Mini-Map for M.EE.HS.N.CN.2.a

Subject: Mathematics
Number and Quantity—The Complex Number System (N.CN)
Grade: 9

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.HS.N.CN.2.a Use the commutative, associative, and distributive properties to add, subtract, and multiply whole numbers.	**M.N.CN.2.a** Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

Linkage Level Descriptions

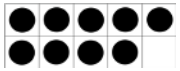
Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Communicate understanding of set by recognizing a group of objects sharing an attribute. Communicate understanding of a subset by recognizing a subset as a set or group of objects within a larger set that share an attribute.	Combine two or more sets to create a new set. Combine two shapes to create a new whole/shape. Solve repeated addition problems by adding the same number multiple times and determining the sum. Demonstrate addition by putting together objects from two sets to create a new set. Demonstrate multiplication by arranging objects into two or more equal groups and communicating that the number of groups times	Multiply numbers up to 12 by factors 1 to 5 and 10, using manipulatives or repeated addition. Add two numbers with a sum within 20 using objects, drawings, counters, or a mathematical equation, and communicate the sum by combining both the numbers.	Apply commutative (e.g., 3 + 4 = 4 + 3) and associative [e.g., (2 + 3) + 5 = (2 + 3) + 5] properties of addition to add two or more numbers. Apply commutative (e.g., 3 × 4 = 4 × 3), associative [e.g., (10 × 4) × 2 = 10 × (4 × 2)], and distributive properties [e.g., 10 × (4 + 2) = (10 × 4) + (10 × 2)] of multiplication as strategies to multiply two or more numbers.	Communicate understanding that the sum of three or more numbers is the same regardless of the grouping or order of addends, the product of three or more numbers is the same regardless of the grouping or order of factors, and multiplying a sum or difference by a given number yields the same result as multiplying each addend by the number and then sum or difference.

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
	the number of objects in each group equals the total number of objects.			

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

Using the properties of addition and multiplication requires a student to be able to recognize that two or more sets or groups of items exist. Work on this skill using a variety of sets. Help students recognize when items are grouped together into a set or separated out. The educator presents a set, labels it (e.g., two balls, one marker, three CDs), counts the items, labels it again, and encourages students to use numerals to label and count the separate sets. Use tools like the ten-frame to point out whole and parts (e.g., a row of 5 dots and a row of 4 dots are parts or subsets of 9).



How is the Distal Precursor related to the Target?

As students' understanding of labeling and counting sets develops, they will begin working on adding items to a set and combining sets to create a new set. Additionally, students will work on developing an understanding of equal shares by actively participating in one-to-one distribution of objects to person (e.g., giving each person in the group two pencils), objects to objects (e.g., given four counters, students line up four more counters in front of or on top of the first set), and objects to available space (e.g., given three chairs at a table, the student places a cup on the table for each available chair).

Instructional Resources

Released Testlets
See the Guide to Practice Activities and Released Testlets.
Using Untested (UN) Nodes
See the document Using Mini-Maps to Plan Instruction.

[Link to Text-Only Map]

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