

Lesson Plan Template

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| 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) <input type="checkbox"/> Peer teaching/collaboration/cooperative learning <input type="checkbox"/> Visuals/Graphic organizers <input type="checkbox"/> PBL <input type="checkbox"/> Discussion/Debate <input type="checkbox"/> Modeling | | 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 first learn how to perform division of polynomials as group. Then, I will split students into groups where they will be assigned a problem to work on. Then, they will present their work to their group. | |
| Standard(s) HS.A.APR.2: Apply the Remainder Theorem. | | Differentiation <p>Below Proficiency: Students who are below proficiency may struggle to make the connection between integer and polynomial long division. They may become confused when they must try a problem on their own. To help with this I will walk around offering suggestions to get them started in their work. Then, I will also ask their peers in the group to try to patiently explain the material to them.</p> <p>Above Proficiency: Students who are above proficiency should quickly grasp the similarities between long division of integers and polynomials. I will have these students go first when they are presenting their work in groups, and I will also have these students try the longer, more challenging long division of polynomials. I will also ask these students to keep thinking about ways that they might apply long division.</p> <p>Approaching/Emerging Proficiency: Students who are approaching proficiency should be able to connect how this form of long division is very similar to the long division of integers. They may get stuck on problems where they need to include a “zero” term such as 0x in the dividend, but they should be able to figure out most of the other problems. I believe that having these students work in groups will help them to catch these mistakes.</p> <p>Modalities/Learning Preferences: comparing lesson to a previous skill, starting with simple examples of integer long division to demonstrate the process, working in groups, students presenting their work to each other to demonstrate the process</p> | |
| Objective(s) Students will learn how to divide and factor polynomials using the long division method. “I can perform polynomial long division on two polynomials, and I can use this to factor them.” Bloom’s Taxonomy Cognitive Level: Understanding, Applying | | | |
| Classroom Management- (grouping(s), movement/transitions, etc.) <ul style="list-style-type: none"> • Students will be expected to listen respectfully to the teacher and other students • Students will be expected to work quietly for the first half of the group time • Students will be expected to participate in the opening activity • Students will be expected to ask questions if they are confused | | Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules, and expectations, etc.) <ul style="list-style-type: none"> • Students are expected to listen respectfully to the teacher and other students • Students are expected to cooperate with their group and have a productive discussion • Students are expected to participate in group discussion by analyzing problems we are working on | |
| Minutes | Procedures | | |
| 1 min | Set-up/Prep: No set up is required. I simply will ask students to take out their notebooks and a writing utensil. | | |
| 5-7 min | Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.) | | |

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| | <p>For the opening activity, I will write several long division problems on the board such as $7462/7$ and $4593/8$. Students will be asked to solve these problems using long division. Then, I will tell them that polynomial long division is very similar to long division of integers.</p> |
| <p>10-15 min</p> | <p>Explain: (concepts, procedures, vocabulary, etc.) We will begin with a simple example. Will try to evaluate $(x^2 + 2x)/x$. We expect the quotient will be $x + 2$. However, we must show this by performing our long division. We will see how many times 'x' can "go into" x^2. Then, since it goes in evenly, we will be left to do the same thing with $2x$, just as we would do in integer long division. An example of this is show below to see what type of writing would be done on the board. Then, we will try another problem. This time, we will do a problem which will have a remainder at the end. The example will be $(x^2 + 5x + 6)/(x + 7)$. This time, we will again be trying to find how many times 'x' goes into x^2 to start. Then, when we perform our subtraction, we must multiply $x + 7$ by 'x' to find what we will write in the next line. We will repeat this process, but it may be simpler to look at the example below. When the problem ends with a remainder (a number that 'x' cannot divide evenly), this remainder will be written in the form $a/(x + 7)$ because 'a' is the remainder and $(x + 7)$ is the divisor in the case. Finally, I will explain to students that when we are doing a problem such as $(x^2 - 6)/(x + 5)$, we must also account for a $0x$ term in our dividend. This will allow the problem to work out more smoothly.</p> |
| <p>20 min</p> | <p>Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions) To practice working on dividing polynomials, I will have students break into groups. This time, I will allow students to choose their groups. They will work in groups of 3-4 students, and I will have groups ready to assign if students are unable to include everyone. In these groups, each student will be assigned a problem to work on. Then, once they have each completed their problem, they will have the opportunity to explain their problem to the rest of their group. If any student is struggling to finish their problem, I will have the group work together to solve this problem instead of having this student present, and this will allow the student the opportunity to see how to finish their problem. The problems assigned to each group will be $(x^2 + 4x - 5)/(x - 1)$ $(x^3 + 3x^2 + 7x + 2)/(x + 2)$ $(x^3 + 4x + 7)/(x - 3)$ $(x^2 - 7x + 4)/(x + 4)$ Solutions: 1) $x + 5$ 2) $x^2 + x + 5$ Remainder: -8 3) $x^2 + 3x + 13$ Remainder: 46 4) $x - 13$ Remainder: 56</p> |
| <p>5 min</p> | <p>Review (wrap up and transition to next activity): After students have had the chance to present their problems to the group, I will ask them if they have any questions about polynomial long division. If there are no questions, I will allow them a few minutes to get started on some of the problems I will assign out of the textbook for homework.</p> |
| <p>Formative Assessment: (linked to objectives) Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc. I will perform most of my progress monitoring by walking around to observe how each group of students is doing together. I will encourage even those who are struggling to find ways to contribute so that their peers can try to explain the concepts to them. Consideration for Back-up Plan: If students are struggling with performing long division, we will continue to work through problems as a large group.</p> | <p>Summative Assessment (linked back to objectives) End of lesson: At the end of the lesson, I will have students turn in their work so that I can see how they are doing. I will also try to assess how students are doing when they present their work to their groups. If applicable- overall unit, chapter, concept, etc.: Students need to be able to divide polynomials on the test. They will be permitted to choose which method they prefer.</p> |
| <p>Reflection (What went well? What did the students learn? How do you know? What changes would you make?):</p> | |

Polynomial Division

Long Division

$$\begin{array}{r} 2x^2 + x - 5 \\ x-3 \overline{) 2x^3 - 5x^2 - 8x + 15} \\ \underline{2x^3 - 6x^2} \\ x^2 - 8x \\ \underline{x^2 - 3x} \\ -5x + 15 \\ \underline{-5x + 15} \\ \text{Remainder } 0 \end{array}$$