

REACHING NEW HEIGHTS

Performance Standard 10A.D

Determine the range, mode, mean, and median of a data set accordingly:

- *Mathematical knowledge*: know what range, mode, mean, and median are and determine them correctly for the 15 heights,
- *Strategic knowledge*: use the correct strategies to calculate range, mode, mean, and median, and
- *Explanation*: explain completely and clearly what was done and why it was done.

Procedures

1. *In order to organize, describe and make predictions from existing data (10A)*, students should experience sufficient learning opportunities to develop the following:
 - Arrange given data in order, least to greatest, or greatest to least.
 - Determine minimum value, maximum value, range, mode, and median for an odd number of data points.
2. Provide each student with a copy of the “Reaching New Heights” recording sheet and the rubric. Have students review and discuss the task to be completed and how the rubric will be used to evaluate their work.
3. Ask students to determine the range, mode, mean, and median of the data gathered. Remind students to show all of their work, and write complete explanations/justifications for all calculations. The answer key:
 - The range is 17 inches – the difference between the largest and the smallest numbers.
 - The mean is 6’1” – the sum of the numbers divided by the total number of heights.
 - The median is 6’1” – the value of the middle number after all of the scores have been put in order.
 - The mode is 6’1” or 6’4” – the values that occurred most frequently.
4. Evaluate each student’s work using the rubric as follows and use the guide on the rubric to determine the performance level.
 - 4 = range, mean, median, and mode were determined correctly; strategies to determine the answers were appropriate; explanations/justifications of procedures used to determine the answers were complete and accurate.
 - 3 = range, mean, median, and mode may have made minor calculation errors or strategies for calculating the range, mean, median, or mode were uncertain, but not both; explanations/justifications had mostly clear and complete.
 - 2 = range, mean, median, and mode may have made minor calculation errors and strategies for calculating the range, mean, median, or mode were uncertain, but not both; explanation or justification were satisfactory, but not both.
 - 1 = range, mean, median, and mode had major calculation errors; strategies for calculating the range, mean, median, or mode were incomplete or incorrect; explanation/justification were incomplete or inconsistent.
 - 0 = task was not attempted.

Examples of Student Work follow

Time Requirements

- One class period

Resources

- Copies of the “Reaching New Heights” recording sheet
- Calculator (if needed)
- Mathematics Rubric

NAME _____ DATE _____

Reaching New Heights

Student Recording Sheet

The XYZ Basketball team has 15 members. They were weighed and measured before the basketball season started. Use the chart to answer the questions below. Be sure to show all of your work. Explain your answers fully—how your work was done and why you chose the strategies you used.

| Player Name | Height | Weight |
|-----------------|--------|------------|
| Tom Thumb | 5'11" | 165 pounds |
| Jim Jumper | 6'4" | 210 pounds |
| Chris Crasher | 6'2" | 187 pounds |
| Nathan Netting | 5'8" | 160 pounds |
| Scott Scorer | 6'6" | 225 pounds |
| Jason Jarvis | 6'0" | 200 pounds |
| Brian Bomber | 6'7" | 250 pounds |
| George Galloper | 5'9" | 185 pounds |
| Dillon Dunker | 6'1" | 230 pounds |
| Fred Flyer | 5'7" | 198 pounds |
| Harry Hopper | 6'4" | 234 pounds |
| Jeffrey Jackson | 6'9" | 275 pounds |
| Kevin Kicker | 5'6" | 155 pounds |
| Larry Leaper | 6'11" | 265 pounds |
| Mike Mover | 5'6" | 167 pounds |

1. What is the range of the heights? Explain your answer.

2. What is the mean of the heights? Explain your answer.

3. What is the median height? Explain your answer.

4. What is the mode of the heights? Explain your answer.

NAME _____

DATE 03-22-02

Reaching New Heights

Student Recording Sheet

The XYZ Basketball team has 15 members. They were weighed and measured before the basketball season started. Use the chart to answer the questions below. Be sure to show all of your work. Explain your answers fully—how your work was done and why you chose the strategies you used.

| Player Name | Height | Weight |
|-----------------|---------------------|------------|
| Tom Thumb | 5'11" ⁶ | 165 pounds |
| Jim Jumper | 6'4" ¹⁰ | 210 pounds |
| Chris Crasher | 6'2" ⁹ | 187 pounds |
| Nathan Netting | 5'8" ⁴ | 160 pounds |
| Scott Scorer | 6'6" ¹² | 225 pounds |
| Jason Jarvis | 6'0" ⁷ | 200 pounds |
| Brian Bomber | 6'7" ¹³ | 250 pounds |
| George Galloper | 5'9" ⁵ | 185 pounds |
| Dillon Dunker | 6'1" ⁸ | 230 pounds |
| Fred Flyer | 5'7" ³ | 198 pounds |
| Harry Hopper | 6'4" ¹¹ | 234 pounds |
| Jeffrey Jackson | 6'9" ¹⁴ | 275 pounds |
| Kevin Kicker | 5'6" ² | 155 pounds |
| Larry Leaper | 6'11" ¹⁵ | 265 pounds |
| Mike Mover | 5'6" ¹ | 167 pounds |

1. What is the range of the heights? Explain your answer. I choose the largest heights to the smallest, and then I subtract 6'11" and 5'6".

$$\begin{array}{r}
 6'11'' \\
 - 5'6'' \\
 \hline
 1'5''
 \end{array}$$

2. What is the mean of the heights? Explain your answer.

$$\begin{array}{r} 73.26666 \\ 15 \overline{) 1,099} \end{array}$$

First I change the heights to inches, second I added all the heights, third I will divided by 15. Last I got my answer it was 73.266... so the mean is 73 inches or 6'1"

3. What is the median height? Explain your answer.

① 5'6", ② 5'6", ③ 5'7", ④ 5'8", ⑤ 5'9", ⑥ 5'11", ⑦ 6'0", ⑧ 6'1", ⑨ 6'2", ⑩ 6'4", ⑪ 6'4", ⑫ 6'6", ⑬ 6'7", ⑭ 6'9", ⑮ 6'11"

6'1"

I choose to put all the heights in order, then what I'll do is I will circle the number in the middle.

4. What is the mode of the heights? Explain your answer.

5'6" 6'4"

Mode is when two numbers are the occur, so I put 5'6", and 6'4"

NAME

"Exceeds" (page 1)

DATE

March 22, 2002

Reaching New Heights

Student Recording Sheet

The XYZ Basketball team has 15 members. They were weighed and measured before the basketball season started. Use the chart to answer the questions below. Be sure to show all of your work. Explain your answers fully—how your work was done and why you chose the strategies you used.

| Player Name | Height | Weight |
|-----------------|--------------------|------------|
| Tom Thumb | 5'11" ✓ 15 (71 in) | 165 pounds |
| Jim Jumper | 6'4" ✓ 19 (76 in) | 210 pounds |
| Chris Crasher | 6'2" ✓ 13 (74 in) | 187 pounds |
| Nathan Netting | 5'8" ✓ 12 (68 in) | 160 pounds |
| Scott Scorer | 6'6" ✓ 11 (78 in) | 225 pounds |
| Jason Jarvis | 6'0" ✓ 10 (72 in) | 200 pounds |
| Brian Bomber | 6'7" ✓ 9 (79 in) | 250 pounds |
| George Galloper | 5'9" ✓ 8 (69 in) | 185 pounds |
| Dillon Dunker | 6'1" ✓ 7 (73 in) | 230 pounds |
| Fred Flyer | 5'7" ✓ 6 (67 in) | 198 pounds |
| Harry Hopper | 6'4" ✓ 5 (76 in) | 234 pounds |
| Jeffrey Jackson | 6'9" ✓ 4 (81 in) | 275 pounds |
| Kevin Kicker | 5'6" ✓ 3 (66 in) | 155 pounds |
| Larry Leaper | 6'11" ✓ 2 (83 in) | 265 pounds |
| Mike Mover | 5'6" ✓ 1 (66 in) | 167 pounds |

1. What is the range of the heights? Explain your answer.

I chose this because, I
had to subtracted the
largest height from
the smallest height

$$\begin{array}{r}
 6'11'' \\
 - 5'6'' \\
 \hline
 1'5''
 \end{array}$$

$$15 \overline{) 1099} \begin{array}{r} 73.266... \\ 1050 \\ \hline 49 \\ 45 \\ \hline 49 \\ 45 \\ \hline 49 \\ 45 \\ \hline 49 \end{array}$$

2. What is the mean of the heights? Explain your answer.

First I changed all my heights to inches. Second I added all my heights. Then I divided 15 and 1099. Last I have gotten 73.266...
So, the mean is 73 inches or 6'1".

3. What is the median height? Explain your answer.

I found the median by putting the height in order, and by finding the height in the middle.
Answer 6'1".

6'11", 6'9", 6'7", 6'8", 6'4", 6'4", 6'2", 6'1", 6'0", 5'9", 5'8", 5'7", 5'6", 5'6", 5'11".

4. What is the mode of the heights? Explain your answer.

I chose this because I chose the heights that occur the most. The mode was 5'6" 5'6" and 6'4".