**Molloy College**

**Division of Education**

**Lesson Plan Format**

**Heading for Coursework**

Student: Robin Posner Professor: R. Moroney

Course: EDU521 Date: 12/12/12

Grade: 9th grade Topic: Operations with Polynomials Content Area: Mathematics

**Instructional Objective(s)**

After practicing multiplication of two binomials problems in class, students will complete six binomial multiplication problems with less than 4 conceptual and/or computational errors.

Key concept: Students will demonstrate their knowledge of the two methods of binomial multiplication and identify similarities and differences.

**STANDARDS AND INDICATORS**

**Mathematics (CCCS) : Arithmetic with Polynomial and Rational Expressions**

**Students will understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.**

**Indicator:**

* **This will be evident when students interpret products of two binomials using the distributive property or the FOIL method to simplify the expression. *For example, simplify (2x+4)(3x-7)=2x(3x-7)+4(3x-7)=6x2-14x+12x-28 = 6x2-2x-28***

**MOTIVATION**

Assume your family is considering extending the size of your house and its current width is 12 meters and its current length is 10 meters.

10

12

Your family is not yet sure how much they wish to extend the house so they assume its width is to be extended *x* meters and that its length is to be extended *y* meters

*y*

10

12

*x*

The new width of the house will be (12 + *x*) and the new length of the house will be (10 + *y*).

Your family wants to know what the new area would be with the extensions. Remember that area is equal to the length times the width. Therefore, our new area would be (12 + *x*)(10 + *y*).

Today we are going to learn how to simplify this type of expression; multiplication of two binomials.

**MATERIALS**

* Calculators
* An overhead projector/Mimio
* Textbooks
* Writing utensils
* Notes

**STRATEGIES**

* Direct instruction
* Teacher demonstration

**ADAPTATIONS**

* The student who has a learning disability in writing will be provided with a copy of the notes with all sections completed.
* The student who is an English language learner will be provided with essential vocabulary words prior to the lesson. Vocabulary words include multiply, variable, distribution, acronym, and binomial.

**DIFFERENTIATION OF INSTRUCTION**

* Less-ready students will be able to define binomial and perform one method of binomial multiplication with few errors while working in pairs.
* Able and ready students will be able to define binomial and perform and explain at least one method of binomial distribution with minimal errors while working in pairs.
* Very-ready students will be able to define binomial and perform, explain and master both methods of binomial multiplication with minimal errors while working in pairs.

**DEVELOPMENTAL PROCEDURES**

* Students will use the Distributive Property to simplify the product of two binomials. (*How can you use the Distributive Property with two binomials? Is it easy to organize your information? What are the important steps that you followed?)*
* Students will use the FOIL Method to simplify the product of two binomials. *(How can a diagram help you multiply two binomials? What essential steps were followed?)*
* Students will practice with 6 exercises (3 with the Distributive Property and 3 with the FOIL Method). *(Which method do you prefer to use? Is one more efficient than the other?)*
	+ Exercises:
		- Use the Distributive Property for the following problems:
			* (x + 3)(x + 6)
			* (2x – 5)(x + 3)
			* A rectangle has a length of x + 5 and a width of (x – 3). What is the area of the rectangle? Write your answer as a polynomial in standard form.
		- Use the FOIL Method for the following problems:
			* (x – 6)(x – 7)
			* (3p + 4)(2p + 5)
			* Explain how to use the FOIL Method to find the product of two binomials.

**ASSESSMENT**

* Students will use an exit card at the conclusion of lesson to simplify the given binomial expression by using one of the two methods. They will explain which one they prefer and why.

**INDEPENDENT PRACTICE**

* Following the lesson on multiplication of two binomials, students will solve various word problems using the Distributive Property or the FOIL Method.

**FOLLOW-UP: DIRECT TEACHER INTERVENTION AND ACADEMIC ENRICHMENT**

Direct Teacher Intervention

* The student and teacher will, together, use a sheet of paper to represent the area of a rectangle and add on pieces (of different color) to represent the variable.

Academic Enrichment

* The student will create a diagram of using more than one variable and compute the area of a cylinder in simplest form.

**TEACHER REFERENCES**

Charles, R. I., Hall, B., Kennedy, D., Bellman, A. E., Bragg, S. C., Handlin, W. G.,…Wiggins, G. (2012). *Algebra 1: Common core*. Boston, MA: Pearson Education, Inc.

*Multiplying binomial expressions: Motivation.* http://quiz.uprm.edu/tutorials/binomial/bin\_home.html

*Foil method to multiply binomials: Examples and practice with formula.* http://www.mathwarehouse.com/algebra/polynomial/foil-method-binomials.php