|  |  |
| --- | --- |
| Date:  | Duration of Lesson: 1 day |
| Title of Unit: Algebra | Title of Lesson: Introduction to Combining Like Terms |
| Lesson Objectives: I can identify and combine like terms in expressions and equations |
| Groupings (e.g., whole class, small groups, co-teaching): Small Group/Whole Group |
| Skills & Standards:  * [*CCSS.MATH.CONTENT.6.EE.A.1*](http://www.corestandards.org/Math/Content/6/EE/A/1/)  *Write and evaluate numerical expressions involving whole-number exponents.*
* [*CCSS.MATH.CONTENT.6.EE.A.2*](http://www.corestandards.org/Math/Content/6/EE/A/2/)  *Write, read, and evaluate expressions in which letters stand for numbers.*
* [*CCSS.MATH.CONTENT.6.EE.B.6*](http://www.corestandards.org/Math/Content/6/EE/B/6/)  *Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.*
* [*CCSS.MATH.CONTENT.7.NS.A.1*](http://www.corestandards.org/Math/Content/7/NS/A/1/)  *Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.*
 |
| **Progression of Learning & Teaching**  |
| Opener:  | * What are terms in an expression or equation? Provide students with expressions and equations and have them identify the terms in the examples
	+ $5x + 3x^{2 }+4 + 8x$
	+ $9x + 3 -2x = -4 $
	+ This will be used as a bell ringer.
	+ Discuss with students how they ‘KNOW’ which terms are the same (like) in the examples provided
 | **Points to Remember**  |
| Activities & Tasks:  | Students will be using algebra tiles to determine what terms are in an expression/equation and how to combine the like terms. After the exploration activity we will discuss as a group what we learned and be able accurately describe the process for combining like terms.Examples to use *add examples based on work done in class*:$$4x +1+x+5 $$$$2+3x+5x+4x+1 $$$$2+x^{2}+3x+2x^{2}+2$$$$x^{2}+1+2x^{2}+1+1+3x^{2}$$$$3x^{2}+1-4x^{2}+5-1$$During whole group discussion create an anchor chart with students’ definitions/patterns/rules for combining like terms | Resources: algebra tiles, note pageAlgebra tile Images if neededVocabulary: * **Equation**: A statement that shows the equality of two expressions by joining them with an equal sign.
* **Expressions**: Symbols that represent numbers or operations between numbers.
* Term: piece of an algebraic expression or equation; a number in a sequence or series; a product of real numbers and/or variables.
* Combine: adding/subtracting like terms using their coefficients (for variables) or constants to simplify an expression or equation
* Like term: Terms with the same variable and same exponent/powers
* Coefficient: A letter or number representing a numerical quantity attached to a term (usually at the beginning)
* Variable: A letter used to represent a numerical value in equations and expressions
* Exponent: The number that denotes repeated multiplication of a term shown as a superscript above that term.

  Monitoring/Scaffolding: Scaffold considerations:* If students have not previously used algebra tiles, model for them what each tile represents
* Provide an example of an expression and model using algebra tiles how to represent that expression
* Provide an example of an expression and have students represent it with their algebra tiles (individually) to check for understanding before students begin working in small groups
* Students may need a refresher that a variable without a coefficient written in front represents a coefficient of “1”. Provide examples of expressions such as $x^{2 }+ x^{2 }and that it simplifies to 2x^{2}$
 |
| Level of Cognitive Complexity:  | ☐ Creating ☐ Evaluating  ☐ Analyzing  | ☐ Applying ☐ Understanding ☐ Remembering  |
| Key questions:  | * How do you know if the terms are the same?
* What are the terms in an expression or equation?
* When is simplifying an equation or expression a better representation of an equivalent form?
 |
| Closure:  | For an exit slip students will answer two questions that ask them to identify and combine the like terms. Students may choose to draw algebra tiles as part of their rationaleExamples of exit slips problems$$4x^{2 }+ 3+x^{2}+1$$$$1+x^{2}+2+2x^{2}$$*And if students are ready for negative coefficients or constants*$$- x^{2}+2+2x^{2}-1$$$$- 2-4x^{2}+2x^{2}-1$$ |
| Next Steps:  | * Using exit slips from previous day address any obvious misconceptions with combining like terms that were evident in student work
* Next class consider providing students with examples and have them do an error analysis on combining like terms- where they identify the correct answer and what the student may have done in error
	+ Possible error analysis
		- $4x^{2 }+2 + 1 +x^{2  }simplified to 4x^{2 }+3$
		- $3x^{2}-2+4x^{2}simplified to 5x^{2 }$
 | **Formative Assessment Criteria for Success:** *Exit slips day one**Error analysis- day two*  |