LESSON MAKER PRO

Data Detectives

Find centers, spreads, and useful predictions.

GRADE 6 · 6.NR.2.4

6.NR.2.4 "Design simple experiments and collect data. Use data gathered from realistic scenarios and simulations to determine quantitative measures of center (median and/or mean) and variability (interquartile range and range)..."

NAME _____ DATE _____

CENTER AND SPREAD

Put the data in order before you find its center and spread. The median is the middle value, the mean is the total divided by the number of values, and the range is the greatest value minus the least value. To find the interquartile range, or IQR, find the median of each half of the ordered data, then subtract Q_1 from Q_3.

WORKED EXAMPLE

Find the median, mean, and range of 3, 7, 8, 12, 14.

1. Order the values: 3, 7, 8, 12, 14.
2. The middle value is 8, so the median is 8.
3. Add the values: 3 + 7 + 8 + 12 + 14 = 44. Then 44 / 5 = 8.8, so the mean is 8.8.
4. Subtract the least value from the greatest value: 14 - 3 = 11.

Answer: Median = 8, mean = 8.8, range = 11.

PRACTICE 6 problems

1 Find the median of 9, 11, 13, 15, 17.

ANSWER _____

2 Find the range of 1, 5, 9, 19.

ANSWER _____

3 Find the mean of 4, 6, 10, 20.

ANSWER _____

4 Find the IQR of 2, 4, 6, 10, 20, 22, 24, 26.

ANSWER _____

5 Group A recorded 21, 22, 23, 24, 27. Group B recorded 20, 25, 30, 35, 40. Which group has the smaller range?

ANSWER _____

6 In four simulation rounds, a player earned 16, 18, 20, and 22 points. Find the mean. Based on the mean, predict about how many points the player may earn in the next round.

ANSWER _____

_____

APPLY IT Show your work

1 Two paper-airplane designs are tested five times. Design A flies 25, 27, 29, 31, and 33 centimeters. Design B flies 20, 25, 30, 35, and 40 centimeters. Find the mean and range for each design. Which design is more consistent? Use its mean to predict a distance for its next flight.

WORK SPACE

ANSWER _____

2 An esports club tracks target hits in five practice rounds. Kai gets 18, 20, 22, 24, and 26 hits. Mira gets 16, 20, 24, 28, and 32 hits. Find each player's median and range. Who has the higher typical score, and who is more consistent?

WORK SPACE

ANSWER _____

3 Design and carry out a simple paper-airplane experiment with teacher support. Use the same paper size, launcher, launch position, and measuring method. Choose and describe one fold to change between designs A and B. Predict which design will travel farther. Make five launches of each in a clear space; measure launch-to-landing distance in centimeters and record your actual results in the table. Calculate each mean and range, compare distance and consistency, and use your results to predict the next flight. Do not copy the supplied data from Apply It 1. Use separate paper for your design, calculations, and conclusions.

YOUR MEASURED DISTANCES (CM)

Trial	Design A	Design B
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____

ANSWER _____

CHALLENGE One step up

Two teams record points in eight game-simulation rounds. Team P scores 30, 34, 36, 40, 42, 44, 46, 48. Team Q scores 20, 34, 36, 40, 42, 44, 46, 58. Find the median, IQR, and range for each team. Is this claim true: "The teams have the same middle-half consistency, but Team Q varies more overall"? Explain using the measures.

WORK SPACE AND ANSWER

ANSWER KEY # Data Detectives

GRADE 6 · 6.NR.2.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the median of 9, 11, 13, 15, 17.	**13**
2	Find the range of 1, 5, 9, 19.	**18**
3	Find the mean of 4, 6, 10, 20.	**10**
4	Find the IQR of 2, 4, 6, 10, 20, 22, 24, 26.	**18**
5	Group A recorded 21, 22, 23, 24, 27. Group B recorded 20, 25, 30, 35, 40. Which group has the smaller range?	**Group A. Its range is 6, and Group B's range is 20.**
6	In four simulation rounds, a player earned 16, 18, 20, and 22 points. Find the mean. Based on the mean, predict about how many points the player may earn in the next round.	**Mean = 19 points. A reasonable prediction is about 19 points.**

PART 2 · APPLY IT

1. **Design A: mean = 29 cm, range = 8 cm. Design B: mean = 30 cm, range = 20 cm. Design A is more consistent because it has the smaller range. A reasonable prediction for its next flight is about 29 cm.** Add each set and divide by 5 to find the means. Compare the ranges, then use the mean of the more consistent design for the prediction.
2. **Kai: median = 22 hits, range = 8 hits. Mira: median = 24 hits, range = 16 hits. Mira has the higher typical score, and Kai is more consistent.** The middle value in each ordered set is the median. Compare the ranges to decide which player's scores vary less.
3. **Results vary. Require an identified changed fold, controlled conditions, a prediction, ten recorded measurements with centimeter units, correctly calculated means and ranges, an evidence-based comparison, and a next-flight prediction.** Teacher supplies paper, a centimeter measuring tape, and a clear supervised launch area. Support measuring or recording as needed. Check the calculations against the learner's actual measurements; accept a tied comparison when the measurements support it.

CHALLENGE

Team P: median = 41, IQR = 10, range = 18. Team Q: median = 41, IQR = 10, range = 38. The claim is true. Both teams have the same IQR, so their middle halves have the same spread. Team Q has a larger range, so its scores vary more overall.

Accept equivalent wording for conclusions and predictions such as “about 29 cm.” For IQR, use $Q_3 - Q_1$ after splitting each even-sized ordered data set into two equal halves. Apply It 3 requires actual experiment results and analysis, not a future plan or copied demonstration values.