Lesson Plan Template

Grade: 7th Grade

Subject: Algebra

Materials: Algebra Tokens

Technology Needed: ActiveBoard

Instructional Strategies:

- ☐ Direct instruction
- ☐ Guided practice
- ☐ Socratic Seminar
- ☐ Learning Centers
- ☐ Lecture
- ☐ Technology integration
- ☐ Other (list)
- ☐ Peer teaching/collaboration/ cooperative learning
- ☐ Visuals/Graphic organizers
- ☐ PBL
- ☐ Discussion/Debate
- ☐ Modeling

Guided Practices and Concrete Application:

- ☐ Large group activity
- ☐ Independent activity
- ☐ Simulations/Scenarios
- ☐ Other (list)
- ☐ Hands-on
- ☐ Technology integration
- ☐ Imitation/Repeat/Mimic

Explain: We will begin class with a large group discussion. Then students will try to solve a few problems on their own. We will use algebra tokens as a hands-on example.

Standard(s)

7.EE.1: Apply properties of operations as strategies to add and subtract linear expressions with rational coefficients with an emphasis on writing equivalent expressions.

Objective(s)

Students will be able to add and subtract linear expressions using tokens and an algebraic method.

Bloom's Taxonomy Cognitive Level: Applying, Analyzing, Evaluating, Creating

Differentiation

Below Proficiency: Students who are below proficiency may struggle to visualize what is going one when we try to represent expressions using the tokens. This will lead into more struggles when we are working with the algebraic method, and they will likely struggle to apply negative signs correctly. To help these students, I will encourage them to ask questions and work with their table when solving problems.

Above Proficiency: Students who are above proficiency will be comfortable with both methods. The token method may reinforce what they are already beginning to understand about combining like terms and writing algebraic expressions. This will help them to combine algebraic expressions using the second method as well. My challenge for these students will be to consider the "Open Middle" problem which I assign at the end of class. These students will also lead the discussions in their pods.

Approaching/Emerging Proficiency: Students who are approaching proficiency will likely enjoy the visual example of the tokens. Their biggest mistake in going from this to the algebraic method will likely be missing a negative sign, so I will encourage them to return to the visual example. These students will also be expected to participate in the class discussion and share ideas about the "Open Middle" problem.

Modalities/Learning Preferences: Visual, Hands-on, Written Problems

Classroom Management- (grouping(s), movement/transitions, etc.)

- Students will be expected to sit in pods and work with others around them.
- Students will also have independent work time during which they will be expected to work quietly.

Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.)

- Students will be expected to be respectful of the teacher and other students.
- Students will be expected to respect the contributions of others, especially during the "Open Middle" problem.

Minutes	Procedures
2-3 min	**Set-up/Prep:** The set-up for this lesson will consist of passing out an entrance slip to students as they enter. I will also hand out the algebra tokens at this time.
	Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.) As an opening activity, I will ask "have any of you every gotten a problem wrong due to missing a negative sign?" After students nod their heads, I will share with them that I have a way of fixing this problem. This method will include using tokens to add and subtract.

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	Now, I will have students model the expression 3x - 2x + 4 using their Algebra tokens. These tokens are two-sided, so students may represent both positive and negative numbers. The lighter side will correspond to positive numbers, and the darker side will correspond to negative numbers. Next, once students have created their representation, I will ask them if we can combine any terms in the expression. They should answer that we can combine the variable terms, and they will see that there are several variable tokens that can be "combined" which correspond to these terms. Finally, students will combine their tokens. They will pair each negative token with a positive token. These will "cancel out." Then, they will combine the remaining positive tokens and record their answer.
	Explain: (concepts, procedures, vocabulary, etc.) Once we have completed the first example, we will introduce problems where we must add and subtract entire expressions. First, we will try to add the expressions 5x + 3 and x + 5. Students will begin by representing each of these expressions using their tokens. Then, they will group these expressions with a "+." This sign represents how we will combine our expressions. Finally, students will be expected to combine tokens and record their answer. The solution here should be 6x + 8. As they work through the problem using tokens, I will be writing the steps for the algebraic method on the board. Once students have completed their work, we will use this to verify our solution. Students will see that we must combine like terms in order to simplify this expression. Then, we will try a subtraction problem. Students must subtract x + 4 from 2x + 2. They will begin by representing each expression with their tokens. Then, they will place a "-" in between the two groups of tokens. After this, they must change the subtraction sign to an addition sign. At the same time, they must flip the sign of the tokens in the second expression (i.e. they will have (2x + 2) + (-x – 4)). Finally, they must combine tokens and record their answer. In this problem, the solution will be x – 2. I will also work through this problem using the algebraic method. First, students will see that the first step of the token method is equivalent to distributing a -1 to the second expression. Then, they must combine like terms to simplify the expression.
	Explore: (independent, concreate practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions) Once we have finished going over problems as a large group, I will ask students to give me a thumbs-up or a thumbs-down describing how they feel about adding and subtracting linear expressions. After ensuring that no more questions remain, I will give them the opportunity to retry the entrance slip. As students are working, I will walk around the room to monitor progress and assist with any questions.
	Review (wrap up and transition to next activity): As a wrap up, I will ask students to try an "Open Middle" problem together. I will put the problem on the board, and then I will ask students how they might go about solving it. The problem will have multiple solutions, so this is meant to spark interest and encourage critical thinking about the topic we have covered. The problem is listed below. Find numbers 0-9 such that the following equation will be true. You may only use each number 1 time. (_x + _) – (_x + _) = 10x - 5

Formative Assessment: (linked to objectives) **Progress monitoring throughout lesson- clarifying questions, check-** **in strategies, etc.** I will monitor student progress by observing student responses during discussions. I will also use the work-time as an opportunity to walk around and observe student work. **Consideration for Back-up Plan:** If the ActiveBoard is not working, I will use the white board.	**Summative Assessment (linked back to objectives)** **End of lesson:** The summative assessment will be the entrance/exit slip. **If applicable- overall unit, chapter, concept, etc.:** N/A
Reflection (What went well? What did the students learn? How do you know? What changes would you make?):	

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Some of the strengths of this lesson were the way that it allowed students to visualize the connection between distributing a negative one into a parenthetical expression. It challenged both the high-achieving students and aided students who were struggling.

The only modification that I would consider is ensuring that I am providing visual diagrams throughout the lesson for students to follow. As I do this, it will be important to take my time to ensure that all students are able to keep up with the activity. This can be done by asking students for a “thumbs up” when they are ready, or it can be done as I walk around the classroom performing a formative assessment of progress.

This activity also was a great way for students to evaluate the ways that they prefer to simplify expressions. It gives them the opportunity for a self-assessment of their progress and their learning preferences.