Lesson Plan - Properties of Operations Week 2 Days 2-5

**Names of Students**: Grizel Macias and Rebecca Breeding

**Grade:** 8th

**Time Requirements:** Approximately 4.5 hours Preparation Time and 4 class periods.
**Source of the Lesson**: Mathematics Enhanced Scope and Sequence – Grade 8
 **Concept Statement**: Students will learn math properties such as commutative property of addition, commutative property of multiplication, associative property of addition, associative property of multiplication, additive identity, multiplicative identity, multiplicative property of zero,  distributive property, inverse property for addition and multiplication.

**State Standards Addressed**:
 8.EE.7, 8.EE.7a, 8.EE.7b
**ISTE Standards Addressed:**
 ISTE 1a, ISTE 2
ISTE 3b, 3c
ISTE 4a, 4b,4c,4d

**Specific Objectives**: The Students will be able to: develop an accurate understanding of properties of math used to solve an equation using the given materials.

TSWBA to accurately write linear equations from word problems using the materials given.

**Materials List**:
1 per person:

Worksheets of properties of operations

Examples of properties worksheets

1 per group:

 round robin cards

Math Manipulative: Versa-Tiles
 scissors

 glue

post-it notes

**Safety Considerations**: Do not cut yourself or your partners. Do not throw scissors. Only cut the paper given to cut.

**Week 2 Day 2**: Introduction to Properties of Operations—Inverse Properties and Properties of equality

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| Lesson Plan | What I Will Do | What Student Will Do | Questions To Ask |
| Engagement Time: \_3 min\_\_\_\_\_\*\*Hand out the pre-assessment to the students. Duration 5 min | Hello Class!I am Ms. Macias and Ms. Breeding. Today we will be making a charts about the properties of math operations But before lets answer these few questions. We will give you five minutes to answer them. We will ask for the one of the students in each table to collect the worksheets. We will pass and collect them.  | Students will say hello. Students will be answering the pre-assessment. One student for each table will be collecting the other student’s worksheets. |  |
| Explanation Time:\_\_15\_min\_\_\_\_\*\* Distribute copies of the Properties of Operations chart. One for each student.  | Properties of operations. What is a property? *A property is simply a true characteristic or attribute of something.* --We can include “property” in the vocabulary worksheet. We are going to fill the Properties of Operation charts together.  We will provide you with the definitions. First, we will write them in the board.Then we will give the students time to ask questions. After finishing the chart. The students will include their worksheet in the given foldable.  \*\*Divide the students into six groups.  | Students will brainstorm and come with an appropriate answer. Students will copy the definition in their chart in the area provided. The students will include the worksheet in a foldable.  | What are some of the properties you know in math? Name them.  |
| Exploration Time: \_6\_min\_\_ | Within your groups discuss the meaning of your property that was given(you have 3 minutes). One group will do: - Property of Equality. - Inverse property-\*\* Your definition can only be a simple sentence. Write it on the back of the page and choose one of the team members to be the speaker and present t their definition.  |  Students will be discussing, writing in a piece of paper and share their meaning of the given property. | Examples of their answers: Inverse property: when you do the opposite operation of a number you get Multiplication 1 and addition 0. Other way they call the inverse property is the “Undo” operation process.  Properties of equality for real numbers:  ax + b = cx + e To maintain the equality, whatever you do to the right side, you also do it to the left side.  |
| Elaboration Time:\_\_10\_\_min\_\_\_\*\* Distribute copies of the Examples of properties activity sheet to each student. Distribute the scissors to each student and say the safety concerns. Give each table 2 bottles of glue. | Now we want you to cut the examples of properties. We are going to give you five minutes to do it. After cutting the examples, match them with the properties. Do not Glue them yet. We will review your answers and then the students can glue it. Then glue them under the examples. If there are misunderstandings, we will address them.  | Students will be cutting and matching the examples with the properties. They will be gluing it to the given worksheet. Students will check their answers and then glue it.  |  |
| Evaluation Time:\_\_5 min\_\_\_\_\_ |   Now, write your own example of the properties. Which type of equation are most of the examples provided in the chart? (glued down)Today, you learned about properties of operations. Inverse property Properties of EqualityThank you for allowing us to be in your class. We will see you tomorrow.  | Students will write their answers in the appropriate box of the given worksheet. Students will be answering the question in the card provided.  |  |

**Week 2 Day 3**: Properties of Operations— Additive Inverse Properties and Properties of equality

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| Lesson Plan | What I Will Do | What Student Will Do | Questions To Ask |
| Engagement Time: \_2 min\_\_\_\_\_ | Hello Class!I am Ms. Macias and Ms. Breeding. Today we will be making a charts about the properties of math operations | Students will say hello.  |  |
| Exploration Time:\_\_15\_min\_\_\_\_\*\* Distribute copies of the Properties of Operations chart. One for each student.  | Small review: complete the two sentences Inverse property is…Properties of equalities are…We will create small discussion to hear the students’ answers. Today, we are going to be talking about ADDITION: Inverse property and Property of equality.We will provide you with the definitions. First, we will write them in the board.Then we will give the students time to ask questions. We will work together one example of each property. Then, the students will work an example by themselves. We will compare answers and clear any misunderstandings. After finishing the chart. The students will include their worksheet in the given foldable.  \*\*Divide the students into six groups.  | Students will brainstorm and come with an appropriate answer. Students will discuss their answers with their classmates. Students will copy the definition in their chart in the area provided. The students will work the examples provided on their own. The students will include the worksheet in a foldable.  | Can you give me an example of each property? How do you know it fits the specific property? \*\* We can give the students an example and they explain which properties we are using in each step. The properties are limited to inverse properties and properties of equality |
| Exploration Time: \_10\_min\_\_ | Within your groups discuss the meaning of your property that was given(you have 3 minutes). One group will do: - Addition Property of Equality. - Inverse property of Addition-\*\* Your definition can only be a simple sentence. Write it on the back of the page and choose one of the team members to be the speaker and present t their definition.  |  Students will be discussing, writing in a piece of paper and share their meaning of the given property. | Examples of their answers: Inverse property: when you do the opposite operation of a number you get 0. The inverse of addition is subtraction: x-x = 0.Other way they call the inverse property is the “Undo” operation process.  Properties of equality for real numbers:  ax + b = cx + e 0- b = 0 - bax +0 = cx + (e - b) To maintain the equality, what ever you do to the right side, you also do it to the left side.  |
| Elaboration Time:\_\_15\_\_min\_\_\_\*\* Distribute the math manipulative Versa tiles to each student. Distribute piece of paper to each students for them to write their justification.  | The students will work in teams:The students will solve one-step equations using the given worksheets and the math manipulative (VERSA TILES) provided. For Example: x – b = c or x + a = eAfter the students finish, we will compare the pattern each group has. Then we are going to talk over some of the mistakes/ problems the students had in solving the given problems | Students will work in teams answering the given questions. The students will provide justification for every step they do to solve the one-step equation.  | Walk around the classroom: Ask the students to not forget to write the justification. In the justification, the students should include the properties we review today.  |
| Evaluation Time:\_3 min\_\_\_\_\_ |   Now, write your own example of the properties. Which type of equation are most of the examples provided in the chart? Today, you learned about properties of operations. ADDITION: \* Inverse property \* Properties of EqualityThank you for allowing us to be in your class. We will see you tomorrow.  | Students will write their answers in the appropriate box of the given worksheet. Students will be answering the question in the card provided.  |  |

 **For Week 2 Days 4-5:** we will follow the same lesson as Day 2 but we are going to talk about different operations properties. **Week 2 Day 4:**  We will fill out the worksheet for MULTIPLICATIVE: Inverse property and property of equality. We will follow the same activities as Day 2. Most of the one-step equations that the students will solve are dealing with whole numbers. To illustrate: 4x=16 or (1/3) x= 9

**Week 2 Day 4:**  This lesson will be a continuation of Day 3: Multiplicative inverse property and property of equality.
This day our focus will be in solving equations that deal with improper fractions. This day we can fill out a vocabulary worksheet for proper functions. We will also talk about the different ways one can solve an equation: Substitution vs. isolating the variable.

**Extension to any of the above lessons:**

* **Writing prompts/Journal:** solve the equation x+4=21, and identify which properties you used for each step.
* Have students create examples demonstrating why the commutative property and associative property do not work for subtraction or division.
* Discuss the meaning of the words commutative and associative in the real world. (Commute, Associate).
* Solve one-equations using the versa-tiles showing the steps and justification of each step.
* Fill out the justification of an example already work out.