|  |  |  |  |
| --- | --- | --- | --- |
| **Time** | **What Students Will Do** | **What Teacher Will Do** | **Rationale** |
| 7 minutes | * Enter the room
* Sit with new partners from seating chart
* Do starter
* Hand in starter stapled to final draft of letter
 | * Read starter aloud: What grade do you think you deserve on your letter? Why?
* Tell them that I will take their self-assessment into advisement when I grade their letter
* Collect final draft of letter and starter
 | * Promotes self-reflection in students
* Students’ evaluations of their own work could inform how I grade their work
 |
| 2 minutes | * Listen to activity description
 | * Tell students that since they just spent so much time writing and working hard, we’re going to play a game as a class. In this game, I’m going to see if I can trick them. I’m going to think of a number that I’ll keep secret from all of them. Then they’re going to tell me what to do to the number (multiply, divide, add, or subtract), and I’ll tell them the final outcome. Then they’ll have to figure out what my secret number is.
 | * This game will teach students to work backwards to figure out a number, which is a helpful way to think of solving equations.
 |
| 4 minutes | * Three students will tell me what to do to the number
* Talk with groups to figure out the secret number
 | * Tell them we’re going to try this out now. I’ve got my secret number. Who wants to tell me what to do first?
* Call on three different students and write down what they say to do on the board. Do it in my head and tell them my final number.
* Tell them to take 2 minutes to work with their groups to figure out my secret number.
 | * Students will not be told any specific way to figure out my secret number. This will allow me to see how they are naturally going about solving the problem.
 |
| 8 minutes | * Share what they think the secret number is
* Depending on the rest of the class (see comments in teacher column), share methods of problem solving once or twice
 | * Ask groups to share what they think my secret number is
* If the whole class is able to figure it out, ask them to share their methods of problem solving
* If some groups are stuck, ask other groups to keep their problem solving method secret
* Do another round with the class. Have groups share their methods aloud. Write them on the board.
* Emphasize that you’re undoing each operation, –doing the opposite of each operation
 | * Students get two chances to figure out a way to solve the problem before we talk about working backwards
* Hearing other students’ methods will help students understand different ways of thinking about the problem
 |
| 6 minutes | * Play secret number game with partner
* Record thinking in math notebook
 | * Tell students to play a few rounds with their partner, switching off who is guessing the secret number.
* Ask them to record their thinking in their notebook
 | * By making students think of secret numbers, it deepens their understanding and gives the more practice
 |
| 7 minutes | * One pair will share one of their rounds of the secret number game
* Copy down the flow chart in their math notebooks
 | * Bring students back together
* Tell them that they’ve been doing something we call “working backwards”
* Ask for one pair to share what they did for one of their rounds with the class
* Rewrite their thinking on the board as a flow chart - tell the class that this is called a flow chart
* Show how you can use the flow chart to work backwards by doing the opposite of each step
 | * Although students have been doing this already, they now formally know that their problem solving method is called working backwards. By showing them a flow chart, it helps them organize their thoughts, which many students struggle with.
 |
| 4 minutes | * Tell the teacher how to work backwards with the flowchart
 | * Write another flow chart on the board
* Use it to work backwards as a class
 | * This follows the gradual release of responsibility method – I do, we do, you do. The previous row was the “I do” part, and this is the “we do” part, since the class is working backwards together with the teacher.
 |
| 14 minutes | * Work on number puzzles worksheet – draw flow charts if desired.
* Extension: Go on to the back of the worksheet
 | * Hand out number puzzles worksheet and ask students to work through the problems individually
* Ask them to show all their work on a separate sheet of paper
* They can draw flow charts if they want
 | * Students will get individual practice with working backwards. Although they do not know it, they are actually solving equations!
 |