Mathematics 2

Week 3 Day 2

Lesson Plan Title

Work with pan balances to demonstrate equal and unequal sets

Lesson Summary

Students will be working with pan balances to demonstrate equal and unequal sets

Curriculum Outcomes

N01, PR03, PR04, N10, M01

Assessment Of Learning or Assessment For Learning

Observation, Conversation, Product

- Were students able to identify and record the balance that represents two equal sets? Were students able to explain their thinking about the balance? Were they able to use language correctly to describe the sets?
- Were students able to identify and record the balance that represents two unequal sets? Were students able to explain their thinking about the balance?
- Were students able to explain the relationship between the two quantities if the scale is balanced?
- Were students able to explain the relationship between the quantities if the left balance pan is lower than the right pan?
- Were students able to explain the relationship between the quantities if the left balance pan is higher than the right pan?
- Were they able to use language correctly to describe the sets?
- Were students able to use the symbols = and ≠ correctly?

Communication/Vocabulary

- balanced
- not balanced
- equal
- not equal
- more
- less
- same as
- pan balance
- sets
- not the same as
- is the same as
- is equal to

Technology

- Use the pan balance from FLARE found on the Mathematics Learning Commons P–3 on Moodle during the "before" and "after" sections of the lesson.
- Use images of signs from the internet, such as No Right Turn on Red, No Peanuts, No U-turn, No Passing, No Dogs Allowed, or No Cell Phones.

Materials

- pan balances
- bags of cubes such as multi-linking cubes, or unifix cubes (Please ensure that each pair of bags uses only one type of counting item; for example, both bags in a pair contain only unifix cubes, not a mix of multi-link and unifix cubes.)
- pairs of opaque bags/brown paper lunch bags with cubes in them; each bag in the set must be labelled with the same letter; pairs of bags may represent unequal sets (different quantities of the same kind of cubes in each of the two bags) or equal sets (same quantity of the same kind of cubes in each of the two bags) NOTE: As you are creating your pairs of bags to represent unequal sets, ensure that the difference between the number of cubes in each bag is great enough to show a difference on the pan balance.

Mental Mathematics

Skip count forward by 5s and 10s to 100. (orchestra counting)

Name the day of the week and month of the year.

Development

Before

Based on the previous day's work, discuss with students the appearance of the pan balance when two sets of cubes were equal and when the two sets of cubes were not equal. Ask students to explain how they might record the information about equal and unequal sets using pictures and words such as *the same as*, or *equal,* and *not the same as*, *not equal,* or *unequal* .

Show students an equal sign (=) and review with them its meaning. Ask them to read the sign using the appropriate language *(the same as*, or *equal)*. In order to introduce the symbol associated with "not equal", show students signs from the environment, such as No Rright Turn on Red, No Peanuts, No U-turn, No Passing, No Dogs Allowed, or No Cell Phones. (You may find images of these symbols on the internet.) Ask students to explain the meaning of the signs. Then, show them the not equal sign (≠) and ask them to explain what they think it might mean. Ask them to read the sign using appropriate language (*not the same as*, *not equal, or unequal)*.

Explain to students that they will be using a pan balance to find out if sets of cubes contained in a pair of bags are equal or not equal. They will place the two opaque bags containing various quantities of cubes on the scale. They will decide if the bags contain sets of cubes that are equal or the same as, or if the sets are not the same as, not equal, or unequal. Their task is to find and record which pairs of bags are contain equal sets and which pairs of bags contain unequal sets. The students must the record the information symbolically (=, ≠).

During

Students will decide whether the pairs of bags contain sets that are equal or sets that are unequal by using a pan balance. After placing two bags on the pans of the balance scale, students will determine whether the sets of cubes contained within the bags are equal or not equal. They will then open the bags, count each set of cube, and use numerals and the symbols =, ≠ to record their findings. For example, if students see that the pan balance is not balanced, they will record the statement, "Bag A: The two sets of cubes in are not equal". They will open the bags and count the cubes. If there were 6 cubes in one bag and 10 cubes in the other bag, students would record their findings symbolically by recording 6 ≠ 10. If the pan balance did balance, students will record the statement, "Bag B: The two sets of cubes are equal". After counting the cubes in the bags and finding that there are 4 cubes in each bag, they would record 4=4. Students will complete the task for as many pairs of bags as time allows.

After

Debrief the lesson and draw out key ideas about the lesson. Areas of focus for the discussion may include the following or other topics based upon observations.

Ask students to share their group's recordings with the class and to share their observations of the pan balances.

- What is the relationship between the two quantities if the scale is balanced?
- What is the relationship between the quantities if the left balance pan is lower than the right pan?
- What is the relationship between the quantities if the left balance pan is higher than the right pan?
- If two sets were equal, what happened with the pan balance?
- If two sets were unequal, what happened with the pan balance?
- If you had 15 cubes on one side of the pan balance and 19 cubes on the other side of the pan balance, what would the pan balance look like? How could you make the pans balance? Is there another way to make the pans balance?
- If someone told you that 12 was equal to 4 and 8, how could you prove that they were correct?
- What does this sign, ≠, mean?
- What does this sign, =, mean?

Differentiation

- Provide a prepared recording sheet to support students in recording their findings.

- Ask students to use the pan balance to prove that $4 + 8 = 9 + 3$ and that $4 + 5 \neq 9 + 5$.