CONSTRUCTING TASK: **Building Trains** (Addition/Combining)

Approximately 1 day and repeated through centers (adapted from Chris Confer's "Snap It" found in Teaching Number Sense)

STANDARDS FOR MATHEMATICAL CONTENT

MCCK.OA.1 Represent addition and subtraction with objects, fingers, mental images, drawings[1], sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.

MCCK.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).

MCCK.OA.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.

MCCK.OA.5 Fluently add and subtract within 5

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
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

"When parts of a set are known, addition is used to name the whole in terms of the parts." (Van de Walle & Lovin 2006) *Building Trains* allows children to focus on a single number for the entire activity. It is important to give the children time to work on a single number (usually to 4 or 5, at first) throughout the activity, allowing them opportunities to explore through a variety of materials and methods of joining or separating. As their understanding of concepts develops, encourage students to extend their understanding with higher numbers. Allowing students multiple opportunities to participate in these types of activities, gives them the chance to think about number relationships in a relaxed setting (Burns 2007; Van de Walle & Lovin 2006).

This activity reinforces the concept of addition (and the inverse, subtraction) through part-part-whole models. For students to see the two parts and the whole, the two parts must be kept as two separate parts. For example, if using counters instead of connecting cubes, the two groups should be kept in separate piles or separated by color and/or using a part-part-whole mat.

ESSENTIAL QUESTIONS

- What happens when I join quantities together?
- What happens when some objects are taken away from a set of objects?
- How can I find the total when I put two quantities together?
- How can I find what is left over when I take one quantity away from another?
- How can I compare one quantity to another?
- How can I solve problems using objects, pictures, words, and words?
- How can I use models to represent addition and subtraction?
- What happens when sets are joined or separated?

MATERIALS

- Connecting cubes (up to 10 per student) or other manipulatives (2-sided counters, shapes, dominoes, to name a few.)
- *Ten Black Dots* (Donald Crews 1986) or similar counting book

GROUPING

Whole, Individual, Small group task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part 1 (Addition)
Before reading the book, *Ten Black Dots* by Donald Crews, or a similar book involving addition (see literature list for suggested titles), ask students to turn to a partner and show them "10" using their "math hands" (notice students who can show ten immediately and those who may count each finger or count on from 5 fingers). During reading, as you come to each number, ask students how many more black dots you would need to get to ten. (For example, on the page that says "*…Two dots can make the eyes of a fox or the eyes of keys that open locks.*" Say, "I see two black dots, how many more dots are needed to make ten?")

Part II
After reading, begin an investigation to explore number relationships within 5 (and later within 10). Give each student five connecting cubes. Explain that when you say, "Break", that is their cue to break the train of cubes into two equal parts. When they have separated their train of cubes, they will need to notice how many are in each group and share the combination they made with the class. Model for them how to share the combination ("I had 5 cubes. As I break my train in half, I am left with a set of 3 and a set of 2. So, 2 and 3 is equal to 5."). Practice the activity with the class and have a few students share their combinations. Once you see that students understand the activity, assign partners and give each set of partners a sum of cubes to work with according to their abilities (numbers within 5 or 10). Students will take turns breaking their trains in two parts and show them to their partners. The partner will then say the combination aloud and repeat the process after switching roles.

Have students write in their math journal about the activity they participated in today. Have them write down any patterns they noticed during the activity ("3 + 2 is the same as 2 + 3. So, it doesn't matter the order of the addends, the sum is the same.") and allow them to share their thinking. For students that have difficulty writing their math thinking, allow them to dictate to you or someone who can scribe their thoughts.

Part III (Five Tower Game)
"Five-Tower Game" (Burns 2007) Students will roll 2 dice, add the numbers that come up and build a tower with that many connecting cubes. Each partner repeats the process until five towers are made. Once the towers are made, the two students compare the number of cubes each person has. How do they know who has more? Less? In addition, questions such as the following can increase engagement in what seems to be a low level activity.

What is the greatest amount of cubes you could earn?
What is the smallest amount of cubes you could earn?
What is the difference in two towers?
Can you use all your cubes and make 2 equal towers? Can you justify your thinking?

FORMATIVE ASSESSMENT QUESTIONS

- Does the order of the addends change the sum? Explain your thinking.
- How do you know when your answer makes sense?

DIFFERENTIATION

Extension
- "Two out of Three" Game (Activity 2.17, page 50. Van de Walle)

Intervention
- Allow students to work with numbers that are appropriate for their performance level. If students are still counting using one-to-one correspondence, you may suggest that they use numbers smaller than five. For those that seem to quickly identify number relationships to five, suggest numbers to ten until they can quickly identify number relationships within ten.
- Allow students who are ready to record addition sentences to describe how they broke apart their trains.

Building Trains (Addition) Name:_____

	Is the same as		+	
	=		and	
	is equal to		+	
	and		Is the same as	
	+		=	
	+		=	