

Lesson Plan Template

Grade: 9 th Grade	Subject: Algebra
Materials: notebook, pencil	Technology Needed: none
Instructional Strategies: <input type="checkbox"/> Direct instruction <input type="checkbox"/> Guided practice <input type="checkbox"/> Socratic Seminar <input type="checkbox"/> Learning Centers <input type="checkbox"/> Lecture <input type="checkbox"/> Technology integration <input type="checkbox"/> Other (list)	Guided Practices and Concrete Application: <input type="checkbox"/> Large group activity <input type="checkbox"/> Independent activity <input type="checkbox"/> Pairing/collaboration <input type="checkbox"/> Simulations/Scenarios <input type="checkbox"/> Other (list) Explain: We will begin class with a large group discussion. Then, once I have introduced the AC method, students will work in groups to solve problems.
Standard(s) HS.A.SSE.2: Use the structure of an equation to identify ways to rewrite it.	Differentiation <p>Below Proficiency: Students who are below proficiency may be overwhelmed by needing to learn three (or four depending on how to count it) ways of factoring polynomials. My goal will be for them to at least understand the most basic steps of factoring polynomials by the end of this lesson so that they could finish a problem when the terms are grouped for them. Then, I hope to give them a list of steps to follow that will help them successfully complete the AC method each time. This series of steps will help them see how to group the terms properly, and it will allow them to finish each problem. Finally, I hope that these students will benefit from asking questions and working with their peers.</p> <p>Above Proficiency: Students who are above proficiency should be comfortable with each of the three methods of factoring by the end of this lesson. They should be comfortable with transforming the expression once they have chosen the appropriate pair of factors for AC. Then, they should also be comfortable completing the factoring by using the grouping method. My challenge for these students will be to help other students to learn at least one thing about factoring. This may mean helping those who are below proficiency, but it also could mean bringing emerging students to a level above proficiency.</p> <p>Approaching/Emerging Proficiency: Students who are approaching proficiency should already be somewhat comfortable with the idea of using algebra tiles to factor and factoring by grouping. This will allow them to understand how to finish this process. They may get stuck on what to do once they have multiplied $A \cdot C$, but once they know how to transform the equation, they should be able to finish it. I will be walking around to help them, and I will also have other students in their groups help them as well.</p> <p>Modalities/Learning Preferences: Group work, establishing a formula for factoring trinomials, working on examples as a large group, real-world examples, working in groups</p>
Objective(s) Students will learn how to use the AC method to factor trinomials. "I can factor polynomials using the AC method." Bloom's Taxonomy Cognitive Level: Applying, Analyzing	
Classroom Management- (grouping(s), movement/transitions, etc.) <ul style="list-style-type: none"> • Students are expected to participate in the opening activity and respect the contributions of others • Students are expected to listen attentively to the teacher • Students are expected to work cooperatively with their group 	Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules, and expectations, etc.) <ul style="list-style-type: none"> • Students are expected to listen attentively to the teacher and other students • Students are expected to work productively and respectfully in their group • Students are expected to ask any questions they may have about the upcoming exam

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Minutes	Procedures
1 min	Set-up/Prep: To set up for this lesson, I will write a problem on the board for students to solve.
5 min	<p>Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.)</p> <p>“If two people are trying to construct a rectangular table using 1x1 stone slabs, what would the dimensions of the table be if the table has an area of $x^2 + 4x + 4$?”</p> <p>Students may try to solve this problem by drawing a picture of algebra tiles in their notes, like how we did in the previous lesson. They should arrive at the dimensions of $(x + 2)(x + 2)$.</p> <p>“In this lesson, we will try to find a new way to factor this problem.”</p>
15-20 min	<p>Explain: (concepts, procedures, vocabulary, etc.)</p> <p>Once we have covered the opening problem, I will ask if students have any ideas how else we might factor this expression. After waiting for responses, I will introduce the AC method. To use the AC method, first, we multiply the first and last coefficients. In this example, these are 1 and 4, so we will get 4. Then, we must find a pair of factors of 4 which will add up to our middle coefficient which is also 4. Our two choices are (2, 2) and (4, 1). The first pair adds up to 4, so we will choose this one. Next, we will break our equation up based on this choice so that we have two ‘x’ terms with 2 and 2 as their coefficients. This leaves us with the expression, $x^2 + 2x + 2x + 4$. Finally, we will factor this by grouping to get $x^2 + 2x + 2x + 4 = x(x + 2) + 2(x + 2) = (x + 2)(x + 2)$.</p> <p>Next, we will try a problem where the leading coefficient is not 1. We will try to factor $2x^2 + x - 6$. In this case, we will multiply 2 and -6 to get -12. Then, we will list all the pairs of factors for -12, that is (-1, 12), (1, -12), (-2, 6), (2, -6), (-3, 4), (3, -4). Then, we must find the pair of factors that adds to 1, which is the pair (-3, 4). Therefore, we rewrite our initial problem as $2x^2 + 4x - 3x - 6$. Then, we will factor this problem by grouping to get $2x^2 + 4x - 3x - 6 = 2x(x + 2) - 3(x + 2) = (2x - 3)(x + 2)$.</p> <p>Finally, in the general case for the polynomial $ax^2 + bx + c$, we will multiply $a \cdot c$. Then we will list all the pairs of two pairs of factors which multiply to get this number. Finally, we will choose the pair of factors that adds up to ‘b’. Then, we will conclude by factoring by grouping.</p>
15-20 min	<p>Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)</p> <p>Next, I will hand out a worksheet for students to work on in groups. I will assign groups and hand out the worksheet after I have done this. Then, I would ideally like for each student in the group to choose one problem to work on. Then, if they are struggling, they can ask others in the group for help, but for the first 3 minutes, students will be expected to work quietly on their own. Then, students will try to complete any remaining problems together once they can talk.</p> <p>Problems will include:</p> <p>$x^2 + 8x + 16$ $3x^2 + 9x - 12$ $2x^2 + 5x + 3$ $5x^2 + 3x - 14$</p> <p>Solutions:</p> <p>$(x + 4)(x + 4)$ $(3x + 4)(x - 3)$ $(2x + 1)(x + 3)$ $(5x - 7)(x + 2)$</p>
5 min	<p>Review (wrap up and transition to next activity):</p> <p>I will wrap up class by asking students if they have any questions about the day’s lesson. Then, I will ask if students have any questions about any topic in the Unit. Finally, I will remind them that the next lesson will be a review day before the test. They will be expected to come with any questions that they have for the test.</p>
<p>Formative Assessment: (linked to objectives) Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc. First, I will monitor how students are doing with the previous lesson based on their responses in the opening activity. Then, I will walk</p>	
<p>Summative Assessment (linked back to objectives) End of lesson: At the end of the lesson, I will collect work from each student. I will grade on completion, but I will also give feedback about anything they need to work on.</p>	

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around the classroom as students are working to gauge how well they are understanding the new material.

Consideration for Back-up Plan:

If students are struggling to understand the AC method, I may have them return to using algebra tiles. I will also encourage them to keep trying or to ask the students in their group to help them understand.

If applicable- overall unit, chapter, concept, etc.:

Students will need to be able to factor polynomials on the test. I will probably allow them to choose which method they want to use, but they should recognize that the AC method will be the most useful tool.

Reflection (What went well? What did the students learn? How do you know? What changes would you make?):