Adding Game (grades 3+)

Lesson Goal:

- Together, the class will find and justify a winning strategy for the "Adding Game" for any given goal number. A *strategy* is a method by which a person can always win the game, no matter what the other player does. In this case, part of the strategy is also to decide if you would rather go first or second.

Format:

- Depending on the goals, this game could be played quickly and discussed informally (Adding Fluency, Reasoning, Problem-Solving). Or, additionally, students could spend time carefully writing down and justifying a strategy (Communication, Precision).
- Could work in pairs or run solely as a whole class discussion

The Adding Game Rules:

- Two players
- A player wins if he or she is the one to say the *goal number*. Let's start with goal of 27.
- The first player starts by saying a number 1-9.
- The second player can say add any number 1-9 to the existing number. *So if the first player says 3, what numbers could the second player say?*
- Players alternate and the person who says 27 **wins**.

Questions:

- What if my number was 33? Who can beat me? Do you want to go first or second?
- What if my number was 42? Who can beat me? Do you want to go first or second?
- What if my number was 40? Who can beat me? Do you want to go first or second?
- Does anyone think they can always beat me? What is the strategy? Will it always work? Why?
- For what goal numbers do you want to go first? For what goal numbers do you want to go second?

Grade Level Content

- Add fluently within 100 using mental math and strategies.
- Emphasis on groups of 10 reinforces understanding of place value and addition strategies
- Indirectly gets at division with remainder (remainder when divided by 10) and more generally when we further restrict the numbers we can say.
- Practices: Reasoning, Problem-Solving, Critiquing, Communication, Precision.

Extensions

- How would this game work if we can use the numbers 1-4? 1-6? 1-12? What does a winning strategy look like? For what numbers do you want to go first? Second? *You could either play the game with these constraints, or you could pose these questions for discussion.*

Resources: under the name *Got It,* general version described here: http://nrich.maths.org/1272/note