PROPERTIES OF OPERATIONS Addition & Subtraction





Make Learning Fun! Original song and video to introduce and reinforce the skill.







PROPERTIES OF OPERATIONS Addition & Subtraction

- I. Pedagogy
- 2. Lesson Plans
- 3. Vocabulary Cards
- 4. Anchor Chart: Switcheroo Property (Commutative Property)
- 5. Domino Switcheroo
- 6. Tablet Switcheroo/Burger Switcheroo
- 7. Anchor Chart: Friendship Property
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- 10. Number Line Mat
- II. Friendship Using a Number Line
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- 15. Fact Family Cute and Paste
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Properties of Operations

Understanding the properties of operations relies mostly on addition strategies. This is simply because the Commutative and Associative Properties are primarily used for addition equations. It is essential that students learn how to reason through addition and subtraction equations logically. As the equations become more complex or include more elements, this understanding of operations will help students break down more challenging equations in the future. Through understanding the Commutative and Associative Properties of operations, students will gain a deeper knowledge of how the numbers within an equation relate to one another and will be able to apply this knowledge universally. While the properties are formally named "Commutative" and "Associative," it is not necessary that students learn these formal terms.

In this unit, students will begin by learning about the Commutative Property, arguably the simpler of the two. This will be followed by learning the Associative Property. There are many math tools you can incorporate to help scaffold student learning, such as manipulatives and number lines. Subtraction will primarily be included with the Associative Property. Subtraction can be a tricky part of this standard because subtraction equations are typically unable to be simply rearranged and result in the same difference. This unit will focus largely on fact families. Understanding fact families is the best way to help students relate addition and subtraction facts to each other and to the properties of operations as a whole. Students will be able to identify how these properties work with numbers and will be able to apply their understanding of the concepts to solve equations in a more efficient and

<u>log</u>ical way.

Properties of Operations

Day 1: Introduce property of operations for addition

Mini Lesson: Introduce the purpose of the lesson today: to use properties of operations to solve addition equations.

- Show students the unit vocabulary cards.
- Watch the Property of Operations song.
- Introduce the "Switcheroo Strategy" anchor chart.
- Model the commutative (or Switcheroo) property using several dominos, writing the dominos' numbers into an addition equation, then showing the Switcheroo strategy
 - i.e., The domino's numbers are 2 and 4. The first equation is 2 + 4 = 6, so because of the Switcheroo strategy, 4 + 2 = 6. Make sure to narrate this reasoning as you do it.

Guided Practice: Hand out one or two dominos to each student and have them write two addition equations using their dominos. Ask a few students to share their equations and their reasoning.

Independent Practice: Students work on the Domino Switcheroo worksheet.

Day 2: Commutative property of operations for addition

Mini Lesson: Introduce the purpose of the lesson today: to use properties of operations to solve addition equations.

- Review the unit vocabulary cards.
- Watch the Property of Operations song.
- Review the "Switcheroo Strategy" Anchor Chart.
- Model the commutative (or Switcheroo) property using 2 different colored cubes or counters.
 - i.e., 7 + 2 = 2 + 7, making 7 + 2 using green cubes for 7 and red cubes for 2, then making the second equation with green cubes for 2 and red cubes for 7. Make sure to narrate this reasoning as you do it and how, no matter the order, they are the same sum.

Day 2 continued ...

Guided Practice: Pass out cubes to the students. Write up 5 equations on the board. One at a time, go through the equations as a class, making one equation out of cubes. Then, have students do a switcheroo and make the second equation.

Independent Practice: Students work on the Cut and Paste Switcheroo worksheet.

Day 3: Associative property of addition with manipulatives

Mini Lesson: Introduce the purpose of the lesson today: to use properties of operations to solve addition equations.

- Review the unit vocabulary cards.
- Watch the Property of Operations song.
- Introduce the "Friendship Strategy" anchor chart.
- Model the associative (or Friendship) property for a few equations using counters or cubes.
 - i.e., 7 + 3 + 2 = ____, add 7 + 3 to make 10, then add 2 to make 12. Then, show how you could add 3 + 2 to make 5, then add 7 to make 12. Make sure to narrate this reasoning as you do it.

Guided Practice: Hand out a Friendship solver card to each student. Have them solve both equations on their card using either manipulatives. Direct students to solve the circled numbers in the equations first. Then, ask them to compare the two equations and see if the sum is the same (it should be).

Independent Practice: Students work on the Friendship Road worksheet with the aid of their manipulatives.

Ogulio Bochoso

Hay 4: Associative property of addition using a number line

Mini Lesson: Introduce the purpose of the lesson today: to use properties of operations to solve addition equations.

- Review the unit vocabulary cards.
- Watch the Property of Operations song.
- Review the "Friendship Strategy" anchor chart.
- Model the associative (or Friendship) strategy for a few equations using a number line.
 - i.e., 5 + 4 + 5, narrate how you jump to 5, then jump 4 to 9, then jump 5 more to 14.
 Remind the students of the Friendship Strategy and show how you can also solve it by jumping to 5, then jumping 5 again to 10, then jumping 4 to 14.

Guided Practice: Pass out number lines to each student. Write out a few equations on the board. One at a time, solve the equations as a class, having each student use their number lines to help them solve the equations. After you have solved it one way, use the Friendship Strategy to solve it in a different order.

• If you do not already have printed and laminated number lines for each student, printable copies are included in this document.

Independent Practice: Students work on the Friendship number line worksheet.

Day 5: Associative property of addition and subtraction using fact families

Mini Lesson: Introduce the purpose of the lesson today: to use properties of operations to solve addition and subtraction equations with fact families.

- Review the unit vocabulary cards.
- Watch the Property of Operations song.
- Introduce the "Fact Family" anchor chart.
- Model completing one Fact Family House. Be sure to narrate how this connects to the "Friendship Strategy" but that you can use fact families for subtraction as well.

Guided Practice: Introduce the Fact Families mini-book. Review each page with the students before they begin their independent work on the mini-book.

Ogulie Bothes

Independent Practice: Students work on their Fact Family mini-books.

TDay 6: Associative property of addition and subtraction using fact families

Mini Lesson: Introduce the purpose of the lesson today: to use properties of operations to solve addition and subtraction equations with fact families.

- Review the unit vocabulary cards.
- Watch the Property of Operations song
- Review the "Fact Family" anchor chart
- Model completing one Fact Family House. Be sure to narrate how this connects to the "Friendship Strategy" but that you can use fact families for subtraction as well.

Guided Practice: Print out the "Fact Family House" anchor chart on a poster. As a class, have students solve what the facts within the fact family would be. Ask students to come up and write their facts.

Independent Practice: Students work on the fact families cut and paste worksheet.

Day 7: Review properties of operations

Mini Lesson: Introduce the purpose of the lesson today: to review properties of operations for addition and subtraction equations.

- Review the unit vocabulary cards.
- Watch the Property of Operations song
- Review the unit anchor charts: "Switcheroo Strategy," "Friendship Strategy," and "Fact Family."
- Model one equation using the Switcheroo Strategy, one equation using the Friendship Strategy, and make one Fact Family House.

Ogulie Bothese

- Switcheroo: 3 + 5 = 5 + 3
- Friendship: 3 + 9 + 2 = 12 + 2 = 14
- Fact family: 13, 7, 6

Guided Practice: Properties of Operations Scoot!

Independent Practice: Students work on Problem Solvers.

TDay 8: Properties of Operations for Addition and Subtraction

Mini Lesson: Introduce the purpose of the lesson today: to use properties of operations to solve addition and subtraction equations with fact families.

 Review the unit vocabulary cards, The Property of Operations song, and the unit anchor charts.

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Guided Practice: Optional to have students learn and play the "Fact Families Game" as a review. Students work in pairs or small groups to match up fact families.

Independent Practice: Property of Operations Quiz

Properties of Operations

Numbers have properties That make addition really easy Numbers have properties Let's add some right now



First you have the switcheroo or commutative That's where numbers can switch the sides of the equation where they live

As long as you keep them the same, the sum is equal as well Like 8 plus 4 or 4 plus 8 they will both add up to 12

Numbers have properties That make addition really easy Numbers have properties Let's add some more right now Next you have the associative or

the property of friendship

No matter how you group them it's the same as long as no one is skipped If you group 7 and 3 and add 5 you will get 15

And if you group 3 and 5 and add 7 the sum will be the same you see.

Numbers have properties That make addition really easy Numbers have properties Like the switcheroo and friendship

Numbers have properties That make addition really easy Numbers have properties Lets go add more right now

FRIEND Ship











_____ Date: _ Friendship Road Directions: Start by solving the Friendship Bond numbers, then finish solving the equation. As you solve the equation, color in the block. 6+(3+7 **|2 + |**) 4 + 8)+ 2 = 2 + (10 + 2)



NUMBER LINE MAT

Directions:

Print, cut out, and laminate a Number Line Mat for each student to use throughout the unit.

You can have students keep these in their math journals/folders to use the rest of the year, or have a class set that you keep and pass out when necessary.

















_____ Date: ____

Problem Solver

Solve the word problems. Write your answer in the box below.

- I. Eva picked 10 strawberries. Eva's brother picked 5 strawberries and their sister picked 3 strawberries. How many strawberries do Eva and her siblings have in all?
- Use a <u>Friendship Bond</u> to solve the equation.
 - Gabe has 17 markers. 10 of his markers are black and 7 of his markers are purple. Write a Fact Family House for Gabe's Markers.

Ο

markers

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Property of Operations Scoot!

Directions:

Name:

- I. Place one card at each student seat.
- 2. Pass out the answer sheet to each student. (You can also have them number a piece of notebook paper)
- 3. Students begin answering the question at their seats and recording the answer on the corresponding sheet.
- 4. When most students are done say "scoot" and students should move to the next seat (review with students how they should rotate before beginning.) Be sure they take their answer sheets with them!
- 5. Continue rotating until each student has answered each question.

*These cards can also be used as Task Cards in a center.



Fact Families Game

Directions:

- I. Print off the Fact Family Houses and equation cards.
- 2. Laminate and cut out.
- 3. Place all the Fact Family Houses and equation cards in a gallon-sized bag.
- 4. This game can be done individually or in pairs.









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