# **Constructing Task:** Add it Up!

Approximately 2 days

## STANDARDS FOR MATHEMATICAL CONTENT

**MCC2.OA.3.**Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

## 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.

*****Mathematical Practices 1 and 6 should be evident in EVERY lesson*****

## BACKGROUND KNOWLEDGE

(Information quoted from Van de Walle, Karp, and Bay-Williams, Elementary and Middle School Mathematics: Teaching Developmentally, page 266-267)

"An interesting category of number structures is that of odd and even numbers. Students will often observe that the sum of two even numbers is even, that the sum of two odd numbers is even, or that the sum of an even and odd number is always odd. Similar statements can be made about multiplication.

Students will provide a variety of interesting proofs of odd/even conjectures. As with other conjectures, they typically begin by trying lots of numbers. But here it is a bit easier to imagine that there just might be two numbers 'out there' that don't work. Then students turn to the definition or a model that illustrates the definition. For example, if a number is odd and you split in two, there will be a leftover. If you do this with the second odd number, it will have a leftover also. So if you put these two together, the two leftovers will go together so there won't be a leftover in the sum. Students frequently use models such as bars of snap cubes to strengthen their arguments."

## ESSENTIAL QUESTIONS

- How do I determine if a number is odd or even?
- What strategies can I use to tell if a number is odd or even?
- What is odd? What is even?
- What is repeated addition?

- How do I use what I know about odd and even to help me with repeated addition?

## MATERIALS

- Various manipulatives (counters, base-ten blocks, unifix cubes, beans) in bags. Need multiple bags with even number of items and multiple bags with an odd number of items
- Group Recording Sheet

## GROUPING

Whole Group, Small Group

## TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Special Note: This task will take a few days as students repeat the work several times. Each opportunity will provide students will more time to describe their thinking and deepen their conceptual understanding of how these two concepts connect.

**Part I**
Teacher will gather students together for large group work. In advance, the teacher should create multiple bags of even materials and multiple bags of odd bags. Guide students in making connections of what happens when we combine two bags with even amounts, what happens when we combine bags with odd amounts, what about when we combine bags with one of each. What is the result? Students will need to record their findings as they combine bags such as: Bag A had 7 and Bag B had 4, therefore adding an odd and an even number which resulted in an odd number; however when I combined Bag A with 7 and Bag C with 3, I had a total of 10 which I know is an even number. This is all with manipulatives, students are not writing the number sentences yet. Scaffolding the conversation to allow students to begin to see how odd sets do not all have partners, while even number sets do have partners. The teacher should allow time for students to predict whether the total will be odd or even and why they think the number will be odd or even.

**Part II**
After students have had extensive work describing all these combinations, go back to the bag combinations with writing addition sentences talking about addition sentences. This time students will connect the combinations with writing the number sentences, connecting repeating addition to even and odd. Use rich math language as you question students and repeat the questions about combinations. What are our addends? What do we know about those numbers? How will knowing if its even or odd help us determine the answer?

This task is one that can be moved to a center once students have had amble time in class discussion. This task is designed to be repeated several times.

## FORMATIVE ASSESSMENT QUESTIONS

- What strategies are you using to determine how many _____ are in your group?

- Can you show that answer in a different way?
- How can you demonstrate this with a picture?
- How could you write this in a number sentence?
- Do you have the same number of any of your objects? Why do you think this is the case?
- What makes a number even? What makes a number odd?
- How can knowing if a number is even or odd help you with addition sentences?
- What is an addend?

## DIFFERENTIATION

### Extension

- Students work independently to grab bags of items and justify their answers.

### Intervention

- Students use manipulatives to show their work.