**Lesson Plan Title**

Partitioning and Equality using a Pan Balance

**Lesson Summary**

Working in small groups, students will create as many different representations of a given number using two different colours of cubes as possible. This partitioning of a number will be limited to quantities from 6 to 12. Students will use these representations of partitioned numbers to explore equality and inequality using pan balances.

**Curriculum Outcomes**

N01, N04, N08, N10, PR03, PR04

**Assessment Of Learning or Assessment For Learning**

Observation, Conversation, Product

- Were students able to create many or all possible partitions for their given number using two different colours of cubes?
- Were students able to use one partition they had created to help find a new partition?
- Were students able to organize a way to find the possible partitions?
- Were students able to record their partitions using expressions (3 + 4)?
- Were students able to record their partitions as equations? (3 + 4 = 7)
- If students were able to record partitions as equations, how did they record them?  Did they place the numeral representing the total quantity on the left hand side of the equation ( 8 = 5 + 3 ) or was the numeral representing the total quantity on the right hand side of the equation (5 + 3 = 8)?

**Communication/Vocabulary**

- number words
- pan balance
- balanced
- not balanced
- equal to
- not equal
- quantity
- sets
- more
- less
- the same as
- parts
- is not the same as, is not equal to
- is the same as, is equal to
- expression
- number sentence

**Technology**

- Use FLARE – Pan Balance as a follow-up activity or as a means of representing some of a group's written number sentences.

**Materials**
- pan balances
- various pre-formed towers of cubes (numbers ranging from 6 – 12)
- unfix cubes or multi-link cubes

(Please use only one type of cube per pan balance/group in this activity. The intention is for the quantity of the two colours of cubes to illustrate the partitioning of the number tower. The number of cubes in the tower and the number of cubes in the partitions should balance the pan balance.)

**Mental Mathematics**

Review skip counting forward by 5s and 10s to 100 with a hundred chart.

Review the addition of zero.

**Development**

**Before**

Briefly discuss yesterday's lesson on equality and inequality. Ask students to discuss what they noticed about the cubes on each side when the pan balance was balanced. Ask students to discuss what they noticed about the cubes on each side when the pan balance was not balanced.

Explain to students that today they will be using the pan balances to represent numbers using two different colours of cubes. Model with the class using a tower of 5 cubes. Place a tower of 5 red cubes on the left side of the pan balance. Invite a student to place some cubes (using two different colours) on the right side of the pan balance until the pan balance is balanced. Invite students to share their observations about the balance and the cubes. Ask students to suggest how this could be recorded with numerals and symbols. Continue to have students create different partitions for the number 5 on the pan balance and record these partitions as equations.

Explain that in their groups, they will choose a tower of cubes, and they will identify the total number of cubes in their tower. Then, they will use other cubes and a pan balance to find as many different equal representations of that number using two colours of cubes. Each student will record the partitions and will use the equal sign to record the equations.

**During**

Students should work with their group to complete the task. Groups may complete the task with more than one number tower.

Teacher's role will be observing and recording anecdotal notes as necessary. Please refer to the assessment section of this lesson.

**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.
Students will share their group's recordings with the class.
- What combinations did you find for your number?

- Do you think you found all possible combinations?
- How can you be sure you found all combinations for your number?
- Were you able to use one tower (partition) to help find a tower (partition)?
- How did you record the partitions? (as expressions or as equations)
- Can you use the towers to prove that both of these equations are correct?   $8 = 5 + 3$  and  $5 + 3 = 8$
- If pairs of towers balanced on the pan balance, what do you know about the two towers?
- How do you know that 15 is equal to/the same as 10 and 5 more? Can you use a pan balance to prove that this statement is correct?
- How do you know that 15 is not equal to/is not the same as 6 and 5 more? Can you use a pan balance to prove that this statement is correct?
- Is it true that 8 is the same and 8 and 0?  Can you use a pan balance to prove that this statement is correct?

**Differentiation**

- The size of the tower of cubes may be adjusted according to the needs of various students as required.

- Recording the partitions pictorially may be helpful for students who may still need to see the pictorial representation in order to explain their number expressions or equations after the cubes are no longer visible on the pan balance.