<u>Lesson Plan for Teaching the Core</u>

**Standard**: *6.EE.A4* Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

**Focus Question**: How can we show whether expressions are equivalent?

**SWBAT**: Students will be able to identify and create … the graphic organizer provides multiple points of entry

**Launch: 3 min**

Explain directions for completing the graphic organizer. Take questions.

Present the first 3 stages of a pattern.

**Explore 1: 15 minutes**

TPS: Draw the next 3 or stages of the pattern. Reveal w/ student work on doc reader or model on SB.

Directions/ Expectation of Outcome(s): Decide whether to work alone or w/ table mates about what part of the graphic organizer to complete next (expression, words, table). Will have to explain how at least 2 of the quadrants are related.

Circulate/ prepare for summary: Identify 2 students who correctly connected at least 2 representations, in different ways of thinking about it. Or, if a struggling kid, how class can help them create their expression/next part. (Use monitoring tool)

**Summary 1: 5 minutes**

Describe how any 2 of your quadrants are connected (represent the same information). Specifically, how does your model relates to your expression, table and/or words?

**Launch 2: 2 minutes**

We used our table, words, and / or model to create an expression. I collected a few expressions from your class and from other classes. NOW we have to determine if these expressions are equivalent to this one (choose one we want to represent our class and one that is not in the list) / we have these 5 expressions… our job is to figure out if they are equivalent" You can use your model, your words or your table to determine, 1. If your expression is equivalent to these expressions, are these expressions equivalent to each other?

**Explore 2: 10 minutes**

Directions/ Expectation of Outcome(s): Which of these expressions (any, all?) are equivalent? How do you know? Is yours equivalent to these? How do we know? Prove it! Use number properties to prove it.

1. 2n + 2 (yes) – our target expression?
2. n + n + 1 + 1 (yes)
3. $n^2 + 2$ (no)
4. 2(n + 1) (yes)

5. 2(n + 2) (no)
6. 2(n + 2) – 2 (yes)
7. 3n + 5 – n – 3 (yes)
8. n + 1 – n – 1 (no)
9. 3(n + 1) – n – 1 (yes)

**Summarize 2: 7 minutes**

Getting at FQ: How did you determine if they expressions were equivalent? What are the strategies we used to determine if expressions were equivalent? What properties did we use to prove this?

**Exit Slip: 5 minutes**

Which of these expressions are equivalent? (provide a number of expressions) Explain how you know with words and numbers?

**Exit Slip Rubric for Grading**:

4 - exceeds standard by correctly identifying all equivalent expressions and provides a well developed, clearly written and accurate

3 – meets standard by correctly identifying all equivalent expressions and provides a written explanation that has a minor flaw in reasoning.

2 – approaching standard by partially identifying the equivalent expressions. Explanation is unclear, weak or incomplete.

1 – below standard by incorrectly identifying equivalent expressions. Explanation is unclear or incorrect.

**Materials:**

SmartBoard presentation, grid paper, graphic organizer, plain white paper, toothpicks (or some other manipulative to help students continue the pattern.

**Differentiation**:

Student choice; multiple points of entry: tiered questions (students have to prove that at least 3 of the expressions are equivalent or not. Other 2 are extensions); manipulatives: grid paper, toothpicks; heterogeneous grouping.

**Where this lesson fits in a scope and sequence:**

Throughout this unit of study students have created models, tables, algebraic expressions and used words to describe linear algebraic patterns. In these problem students will revisit the concept of describing linear algebraic patterns that lead to 2 or more equivalent expressions to provide for opportunities for deeper understanding.

**Advancing and Assessing Questions:**

Describe how do you see the pattern growing.

So I see you drew… try… (grounding them in the geometric reasoning)

Do the/ which of the expressions predict the same number of toothpicks in shape *n*?

Can you write another expression equivalent to these? Explain why they are equivalent. How can you prove this?

What property (ies) can you use to prove these expressions are equivalent.

Can you use an area model to demonstrate equivalence?

How may terms does the expression have?

What are the constants? Coefficients?

My Notes:

Day before: Review properties. Some of the stations.