STEAM Math Lesson:
Stacking Challenge - Grades 6-8

This lesson challenges students to stack as many of a certain item as they can, collect data from their classmates, then calculate the class's mean, median, mode, and range based on the data set. Students will engage in basic engineering, practice and review an important math concept, and have fun with this hands-on activity!

✅	✅	✅
Teacher Led	**Requires Computer OR Mobile Device**	**Requires Spaces**

Spaces Prep	**Create your Activity in Spaces before the lesson. Not sure how to create an Activity? Check out this short video tutorial on assigning and managing activities.**

Learning Goals

1. Students will **build** a tower using provided materials.

2. Students will **collect and record** data from their classmates.

3. Students will **calculate** the mean, median, mode, and range of their class's data set.

Materials

📖	**Student Handouts**	● **Handout [A] - Data and Calculations** (pages 4-5)
☑️	**Technology Requirements**	● Mobile device, tablet, or laptop ● Projector or Smartboard
🎥	**Video/Audio Clips**	● [Mean, Median, Mode, and Range Review Song](#) video
✏️	**Additional Materials**	● Materials for stacking for each student (examples: blocks, coins, Oreos, Starbursts, etc.) ● Clipboard for each student (optional) ● Extra paper or math journals (optional) ● Pencils for each student

Instructions

Before the lesson

1. Explain to students that they will engage in a challenge to stack as many of a certain item as they can individually. Once their tower collapses and they have data about how many items they stacked, they will collect data from their classmates, then calculate the mean, median, mode, and range of the data set.

2. Show the [Mean, Median, Mode, and Range Review Song](#) video.
   ○ Depending on your class's familiarity and comfort with mean, median, mode, and range, you may want to do a practice problem or two with a random data set– this could be the number of letters in a few students' names, number of people in a few students' homes, etc.
   ○ It may be especially important to go over how to calculate median when there is an even number in the data set (adding the numbers together and dividing by 2 to find the average of the median).

During the lesson

1. Start by giving each student **Handout [A] - Data and Calculations** (pages 4-5).

2. Next, give each student materials to stack.
   ○ Make sure to go over the importance of keeping track of how many items are in their tower as they stack so they know how many items there are!

3. Allow students to take their time stacking, challenging them to have the MOST items in their tower.
   ○ If a student's tower collapses early, you could have them try again and record their data on a second worksheet.

4. Once students' towers have collapsed, OR you have given them ample time, have students stop and record the number of items in their tower on side 1 of **Handout [A] - Data and Calculations.**

5. Next, have students attach their worksheet to a clipboard (optional) so that they can move around the room and collect data from their classmates in the Class Data table on side 1 of **Handout [A] - Data and Calculations**. You will need to have students add in extra rows or print an extra page of side 1 if you have more than 20 students in your class.

6. Once students have collected data from their classmates, have them move back to their desk or table to record their data set in order from least to greatest and calculate the range, mean, median, and mode on side 2 of **Handout [A] - Data and Calculations**.
   ○ Students may need more space to show their work on a piece of graph or blank paper or in a math journal.
   ○ If you have students who need extra support with math calculations, you could have students work in pairs.

After the lesson

1. Once everyone has completed their calculations, have students check their work with a partner. If there are discrepancies, both students should double check their calculations.

2. If time, engage in a discussion about noticings or surprises in their data calculations.

Worksheet

HANDOUT [A]: Data and Calculations (side 1)

Name_____

Number of Items in My Tower: _____

Class Data

Classmate's Name	Number of Items in Their Tower

Worksheet

HANDOUT [A]: Data and Calculations (side 2)

Data Set (in order from least to greatest):

_____

Data Calculations– make sure to show your work!

What is the range? (greatest number - smallest number)	
What is the mean? (all numbers added together and divided by number of data set to find the average)	
What is the median? (number that appears in the exact middle of the data set)	
What is the mode? (number that appears the most times in the data set)	