Rumble's Range

Rumble needs your help! He and his buddies have been shooting some hoops, but their scorekeeping has gotten all jumbled. Can you help him perform some calculations to sort everything out?

HERE'S WHAT YOU'LL NEED:

- **Sticky notes (two different colors)**
- **Paper and pencil**
- **Calculator or calculator app**
- **White board or large piece of paper to place sticky notes**
- **Fantasy Team Statistics page, printable** (included on last page)

This activity can be done individually or with a partner, as well as in a classroom or at home.

WARM-UPS

Rumble and his friends have been spending the afternoon playing basketball. They've been keeping track of scoring, but they want to dig a little deeper and tabulate their data. To help them out, you're going to find mean, median, mode, and range to help calculate Rumble's data.

Begin with mean. **Mean** is the average of a set of numbers. How do you calculate the mean of a data set? You'll begin by adding all of the points together. You can use a calculator or calculator app for this step, or you can do it by hand if you'd like to challenge yourself! After you've added all the points together, divide the sum by the amount of players there are.

This set of numbers represents the points scored by Rumble's friends. Try and find the mean:

6, 2, 4, 7, 6

After you've found the mean of this set of numbers, move on to finding the median. The **median** is the middle in a sorted list of numbers. For example, if you arranged nine numbers from least to greatest, the fifth number would be the median.

Using the same set of numbers as above (6,2,4,7,6) place them in numerical order and find the middle number.

Pro tip: If you have an even set of numbers, there will be two middle numbers. To find the median, calculate the mean of those two middle numbers.

Now you're going to find the mode of this number set. The **mode** is the number that appears most often. Which number appears the most often in that number set?

Lastly, calculate the range of this set. The **range** is the difference between the largest number and the smallest number, that is, the smallest number subtracted from the greatest number. Using the same number set, subtract the smallest from the largest and that will give you the range!

Now that you're a pro using this quartet of math calculations, take a look at this table of data; it contains how many points each Rumble and his friends scored in their game. Find the mean, median, mode, and range of the following set of points.

Rumble the Bison	16 points
Serena the Scissor-tailed Flycatcher	7 points
Penny the Prairie Dog	5 points
Otto the Robot	15 points
Anthony the Armadillo	7 points
Bernadette the Bullfrog	9 points
Riana the Red Tail Hawk	13 points
Samuel the Snapping Turtle	3 points
Travis the Turkey	14 points
Cayla the Collared Lizard	7 points

GAME TIME

Rumble and his friends are nearly through the season; they have played 70 games and there are only 12 games left. If only four teams make the Playoffs, Rumble wants to know the likelihood that the Bisons will make it! Remember that the teams that go to the Playoffs have the winningest record.

Now you're going to put all this mathematical knowledge to use with a group activity. You analyzed data in Warmups based on a five-on-five game of basketball that Rumble played with his pals. Now you're going to chart data from a nearly complete season played by Rumble and his fantastical friends. Grab the printed or downloaded "Fantasy Team Statistics" page found at the end of this document.

Begin with the **WINS** column. Start by making a graph. Draw a horizontal line at the bottom of the whiteboard or a large piece of paper. (In case you confuse horizontal and vertical lines, remember that horizontal lines go in the same direction as the horizon!) Because there's not enough space on the board to write the numbers 0—70, write a number line on the horizontal line in groups of 10s (0-10, 11-20, 21-30, etc.).

Working with your classmates or friends, place one color of sticky note each (or small piece of paper and tape) on the graph in the appropriate space to represent the number of wins each team had. What do you observe from the dispersal of the data in this visual format?

You're going make a new graph with the data of Points Per Game for the fantasy teams. However, because it would take too much space to make a number line with decimals, begin by rounding each number to the nearest whole number.

From what you learned in the Warmups, do you recognize Points Per Game to be a median, mean, or mode?

Next, make a new horizontal number line on the white board. This time, you're going to list the numbers 85 to 105 by fives to cover the span of the Points Per Game data. Repeat the same graphing process with a different color of sticky note.

Finally, you're going to find the mean, median, mode, and range of all of these data sets.

Rumble has analyzed all of this data with you, and he has some questions. Out of his friends' ten fantasy teams, only four of them are going to make the playoffs. By looking at the data, how likely do you feel that the Bisons will make the playoffs? Why or why not?

ANALYZE THE REPLAY
What happened?

Did you observe any patterns in the data, either when it was graphed or when you were completing calculations? Did you notice a specific shape that the graph formed? How did changing the input from a number set to a graph help you see trends? Why do you think information is sometimes presented in number sets and sometimes presented in graphs?

The data in the number set and the graph are connected. You can make predictions about mean, median, and mode based on the graph. For example, when you see one tall peak in the graph, that peak is the median, and very close to the mode. How far the sticky notes spread from side to side on the graph is the range of the data. If the graph is relatively balanced and symmetrical, that peak is also the mean. However, if you have a peak with a lot more sticky notes on one side than the other, the mean is going to be pulled toward the side with more sticky notes.

OVERTIME
Let's take it further.

In working with these mathematical principals, you learned the foundations of statistics. Statistics is the gathering, organization, interpretation, and analysis of data—which is exactly what you did in these activities!

If time allows, break into groups and shoot 5 or 10 baskets and keep track of the points scored by each classmate. Record this data in a number set, or graph your points with sticky notes, and then dig deeper and find the mean, median, mode, and range.

COACH'S CORNER
Additional information and explanations for parents and educators

In this Devon Thunder Explorers activity, students started with some math basics of calculating mean, median, mode, and range. They then worked on their graphing skills, as well as tackling more complex sets of numbers. Statistics play an important part in basketball. In a sport, statistics are a metric of measuring specific qualities of a team or a player. However, scientists, engineers, and even businesspeople use statistics in a huge variety of careers. From insurance professionals, health workers, chemists, mathematicians, and engineers, they all need to find trends in large amounts of data.

While students graphed stats of fantasy teams and players in this activity, the data that they analyzed was based on real NBA statistics. Statistics in sports give quantifiable evidence of who is succeeding, what skills lie with which players, and who you may want on the court at different times. Statistics play a big role in building a basketball team as well. Players who look good on paper may not be the best fit to improve or grow a team. Some players have certain skills they bring to a team, such as being great defenders, ball handlers, or showing leadership on the court and in the locker room. A player's main impact on their team is their ability to help improve the team, so if they bring a certain skill which the team doesn't have, they may be a good fit. Students also had a chance to analyze patterns within the data, as well as experiment with different forms of organization and graphing.

OKLAHOMA ACADEMIC STANDARDS – SCIENCE

Standard	4th Grade	5th Grade	6th Grade
Numbers and Operations			
4.N.1.1	•		
Data and Probability			
4.D.1.1	•		
4.D.1.2	•		
4.D.1.3	•		
5.D.1.1		•	
6.D.1.1			•
6.D.1.2			•

Fantasy Team Statistics

Team Name	Wins	Losses	Points Per Game
The Bisons	47	23	100.6
The Scissor-tailed Flycatchers	51	19	100.1
The Prairie Dogs	15	55	93.4
The Robots	37	33	99.1
The Nine-banded Armadillos	36	34	97.3
The Bullfrogs	21	49	98.5
The Red Tail Hawks	43	27	101.7
The Snapping Turtles	27	43	92.7
The Wild Turkeys	37	33	88.4
The Collared Lizards	27	55	99.9