Balancing Act

Strand: Probability and Statistics

Topic: Representing mean as the balance point

Primary SOL: 6.11 The student will

                       a)   represent the mean of a data set graphically as the balance point;

Materials

- Large number line (see below)
- Sticky notes
- Ruler
- Balancing Act activity sheet (attached)

Vocabulary

fair share, mean, median, measure of center, mode (earlier grades)
balance point (6.11)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)
Before the lesson, create a large number line on which students may affix markers. The number line should start at zero and extend through at least 20.

1. As students enter the room, distribute sticky notes. Poll the class with a specific question to generate data. Choose a question such as one of the following that will yield a variety of responses over a fairly wide range:
    - How many relatives live within 100 miles of you?
    - How many states have you visited?
    - How many family vacations can you remember?
    - How many books have you read this year?
    - How many video games do you have?

    Have each student record his/her response to the question by placing a sticky note marker at the appropriate number on the number line.

2. Begin the lesson by reviewing the importance of statistics in describing, summarizing, and making inferences about data. Continue by defining *measures of center* and asking students for their personal definitions of *mean, median,* and *mode.* Work through the processes of determining values for measures of center and range.

3. Ask students about the methods they have used previously to calculate the mean of a data set. This should prompt a discussion of the mean as fair share (SOL 5.17).

4. After each student has placed a marker on a specific data value, explain that *mean* can also be represented as the balance point of the data. Discuss the meaning of *balance point.* Illustrate balance point by balancing a ruler on your finger (centering it on your finger until it does not fall off). (Take a picture or have a student record the data before moving the data markers. You will need that data later on.)

5. Using the data markers on the number line, start finding the balance point by moving two of the outermost data values (values farthest to the right and to the left) toward each other one unit. Continue this process until all values have been moved toward a center

point and are stacked on top of each other at one number. This number is the balance point or mean of the data set.

6. After finding the balance point, return the sticky notes to their original positions and have students verify that the balance point is the mean of the data using the sum/division method. Also, include the discussion of *mean* as the average of all data values.

7. Finally, give the formal definition of the balance point or *mean*: the point on a number line where the data distribution is balanced. This means that the sum of the distances from the mean of all the data points above the mean is equal to the sum of the distances of all the data points below the mean. This is the concept of mean as the balance point (SOL 6.11 [a]). Connect this definition to the class data set before the rearrangement, as well as to the illustration of balancing the ruler.

8. As added practice, have the students work through the Balancing Act activity sheet.

Assessment
- **Questions**
  - What are some challenges that may be faced when using this method for calculating the mean of a data set?
  - How can we verify the mean of a data set mathematically?

- **Journal/Writing Prompts**
  - Explain how to decide when mean is the best measure of center to describe a data set.
  - Explain how to decide when mode is the best measure of center to describe a data set.
  - Explain how to decide when median is the best measure of center to describe a data set.
  - Explain why a measure of center is important when analyzing data.

- **Other Assessments**
  - Give each student or a pair of students number lines with data marked and have them find the balance point.
  - Students create their own number lines with data marked and have another student find the balance point.

Extensions and Connections (for all students)
- Have students find the median and mode for this data set. Based on the values, have students determine which value depicts the best measure of center for this specific data set and explain why.

Strategies for Differentiation
- Show students the actual calculation associated with deriving the balance point or mean before the use of the number line.
- Before building up the concept of mean as the balance point, show an example, including manipulatives, of mean as fair share.
- Include the calculations for one or two of the items on the activity sheet for some students as needed for reference.

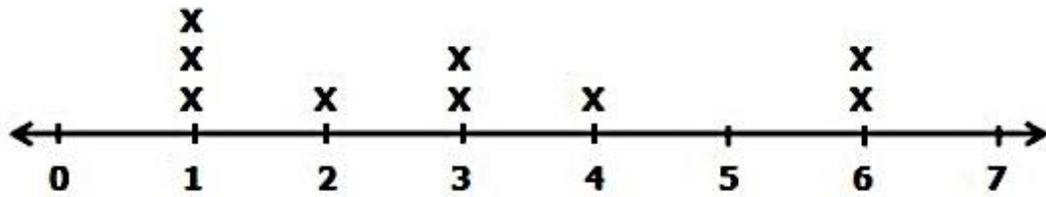- Allow students to work with a partner for all learning activities.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

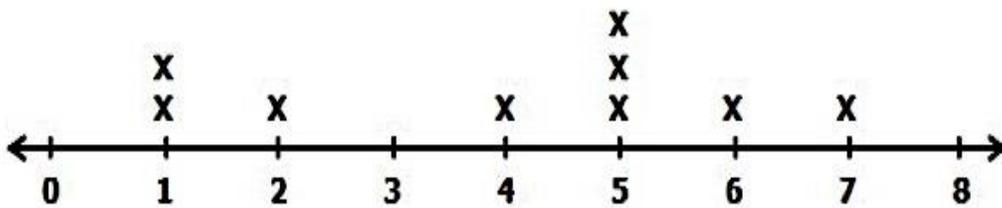Virginia Department of Education © 2018

Balancing Act
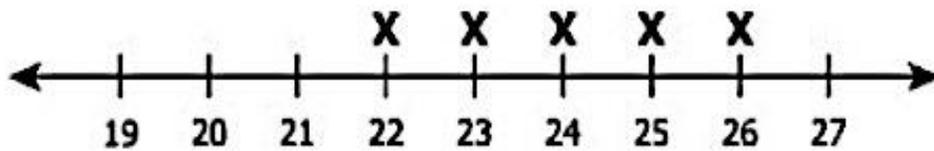
Directions: Find the balance point of each given data set.

1.

2.

3.

4.