper strip for each of the substrands under each strand and then strips for the foundations under the substrands. A template has been created and is available at the end of this activity. It is helpful to put each set into an envelope that can easily be distributed to groups or individual students.

### **Getting it started**

Distribute sets of the foundations that have been assembled in envelopes. You will need as many sets as there will be groups, pairs, or, if they will do this individually, individual students.

Ask your students to reassemble the sets. For each strand, ask students to place appropriate substrands under or next to it. Next ask them to place appropriate foundations under or next to the substrands.

### **Keeping it going**

If you choose to do this with small groups, five groups would give each group a chance to focus on one strand. Instead of having each group limited to one strand, you could also have each group rotate through the five strands.

### **Putting it together**

If your exploration of the foundations takes place over several weeks, you could also have students explore one strand each week.



Slides 2-3

Ask students to reflect on their experience.

- Were some strands easier to put together than others? Why do you think this is so?
- What was most challenging? Most fun?

- Can you think of a way to do this with family members in an evening group meeting?
- Can you think of examples they have seen of one or two of the foundations in each strand?
- Which substrand do you want to know more about? How could you find out more about that strand?

**Taking it further**

Students can prioritize the substrands according to which strands they believe are most important for teachers to know about and be able to work on.

Where do they see the most need for teachers to support development in the children they work with?

**Assessment**

Putting the puzzle together could be used as an assessment activity. If this is done as an assessment, students' work can be checked and recorded as appropriate to your particular needs and procedures.

For example, if students are doing this early in their work on the math domain of the foundations, you might want to allow students the support of being able to check their work with the *California Preschool Learning Foundations, Volume 1 (PLF, V1)*. Another form of support is to allow them to check the work of a peer or the work of other groups.

This also could be used before beginning work with the math foundations, using the publication as a guide, and then again after working with them as an assessment, without using the publication as a guide. Upon completion, students should check all of their work with the publication.

<i>Number Sense</i>	
<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
Children begin to understand numbers and quantities in their everyday environment.	Children expand their understanding of numbers and quantities in their everyday environment.
Recite numbers in order to ten with increasing accuracy.	Recite numbers in order to twenty with increasing accuracy.
Begin to recognize and name a few written numerals.	Recognize and know the name of some written numerals
Identify, without counting, the number of objects in a collection of up to three objects (i.e., subitize).	Identify, without counting, the number of objects in a collection of up to four objects (i.e., subitize).
Count up to five objects, using one-to-one correspondence (one object for each number word) with increasing accuracy.	Count up to ten objects, using one-to-one correspondence (one object for each number word) with increasing accuracy.
Use the number name of the last object counted to answer the question, “How many . . . ?”	Understand, when counting, that the number name of the last object counted represents the total number of objects in the group (i.e., cardinality).
Children begin to understand number relationships and operations in their everyday environment.	Children expand their understanding of number relationships and operations in their everyday environment.
Compare visually (with or without counting) two groups of objects that are obviously equal or nonequal and communicate, “more” or “same.”	Compare, by counting or matching, two groups of up to five objects and communicate, “more,” “same as,” or “fewer” (or “less”).

Understand that adding to (or taking away) one or more objects from a group will increase (or decrease) the number of objects in the group.	Understand that adding one or taking away one changes the number in a small group of objects by exactly one.
Understand that putting two groups of objects together will make a bigger group.	Understand that putting two groups of objects together will make a bigger group and that a group of objects can be taken apart into smaller groups.
Solve simple addition and subtraction problems nonverbally (and often verbally) with a very small number of objects (sums up to 4 or 5).	Solve simple addition and subtraction problems with a small number of objects (sums up to 10), usually by counting.

<b>Algebra and Functions</b> <i>(Classification and Patterning)</i>	
<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
Children begin to sort and classify objects in their everyday environment.	Children expand their understanding of sorting and classifying objects in their everyday environment.
Sort and classify objects by one attribute into two or more groups, with increasing accuracy.	Sort and classify objects by one or more attributes, into two or more groups, with increasing accuracy (e.g., may sort first by one attribute and then by another attribute).
Children begin to recognize simple, repeating patterns.	Children expand their knowledge of simple, repeating patterns.
Begin to identify or recognize a simple repeating pattern.	Recognize and duplicate simple repeating patterns.
Attempt to create a simple repeating pattern or participate in making one.	Begin to extend and create simple repeating patterns.

<i>Measurement</i>	
<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
Children begin to compare and order objects.	Children expand their understanding of comparing, ordering, and measuring objects.
Demonstrate awareness that objects can be compared by length, weight, or capacity, by noting gross differences, using words such as <i>bigger, longer, heavier, or taller</i> , or by placing objects side by side to compare length.	Compare two objects by length, weight, or capacity directly (e.g., putting objects side by side) or indirectly (e.g., using a third object).
Order three objects by size.	Order four or more objects by size.
	Measure length using multiple duplicates of the same-size concrete units laid end to end.

<i>Geometry</i>	
<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
Children begin to identify and use common shapes in their everyday environment.	Children identify and use a variety of shapes in their everyday environment.
Identify simple two-dimensional shapes, such as a circle and square.	Identify, describe, and construct a variety of different shapes, including variations of a circle, triangle, rectangle, square, and other shapes.
Use individual shapes to represent different elements of a picture or design.	Combine different shapes to create a picture or design.
Children begin to understand positions in space.	Children expand their understanding of positions in space.
Identify positions of objects and people in space, such as in/on/ under, up/down, and inside/outside.	Identify positions of objects and people in space, including in/on/ under, up/down, inside/outside, beside/between, and in front/behind.

<i>Mathematical Reasoning</i>	
<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
Children use mathematical thinking to solve problems that arise in their everyday environment.	Children expand the use of mathematical thinking to solve problems that arise in their everyday environment.
Begin to apply simple mathematical strategies to solve problems in their environment.	Identify and apply a variety of mathematical strategies to solve problems in their environment.