



stage 4: ten as a unit

Big Idea: Hierarchical Groupings

Hierarchical Groupings is the idea that amounts can be grouped into a system of sets and subsets. We can count 11 objects and group them into 1 ten and 1 one, or we can call them 11 ones. One hundred seventy-nine represents 1 hundred, 7 tens and 9 ones. It is the concept that a group of things can also be one thing – one unit – at the same time.

In order to progress mathematically students need to be able to perceive the place value structure of a number – they need to be able to understand what larger numbers mean. They need to understand that 273 is 2 groups of one hundred and 7 groups of tens and 3 ones. Without understanding this structure, 273 is just the number that comes after 272 and before 274. While this may be correct, it does not represent the sufficient understanding children need in order to use what they know for more complex number manipulations.

There are other examples of hierarchical groupings, further illustrating why this is an important Big Idea. Time, for example, is organized in terms of seconds, minutes, hours, days and so on. Sixty seconds equals one minute, 60 minutes equals one hour, and 24 hours equals one day. Time is a particularly complex system for children to master because it involves the base ten number system as well as the unique hierarchical grouping of the temporal system. Furthermore, the grouping amounts for each step of the hierarchy may be different; 60 minutes equals 1 hour, but 60 hours does not equal 1 day.

Why are Hierarchical Groupings Important?

A student who does not have a strong understanding of Hierarchical Groupings may have difficulty answering the question, “Which number is larger, 79 or 81?” He might think 79 is larger because the 7 and the 9 combined make 16, while the 8 and the 1 combined only make 9. Or the 9 is larger than the 1, concluding that 79 is more than 81. Such conceptions indicate a lack of understanding that the 7 in 79 equals 7 tens and the 8 in 81 is the same as 8 tens. The understanding of how these numbers are composed in the base-ten place-value system is foundational to success with multi-digit addition and subtraction where students must compose larger numbers in addition and decompose them for subtraction.

In Stage 4, the student sees what parts combine to make 10, composes and decomposes 10 in multiple ways, and experiences 11-19 as a bundle of 10 and some more. As in Stage 3 with combinations 0-5, Symphony Math provides a multitude of examples for the student to master combinations to 10. Ten is a benchmark number, and the tasks in Stage 4 are scaffolded to help a student use it as such when composing and decomposing numbers. Counting can become a hindrance when working with large numbers; Stage 4 aims to help students rely on strategies with 10 when solving problems instead.



Stage 4 Learning Progression

Concept	Standard	Example	Description
4.1: Introducing 10	K.OA.4	$8 + 2 = ?$	Students find the number that makes 10 when added to any given number 0-9.
4.2: Combinations of 10	K.OA.4	$1 + ? = 3$	Providing additional opportunities to learn how numbers combine to make 10, SubStage 4.2 combines missing addends, missing sums, and the commutative property with the goal being that students become fluent with these pairs; more automatic in recognizing the parts of 10.
4.3: Ten Plus	K.NBT.1	$10 + 4 = ?$	Once a child recognizes that ten ones make one unit of 10, he is ready to add on to 10 and enter the teens. Without counting, he forms a bundle of ten, and sees the leftovers as number that is that many more than 10. He is able to compose numbers from 11-19 into ones and some further ones.
4.4: Subtracting with 10	1.OA.4	$3 - ? = 1$	Connect addition and subtraction relative to the number 10. Understand subtraction as an unknown-addend problem. For example, subtract $10 - 8$ by finding the number that makes 10 when added on to 8.

Using the Extra Practice Worksheets

The Symphony Math Worksheets provide extended practice using the Multiples Ways of Knowing from the Symphony Math program. Students should work through all worksheets in the order given:

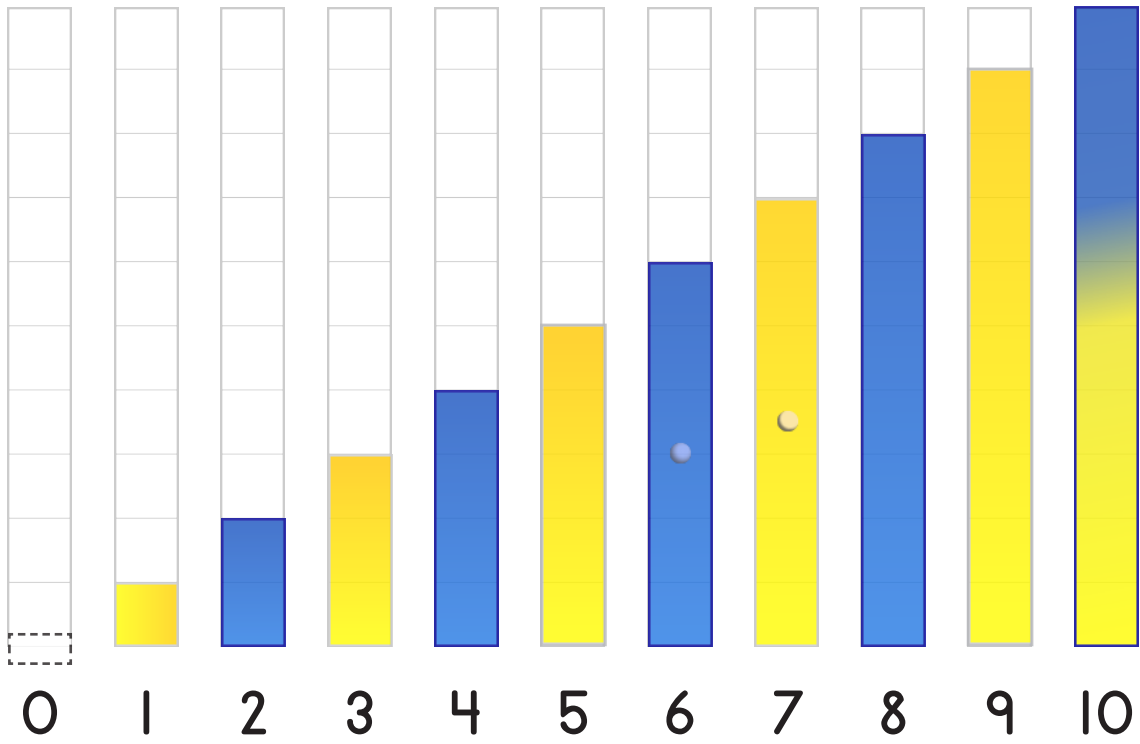
Worksheet	Purpose	Instructions
Manipulatives	Use a visual model to represent the concept.	Create bars, dot cards, or number lines for each item.
Bridge	Connect symbols to their visual representations.	Create objects, numbers, and symbols to complete each item.
Symbols	Understand the concept at the abstract level.	Create numbers and symbols to complete each item.
Apply	Extend understanding to real-life problem solving.	<ol style="list-style-type: none"> 1) Read the story presented at the top of the page. 2) Create a number model of the full solution. 3) Write the number sentence that matches the model.

Group Learning

The Symphony Math Extra Practice materials are designed to promote a conversation about the Big Ideas in math. One-on-one or small group instruction with the materials is recommended for students who need more time to make connections between the mathematical concepts in the Stage and the application of those concepts in their math curriculum.



Symphony Bars: Stage 4



Dot Cards: Stage 4

