Grade Level/Course:
Kindergarten/1st grade
Lesson/Unit Plan Name:
Exploring Equality
Rationale/Lesson Abstract:
Students will explore the concept of equality using manipulatives.
Timeframe:
1-2 days
Common Core Standard(s):
K.OA.1
Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps) acting out situations, verbal explanations, expressions, or equations.
1.OA.7
Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 - 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.
Instructional Resources/Materials:
*Optional: Equal Shmequal by Virginia Kroll -
For Demonstration teacher will need:
- Balance scale
- Red/blue/black White board markers
- Red/blue/black unifix cubes
For activity each pair of students need:
- 10 black, 10 red and 10 blue unifix cubes (separated into single cubes in a small bag)
- Equality cards printed in color (blackline master included) cut up in an envelope or small bag*
- True/False mat (blackline master included)
- Glue stick
For extension:
- Package of notecards
- Deck of cards for pairs of students
For Closing:
- Exit ticket (Black Line Master included)
- A bag of cubes
* If you cannot print it in color, please use colored markers to mark the colors on the equality cards.

Activity/Lesson:

Direct Instruction:
Optional opening activity:
- Read the book Equal Smequal by Virginia Krall.
- Stop reading after the animal's first attempt to make equal teams and have them talk to a partner about how they could make equal teams.
- Share out and discuss their ideas. You can read until the end of the book or continue the lesson on equality and then read the ending later.

Discuss the meanings of mathematical symbols with the students. Have them talk with a partner about what each symbol means and then share out as a group.

+ Add, join together
- Subtract, take away
= Equal, the same

Use a balance scale to demonstrate equality.   Discuss how the balance scale shows when there is the same amount on each side, and what it looks like when it is not the same (or not equal).

Example 1:

T: "If I put 2 cubes on this side and nothing on the other side what happens to the scale?"
It is not equal. There is not the same on each side.

T: "What do I need to do to make it equal (the same on both sides)?"
Put 2 cubes in the other side.
Show students how the scale balances when it is equal.
Write up on the board 2 = 2

Have students chorally say the equation with you and reiterate that it is equal because we have the same amount on each side.

Add one cube to one side of the scale.
T: "Is it equal now? Why or why not?"
Students should talk with their partner.

Share out student responses.
Write 2 ≠ 3 and tell students this is not the same or equal on both sides so we put a slash through the equal sign to show that it is "not equal."

Example 2:

Put 4 cubes in one side of the scale.
T: "How many do I need to put in the other side to make it equal?"

Have students show you on their fingers how many you should put in.
Invite a student to put 4 in the other side.
Have students give you a thumbs up or down if it is equal.

Write 4 = 4 on the board and talk about how it relates to the cubes in the scale.
"Now I will put 4 cubes in one side and 3 cubes in the other side. Will it be equal?"
Have them give you a thumbs up or down and discuss.
Show the equation: 4 ≠3.

Example 3:

Have a student put 5 black cubes in one side of the scale.
T: "How many cubes do we need to put in the other side for it to balance?"
Have students discuss with a partner and then share out ideas.
Students may say 5 cubes.

T: "Could I put in 2 red cubes and then add 3 blue cubes? Would it balance?"
Add 2 red cubes first and then 3 blue cubes to prove that it is equal.
Write **2 + 3 = 5** on the board.

T: "So we can add 2 cubes first of one color and then add 3 more cubes of another color and together that's five cubes on this side and then five cubes on that side, so it balances, it's the same amount on both sides."

T: "What if I put the five black cubes on this side and the red and blue cubes on the other side? Will it still balance?"

Switch the cubes to the other side of the scale and prove that it still balances.
Write **5 = 2 + 3** on the board
Discuss that it doesn't matter which side the cubes are on as long as there is the same amount on both sides.

Here is another way to prove that **5 = 2 + 3**:

Take the 5 black cubes out and put them together to make a tower.
Take the 2 red cubes out and put them together.
Take the 3 blue cubes out and put them together.
Demonstrate "adding" the red and blue cubes together to make a tower and show the cubes next to the numbers on the equation.
Show the black cubes next to the 5 in the equation.
Demonstrate holding the towers next to each other and ask if the towers are the same or equal.

T: "We can prove that this equation is equal because the towers match up exactly the same. They are equal."

Example 4:

Write the equation **3 + 4 = 6** on the board
T: "Is this equal? Thumbs up or thumbs down."
Ask a student to make a tower of 3 red cubes and 4 blue cubes while you make a tower of 6 black cubes.

Direct the student to add the red and blue cubes together to make one tower.
Match the red/blue tower to the black tower to prove that it is not equal because the towers are not the same size.

Change the equation on the board: **3 + 4 ≠ 6**

Activity:

Put the students in partners and hand out one bag of cubes to each pair.
Have partners decide who will first be in charge of the red and blue cubes and who will be in charge of the black cubes. Explain that the students will take an Equality card out of the bag, prove it is true or not true and then sort the cards into the True/False graphic organizer. Teacher will demonstrate the activity first and then hand out the True/False graphic organizer and Equality cards.

Show students one of the Equality cards with an equation on it.

Example: **8 = 3 + 4**

Partner 1 should build a tower of 3 red and 4 blue and then put them together to show the addition.
Partner 2 should build a tower of 8 black cubes.

Guide the students in building the towers and matching them up to see if they are the same (equal). When they determine that it is not equal, demonstrate how you will glue the card in the "False" side of the graphic organizer.

Do as many examples together as needed before allowing the students to work in partners.

Students should complete the rest of the cards with their partners. Allow the students to switch colored cubes so that each student gets a chance to work with the red and blue cubes as well as the black ones.

Closing:

Pull students together with their graphic organizers.
Choose 2 or 3 equations from the cards and have different students come to the front and use the cubes to prove whether the equation is true or false.

Extension:

Ten and then Some-
- Put the students in pairs and give them eight note cards labeled 10 +1, 10 + 2, 10 + 3, 10 + 4, 10 + 5, 10 + 6, 10 + 7, 10 + 8. Label one note card with an equal sign and an addition sign.
- Lay out the cards face up.
- Each pair will need a deck of cards (can be made as well) taking out the aces, face cards and tens.

- Each student chooses one card from the deck. They must create an expression with their two playing cards and then search for the note card that is equivalent.
- When they find it, they must create an equivalent equation using their equal sign notecard.
- If they choose 2 cards whose sum is less than ten, they must put the two cards back in the deck randomly and choose again.
- Students must record on a piece of paper or white board their two expressions as an equation.
  (e.g. 5 + 8 = 10 + 3)
- Return the cards to the deck and continue play.

Assessment:

While students are sorting their equations, make observational notes about how they prove whether an equation is equal or not equal.

Ask, "How do you know this equation is true? False?"

Give paper exit ticket to students after they have had ample practice. Students may use unifix cubes or drawings of cubes to help prove their answer.

$4 = 4$	$6 + 2 = 8$	$8 = 4 + 5$
$5 + 3 = 7$	$3 + 1 = 2 + 2$	$6 + 3 = 9$
$10 = 3 + 7$	$10 = 5 + 4$	$4 + 2 = 2 + 6$
$6 = 2 + 4$	$5 = 4 + 1$	$7 = 6$
$4 + 3 = 6$	$9 = 2 + 6$	$6 + 4 = 10$

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$5 + 3 = 7$	$3 + 1 = 2 + 2$	$6 + 3 = 9$
$10 = 3 + 7$	$10 = 5 + 4$	$4 + 2 = 2 + 6$
$6 = 2 + 4$	$5 = 4 + 1$	$7 = 6$
$4 + 3 = 6$	$9 = 2 + 6$	$6 + 4 = 10$

True   False

Name:_____

Circle all the equations that are correct.

4 = 5   3 = 3

4 + 3 = 7   10 = 8 + 3

7 + 2 = 10   8 = 4 + 4

Name:_____

Circle all the equations that are correct.

4 = 5   3 = 3

4 + 3 = 7   10 = 8 + 3

7 + 2 = 10   8 = 4 + 4