Lesson Title: Commutative, Associative, and Distributive Properties!

Grade Level: 3rd Grade, approximately 20 students at average grade level expectations, grouping in teams as well as individually for class discussion and participation.

Common Core Standards

3.OA.5 Apply properties of operations as strategies to multiply.

Goals/Rationale:  After reviewing the commutative, associative, and distributive properties using informational sheets, board work,a game of jeopardy using projection, and technology applications using iPads, students will be able to identify properties and utilize them to solve multiplication problems.

Objective:  Students will be able to categorize mathematical equations into an associative, commutative, or distributive property, as well as solve equations with knowledge of these properties.

1. Teacher Preparation & Materials
Print Worksheets for entire class

 Projector for worksheets

 Set up online jeopardy using:

 https://jeopardylabs.com/play/associate-commutative-distributive-and-identity-property-game

 Set up projector and laptop/iPad

1. Grouping Structures:

Whole class lesson for opening review, and core explanations. For Jeopardy students must be split into 3 even groups. After Jeopardy students will work silently on their worksheets.

1. Prior knowledge:

 At the beginning of the lesson, check for the student’s prior knowledge on properties by showing an example on the board of each property. Be sure to check students understanding of equations and common symbols.Select students who may know how to describe properties. Allow students to create discussion over their prior experience with properties, and how they are used to solve equations.

1. Instructions for Lesson
A. Check for prior knowledge of associative, commutative, and distributive properties. (See #3 prior knowledge)

 B. Pick a student to hand out descriptive worksheets over the properties (students are quiet.)

 C. Place Angry Bird Worksheets on projector to discuss one property at a time. Call two students to the board to draw one example of each property.

 D. After discussion of all properties and examples are given by students, divide class into three teams.

 E. Setup jeopardy on the projector via computer and website.

 F. Participate in a short game of Jeopardy with entire class. Students are to remain quiet until the question is done, and must raise hand when their team knows the answer.

 Example questions:

Which property is being used? 4x (7x10) = (4x7) x10

 Students may guess distributive property judging by the way the parentheses are placed, but they must explain answers and thought process behind their answer.

Correct answer: Associative Property, because the numbers are just being grouped differently in the equation.

True or False: The associative property works with both multiplication and addition.

Students may say false because they are focusing on multiplication during this exercise.

Correct Answer: True. The class may confuse answers between associative, commutative, and distributive properties. If students do not understand, provide evidence and explain the associative property in depth. Students who answer should justify answers given, give examples, and be able to explain strategies to the classroom.

(2 + 4) + 5  =  6 + 5  =  11 Has the same answer as this:2 + (4 + 5)  =  2 + 9  =  11

3 x (4x5) = 12 x 5 =60 Has the same answer as this: 3 x (4x5) = 3 x 20= 60

 G. When game is done, pass out worksheet for students (see attached.) If students finish early they can choose to solve the math problems on the property identifying worksheet, or read quietly. The teacher is to help students when struggling, or has a specific question.

H. Students who are done may use their time to work on iPads to practice with properties of math to solve equations.

Assessment type:

Formal- The collecting of the worksheets that students work on in class to identify

 equations with properties will enable the teacher to assess progress and comprehension over the three properties. Worksheets require students to identify properties of the listed math problems, and to solve math problems depending on amount of time and understanding.

Math Problems include:

1. (3x9)x7= (9x7) x3 4. 9(9+9)= (9x9)+(9x9)
 \_\_\_\_ \_\_\_\_
2. 1(2x4) = (1x2) + (1x4) 5. (32x2)= (2x32)

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1. (4x11)= (11x4) 6. 1(2+3)= (1x2)+(1x3) \_\_\_\_ \_\_\_\_

Students will categorize mathematical equations into an associative, commutative, or distributive property, as well as solve equations with knowledge of these properties. When categorizing has finished, students will use properties to solve equations using multiplication.

Post Assessment:

What did we learn today?

Review Assessments before release to next lesson. Do an equation on the board together discussing properties, and steps that we use to solve math problem. Challenge individual students to solve equations using the distributive property.

Board Question 1: (6+7) x1= ??

Projected Answer: (6+7)x1=??

 (6x1)+ (7x1) =??

 6x7=42

Board Question 2: (5+7)x6=??

Projected answer: (5+7)x6=

 (5x6) + (7x6) =??

 30+35= 65

Extension: Require students that have mastered properties to solve math problems on worksheet. Ask students to create their own examples of associative, commutative, and distributive properties and solve.

Accommodations for struggling Mathematicians:

Allow students to create their own visual representations for distributive multiplication. Allow students to use addition with the properties instead of multiplication to solve.

Students may use the Angry Birds work sheets as an example. Students may practice using the Distributive Property with symbols, shapes, or whatever helps visually represent the concepts of distributing numbers through parentheses. Ask student to explain visual representation.

Say: “Can you tell me how this problem is an example of the distributive property?”



