CONSTRUCTING TASK: What Numbers Can You Make?

Approximately 1 day

**Adapted from Developing Number Concepts, Addition and Subtraction*

STANDARDS FOR MATHEMATICAL CONTENT

MCC.1.OA.3. Apply properties of operations as strategies to add and subtract.
Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2+ 10 = 12. (Associative property of addition.)

MCC.1.OA.4. Understand subtraction as an unknown-addend problem. For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.

MCC.1.OA.5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

MCC.1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).

MCC.1.MD.4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

The goal of this activity is for students to understand number combinations. There may be multiple ways to represent a number, but listen for how the students explain themselves.

ESSENTIAL QUESTIONS

- How can we show that addition and subtraction are related?
- How can we use different combinations of numbers and operations to represent the same quantity?
- How can decomposing a number help you?

MATERIALS

- Connecting cubes
- What Number Can You Make- Recording Sheet
- I Spy Addition- Game
- Deck of Playing Card

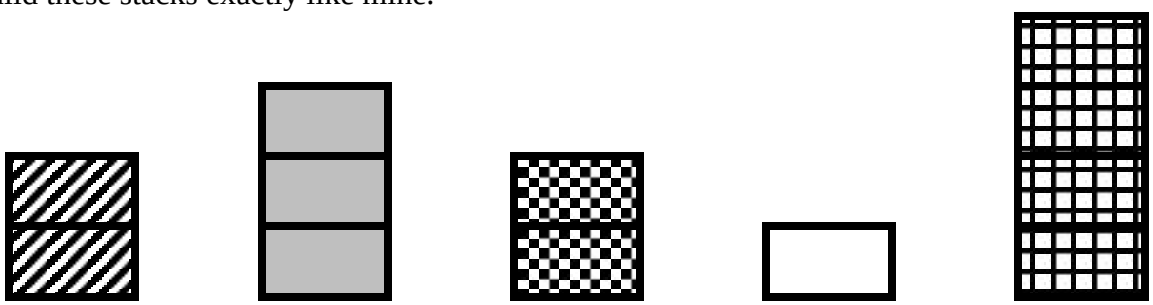
GROUPING

Depending on the story problem, this task could be solved with students working as a whole-class, small groups, or independently.

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I
Make 5 stacks of connecting cubes, each stack a different color and having no more than 5 cubes. Show your five stacks to the class and have them build the same stacks to match yours. For example:

"Build these stacks exactly like mine."



yellow **orange** **green** **blue** **red**

The object of this activity is to find out which numbers it is possible for children to combine using these stacks singly and in combination. The students may use more than one stack to

achieve their goal number, but they should not physically connect two stacks, nor should they disassemble a stack.

Once the group has built their five stacks, give them a number to create. Begin by asking them, "Can you pick up four?" Most of your students will achieve this by picking up the red stack. Then ask the students if there are any other ways that they can pick up four. You are looking for students to pick up more than more stack, such as the orange and blue stacks or the yellow and green stacks. Ask your students to show example how they know that they have picked up the correct number. This will help them to communicate their strategies and to reinforce the Standards for Mathematical Practice. Expected responses could be, "The yellow stack has two and the green stack has two. Two and two makes four cubes.

Continue this practice building other numbers, each time recording the number sentences on the anchor chart.

This activity can be done over and over using different combinations of stacks. Pose questions such as:

- What happens if you didn't have a "one" stack?
- What would happen if all the stacks had the same number of cubes?
- What is the largest number we could make?
- What is the smallest number we could make?

Part II
Have the students repeat the activity using their five cube trains to make each of the numbers from one to ten in as many ways as possible. However, this time, have them record their results by making a table on the "What Numbers Can You Make?" recording sheet. If they can't make a particular number, they do not fill in anything for that number. If they can make the number, they record each combination they use to make it, example 2+3. Note that some combinations will be repeated if children have different colored trains of the same length.

Part III
Students should work with a partner to play, *I Spy Addition* to increase fluency with addition. Students will need a deck of playing cards, with face cards removed. Aces will count as 1. Arrange the cards face up in 5 rows with each row containing 8 cards. Player one will find a number combination and tell player two ONLY the sum. *I spy two cards that add to 12.* Player two looks for 2 cards next to each other, horizontally, vertically or diagonally that create a combination with the same sum that player one saw. It does not have to be the exact match that player one spotted, as long as the combination shares the same sum. If player two finds the combination, they get to pick up the cards. If player two cannot find the combination, player one gets to pick up the cards. As cards are picked up, the remaining cards are shifted to fill in the

spaces. Play will continue until all that cards have been collected. The winner is the player with the most cards.

FORMATIVE ASSESSMENT QUESTIONS

- According to your graph, which numbers are you able to create the most ways? Why do you think that is?
- What number did you use often to construct larger numbers?
- Does your graph look like your neighbors? Why do you think?

DIFFERENTIATION

Extension

- Have students work with more cube trains, giving them more variety in their number.
- Allow students to go above 10.

Intervention

- Have the students us a smaller number of cube trains. This will limit the variety of ways to create a number.
- Begin with only making combinations of numbers up to five.

What Numbers Can You Make?

Sum	Number Combinations				
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

I Spy Combinations - Addition

Purpose:

The purpose of this activity is to help students develop fluent recall of number combinations to 20.

Number of Players:

2 Players

What you need:

- A deck of playing cards, with face cards removed. Aces will count as 1.

What to do:

- Arrange the cards face up in 5 rows with each row containing 8 cards.
- Player one will find a number combination and tell player two ONLY the sum. *I spy two cards that add to 12*
- Player two looks for 2 cards next to each other, horizontally, vertically or diagonally that create a combination with the same sum that player one saw. It does not have to be the exact match that player one spotted, as long as the combination shares the same sum.
- If player two finds the combination, they get to pick up the cards. If player two cannot find the combination, player one gets to pick up the cards.
- As cards are picked up, the remaining cards are shifted to fill in the spaces.
- Play will continue until all that cards have been collected.
- The winner is the player with the most cards.

Extension:

- Students will create number combinations using three cards in a row.