

**Olivia Solomon**  
**9th Grade Algebra I**  
**Adding and Subtracting Polynomials**

---

**Adding and Subtracting Polynomials**

**Lesson Description**

**Grade Level**

9th Grade

**Lesson Goal**

Students will understand how to add and subtract polynomials by identifying each of a polynomial's terms by their specific degrees and coefficients and then performing addition or subtraction to successfully combine like terms.

**Lesson Objectives**

Students will be able to identify the degree and coefficient of each term of a polynomial expression.

Students will be able to add and subtract polynomial expressions.

**Materials**

Student materials: notebook, writing utensils, computer

Teacher materials: computer and/or iPad

**Accommodations**

Specific accommodations will be made on a case-by-case basis. In general, everyone has access to the presentation the day before the lesson is taught so students can look up words that confuse them and can ask me or their ESL/Special Education teacher questions from it. They also will be graded for completion and not correctness on the Playposit video, and during group work I will work with them separately to make sure they understood the Playposit video, as well as work with them on the group work questions.

**PDE Academic Standard**

Standard - CC.2.2.HS.D.3: Extend the knowledge of arithmetic operations and apply to polynomials.

**Tech Standard**

Empowered Learner: 2c

Digital Citizen: 2b

**Presentation Strategy**

Google Slides

**Practice of In-Class Activities**

This lesson's in-class activity is a video on the website titled Playposit, in which students will watch and interact with a Youtube video on adding and subtracting polynomials. This will work for students in the classroom and on Zoom because they can utilize their computers to complete it.

Upon completion, students will work with a small group (3-4 people) either in class or online in breakout rooms on a series of addition and subtraction problems with polynomials and students groups will be selected to share their answers at the end of class.

### **What the \_\_\_\_\_ does:**

#### **Student**

Students will come into class and complete the warm-up problems independently. They will then take notes as the teacher gives a brief lesson on adding and subtracting polynomials. They will then watch a video on adding and subtracting polynomials, followed by being guided through four examples with the teacher. Following this, students will complete three in-class assignments. The first one will be watching a video on Playposit independently, interacting with the questions on the video. The second one will be students playing with a project made on Scratch to review the concepts learned in class and in the video. The third one will be working on practice problems in groups, followed by a class discussion on the practice problems.

#### **Teacher**

I, the teacher, will give students time to work on the warm up questions, and then we will go over them briefly in a small discussion. I will then present students with the notes slides, wherein I will fill in information as I go (not all info on slides will be on class presentation so I can fill it in as we go). Following this, I will allow students time to work on their first two in-class activities with Playposit and Scratch, and during this time I will go around the room (and in breakout rooms online) to check progress and provide help to ELLs and those with special needs. After students complete these, I will launch the third activity for the groups to work on, and after the groups finish I will randomly assign groups to present their answers and explanation, either using the class white board or the zoom white board.

### **IT**

**Playposit** Video on Simplifying Polynomials

Class code for Playposit: 1518361-1066151

Link to video: <https://app.playpos.it/go/play/1250958/1518361/1066151/0/Simplifying-Polynomials>

**Scratch** tool for quick review on adding polynomials

Link to pre-made tool: <https://scratch.mit.edu/projects/153526238/>

### **EU & U**

#### **Ease of Use**

The ease of use for playposit used in this lesson is a 4 on the ease of use scale (1-4). This is because it's very easy to set up a student account and make use of the technology. This technology is a great way for students to watch and interact with videos, rather than just watching a video where they may not pay attention. In this program, they need to interact and answer the questions correctly. Overall, it's very easy to use and complete. As for scratch, I'd give ease of use as a four here as well, since students are utilizing someone else's project for review.

### **Usefulness**

Playposit would also be a 4 on the usefulness scale of 1-4. As stated before, students must interact with the video in addition to watching it. It is very useful to get students to interact with different ideas in the video, rather than just watching the video and potentially not paying attention. It's very useful in any class for any video and that's why it's rated as a four on the scale. As for scratch, I'd give it a four for usefulness, as it provides a cute way to review adding polynomials.

### **SAMR**

The SAMR level for this instructional technology of Playposit would fall under the augmentation category. Although it allows for a combination of technologies, it mostly fits under the augmentation category. I argue this because it highlights the key elements of an **increase in efficiency**, **digital resources** can be reused, and **digital submission**. By this, the task at hand is transformed to make technology an essential component, and it acts as a direct substitute for a similar in-class experience but here the technology allows for functional improvement and attention. Also, the SAMR level for scratch is substitution, since it acts as a direct tool substitute, **the technology is optional** for this review, and the **task will proceed if this is removed**.

**Olivia Solomon**  
**9th Grade Algebra I**  
**Multiplying Polynomials**

---

**Multiplying Polynomials**

**Lesson Description**

**Grade Level**

9th Grade

**Lesson Goal**

Students will understand how to multiply polynomials by utilizing the distributive property and the FOIL method. Students will utilize prior knowledge of identifying the degree and coefficient of each term of a polynomial expression to help them multiply terms.

**Lesson Objective**

Students will be able to multiply a polynomial expression by a constant, monomial, binomial, and/or another polynomial by the distributive property and the FOIL method.

**Materials**

Student materials: notebook, writing utensils, computer

Teacher materials: computer and/or iPad

**Accommodations**

Specific accommodations will be made on a case-by-case basis. In general, everyone has access to the presentation the day before the lesson is taught so students can look up words that confuse them and can ask me or their ESL/Special Education teacher questions from it. During group work, I will work with ESL students/Special needs students separately to make sure they understood the content taught during the lecture portion of class, as well as work with them on the group work questions.

**PDE Academic Standard**

Standard - CC.2.2.HS.D.1: Interpret the structure of expressions to represent a quantity in terms of its context.

**Tech Standard**

Digital Citizen 2b

Innovative Designer 4a

Global Collaborator 7b

**Presentation Strategy**

Google Slides

### **Practice of In-Class Activities**

The in-class activity for this lesson is that students will work with a small group (2-3 people) either in class or online in breakout rooms on a series of multiplying polynomial questions. Once completed, I will assign each group with a question to share with the class on the instructional technology Padlet, where one member of the group will post a photo of their work for a specific question along with a short explanation. Another member of the group will present their findings to the class.

### **What the \_\_\_\_\_ does:**

#### **Student**

In this lesson, the students will begin by answering warm-up questions. Following a brief discussion on warm up answers, students will take notes from the notes slides as I go over them. Following the short lecture and video, students will follow along as I complete practice problems. Next, we will break into the main in-class activity, where students will work in groups to complete a series of questions. Following their group work, I will assign students problems at random to report on. To do this, students will utilize the instructional technology Padlet to post a photo of their scratch work and a short explanation, followed by students explaining their work to the class.

#### **Teacher**

In this lesson, I, the teacher, will allow students time to answer the warm up questions, and follow it by a brief discussion with answers to the problems. Following this, I will go into the notes section of the lesson, wherein I will fill out slides as we go along. I will show students a video on multiplying polynomials, followed by some practice problems that students will help me solve. Next, I will assign students to complete the in-class activity with their groups (whether in-person or online), and as they work on that I will go around the room (in-person and into breakout rooms) to check student progress, working closely with ELLs and students with special needs to ensure they're on track and understand what was taught. Finally, I will assign student groups to present their findings on a particular practice problem, and I will offer my expertise in discussion and proper answers/methods.

### **IT**

#### **Padlet**

Link to Padlet: <https://padlet.com/omsolom15/7sfhy6soqcmh82>

Password: math

Students will share their answers to a specifically assigned practice problem.

### **EU & U**

#### **Ease of Use**

On the ease of use scale, Padlet is at a 4. I say this because it is incredibly easy to make use of the program without even making an account on the website. It's very easy to add information, including a photo, to the board, and it allows for great online collaboration for the hybrid classroom.

#### **Usefulness**

On the usefulness scale, Padlet is a 4 as well. I think this program is incredibly useful for any subject or any topic. It can be used in various ways, however I chose to use it to allow for online

collaboration amongst my students during a synchronous class. It changes the way that students share their ideas, and for that it's incredibly useful and a great program.

### **SAMR**

The SAMR level that Padlet plays in this lesson is modification. Padlet allows for significant task redesign because it transforms the way that students collaborate through the online classroom. This program highlights the SAMR key elements of **online collaboration, peer feedback, local audience**, and **combination of technologies**, because it allows for students to interact with each other by posting their ideas. By this, Padlet transforms this lesson into something better.

**Olivia Solomon**  
**9th Grade Algebra I**  
**Factoring Quadratic Polynomials**

---

**Factoring Quadratic Polynomials**

**Lesson Description**

**Grade Level**

9th Grade

**Lesson Goal**

Students will understand how to factor quadratic polynomials from a two-degree, three-term expression to two sets of parentheses with two terms in each, reversing the process they learned in the prior lesson of multiplying polynomials by using the FOIL method.

**Lesson Objective**

Students will be able to factor quadratic polynomials into two sets of parentheses with two terms each.

**Materials**

Student materials: notebook, writing utensils, computer

Teacher materials: computer and/or iPad

**Accommodations**

Specific accommodations will be made on a case-by-case basis. In general, everyone has access to the presentation the day before the lesson is taught so students can look up words that confuse them and can ask me or their ESL/Special Education teacher questions from it. During group work, I will work with ESL students/Special needs students separately to make sure they understood the content taught during the lecture portion of class, as well as work with them on the group work questions. I will also work more closely with these students on their individual practice problem and setting up their Flipgrid video. By this, their Flipgrid submission will be graded on completion and not by understanding or not, as I can work closely with them if they don't understand it.

**PDE Academic Standard**

Standard - CC.2.2.HS.D.2: Write expressions in equivalent forms to solve problems.

**Tech Standard**

Empowered Learner 1a

Digital Citizen 2a

Innovative Designer 4a

**Presentation Strategy**

Google Slides

### **Practice of In-Class Activities**

There are two in-class activities in this lesson. The first one is that students will work in groups of 2-3 either in the class or at home in breakout rooms on a series of factoring problems. Once completed, a representative from select groups will give their group's answer and thinking process utilizing the zoom white board feature. Then for the second in-class activity, students will each individually complete a different practice problem, checking for accuracy, and then uploading a video on Flipgrid of their scratch work and giving an explanation to their work.

### **What the \_\_\_\_\_ does:**

#### **Student**

In this lesson, students will start by watching the video on the presentation. We will then go into a somewhat lengthy notes section, where students will take notes and participate in lecture. Following this, students will follow along as I complete practice problems, again offering participation. Following this, students will complete two in-class activities. The first one will be working in groups on a few practice problems, and a quick verbal/visual discussion will take place upon completion. And for the second in-class activity, students will be assigned a personal trinomial that they must factor and check individually, and they must take their findings and create a video on Flipgrid that displays their work and they explain how they got what they did.

#### **Teacher**

In this lesson, I, the teacher, will start by playing the video on the presentation for students to watch, followed by the expensive notes section, which I will take my time on since factoring is important going forward. Following notes, I will lead students in some example problems, in which I will ask for their participation in going through them. Then, I will launch the activities for the students. Their first activity involves practice problems in groups. During this, I will go around the room (and in breakout rooms) to check student progress, as well as pay close attention to ELLs and students with special needs. Following this, I will ask student groups to volunteer to give their answers on the board/zoom white board and discuss it with the class. After discussion on the problems, I will launch the second activity, wherein I'll assign each student with a particular trinomial that they must individually factor and create a Flipgrid video explaining their work. Again, I will go around the room to check student progress, as well as check how students online are doing.

### **IT**

#### **Flipgrid**

Link to Activity: <https://flipgrid.com/82993ca0>

Students will upload a video showing and explaining their reasoning on an individual practice problem.

### **EU & U**

#### **Ease of Use**

Flipgrid is always easy to use for both teachers and students, so I would give this instructional technology a 4. It's easy to link to Google classroom and to invite students on the teacher side. On the student side, it's very easy to navigate the features and to record the video or audio. So overall, this technology is a great tool on the ease of use scale.



### **Usefulness**

Flipgrid is also an incredibly useful program, so I would give it a 4 as well. I believe that this instructional technology can be utilized for any grade level or subject area, and it can even be used for math to have students explain their reasoning by video and images. It's a useful way to check that students understand what's going on while they continually learn the concepts.

### **SAMR**

As for the SAMR model, I would call Flipgrid somewhere between augmentation and modification, however for this assignment I'll call it augmentation. Here, Flipgrid acts as a tool substitute in order to improve learning. Flipgrid allows for an **increase in efficiency** in not only learning and sharing ideas, but also in grading and me checking student understanding. It also falls under the key elements that the **digital resources can be reused** and **digital submission**, since these tools can be reused and modified, as well as digitally submitted. Overall, Flipgrid allowed for a great enhancement to the lesson!