# FRAYER MODEL (TEACHER GUIDE)

During the scavenger hunt, in the **top-left corner** of the Frayer Model handout, students are expected to write a definition of *polynomial expression* based on the video **Parts of Polynomial Expressions** they watch using the QR code.

If students need additional help writing their own definition, highlight the following information by breaking down terms and having a class discussion around what is a polynomial? What is a term? What is an expression?
**What is a polynomial expression?**

- **Polynomial**: "Poly" means many, "nomial" is term; therefore, polynomial means many terms.

  - **Term**: a single number or a variable, or numbers and variables multiplied together. The parts of the expression that are separated by + or − signs.

  - **Expression**: a term or a group of terms separated by plus or minus signs. Sidenote, it is only one side of an equation.

In the **top-right corner** of the Frayer Model handout, students are expected to write the steps for simplifying polynomials by adding or subtracting and what is the most important thing to remember when subtracting polynomials.

The following are key understandings to discuss:

- **How do we simplify polynomials?**

  - **Remove parenthesis.**

    - **Why do we remove parenthesis?**

      - Because we are multiplying each term inside parenthesis with a positive 1 when adding or negative 1 when subtracting (distributive property)

  - **Identify like terms**

    - **What are some strategies we can use to identify like terms?**

      - To identify like terms, color like terms using same color, put same shape around like terms, underline like terms with same number of lines, or use any identifying marking to determine groups that have same variable raised to same power.

- **What characteristics do you look for when identifying like terms?**

  - **The term takes the sign**. For example, $5x^{\square} - x^2$ , the subtraction in front of $x^2$ makes that term negative $x^2$ .

  - **Maintain exponent.** Pay attention to the exponents attached to the terms. Like terms have the same variable raised to the same power. Is $x^3 y^2$ the same as $x^2 y^3$? Why or what not? What would make them like terms?

  - Terms with the same variable (s) raised to the same powers

  - **Combine Like terms.**

  - **What does it mean to combine like terms?**

    - Add terms that are grouped by the same variable and power together to simplify into one term.

    - Do you combine constant terms with variable terms?

- **Write in standard form.**

  - **What is the standard form of a polynomial?**

    - Put the terms of the polynomial in descending order from highest power to the lowest power.

- **What is the most important thing to remember about subtracting polynomials?**

  - Change signs of the second polynomial correctly by distributing the negative one to all terms OR add the opposite of every term within the second expression.

**How are adding/subtracting polynomial expressions different? Similar?**

- **Different**: When subtracting, a negative one is distributed to each term within the second expression OR add the opposite of every term within the second expression.
- **Similar**: The steps are the same, distribute something to remove parentheses and identify and combine (add) like terms to simplify

In the **bottom left and right corner** of the Frayer Model handout, students are expected to simplify the polynomial expressions on the scavenger hunt QR code using either the vertical or horizontal methods. Students use the videos to show them how to use each method for both adding and subtracting polynomials. ***Once the students have completed their Frayer Model come back as a class and go over the answers on the handout.***