Box & Whisker Worksheet

For questions 1 – 6, refer to the box & whisker graph below which shows the test results of a math class.

Test Scores (as %) for 6th Period

1. What was the high score on the test?
2. What percent of the class scored above a 72?
3. What percent of the class scored between 88 & 96?

4. Do you think that this test was too hard for the students? Explain.
   No, majority passed the test

5. Would you expect the mean to be above or below the median? Explain.
   Yes, the lower grades would pull down the mean.

For questions 6 – 9 refer to the box & whisker graph below that shows how much time was spent per night on homework for sophomore class at a certain high school during September.

Average Minutes Per Night Spent On Homework

6. What percent of the sophomores spend more than 60 minutes on homework per night?

7. What is the range of times that the middle 50% of the sophomores spend on homework per night?

8. What percent of the sophomores spend less than 20 minutes per night on homework?

9. Would you expect the mean number of minutes per night to be higher or lower than the median? Explain.
   Higher - the median is the upper extreme will pull up the average time.
For questions 10 – 18, refer to the box & whisker graphs below that compare homework time per night with TV time per night for the same group of sophomores.

**TV & Homework Minutes per Night**

10. What percent of the sophomores watch TV for at least 15 minutes per night?

11. Is it more common for a sophomore at this high school to spend more than 1 hour on homework or more than 1 hour watching TV? Explain.

**TV**

<table>
<thead>
<tr>
<th>75%</th>
<th>25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>60</td>
</tr>
</tbody>
</table>

For questions 12 – 18, identify if each statement is true, false, or cannot be determined.

12. Some sophomores didn't watch TV that month.

13. The TV box & whisker graph contains more data than the homework graph.

14. 15% of the sophomores didn't watch TV that month.

15. In general, these sophomores spend more time watching TV than doing homework.

16. The TV data is more varied than the homework data.

17. The ratio of sophomores who spend more than 110 minutes per night watching TV to those who spend less is about 2:1.

18. Twice as many sophomores watch TV for more than 1 hour than do homework for more than 1 hour.
Warm Up

Apply a real life situation to the data below and plot a box and whisker using the number line below.

<table>
<thead>
<tr>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Real life situation:

0, 0, 1, 1, 3, 3, 4, 4, 4, 6, 6
Comparing and Contrasting Box and Whisker Plots

Always Know

- Lower Extreme
- Upper Extreme
- Range
- Median
- UQ
- LQ

Unknown

- How many pieces of data
- Mean
- Mode
- How many pieces of data

Practicing with the number of data points:
You are given the box and whisker plot below. It represents the number of times 15 families purchased fast food during a two month period. What are the numbers?

Determine what you know.

<table>
<thead>
<tr>
<th>LE</th>
<th>LQ</th>
<th>M</th>
<th>UQ</th>
<th>UE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>9</td>
<td>19</td>
<td>30</td>
<td>36</td>
</tr>
</tbody>
</table>

How do the numbers that you know relate to the quartile percentages?

1. How many families had fast food 19 times or more over the two month period?

2. How many families averaged fast food only once a week or less?

High Temperatures in Boston and Seattle for the month of November

1. If the above box and whisker plots are the results of collecting data every day for the month of November, how many days were at 51.5 and above in Boston and 52 and above in Seattle?

- 15 in Boston and 15 in Seattle.

2. Which city experiences a greater range in temperatures?

- Boston experiences a greater range in temperatures.
Comparing and Contrasting Box and Whisker Plots

Ages of Players on the Yankees and Rangers During the 2002 Season

1. Is there a large difference between the range of ages on the teams?

2. Which team is the “younger” team; and which team is the “older” team?
   - Yankees: higher median
   - Rangers: lower median

3. How can one team be older or younger than the other if their range is similar?

4. If there were 38 Yankee players on the roster and 51 Rangers on the roster, how many Yankees were 31 or older and how many Rangers were 31 or older?
   \[ \frac{38}{51} \times 13 = 13 \]

Points Scored in Each Game of the 2001-2002 Season for the Patriots and the Rams

1. Did one team score consistently higher than the other team?
   - The Rams scored consistently higher than the Patriots. 75% of the Rams scores are above the top 50% of the Patriots.

2. Which team do you think had the better season and why?
   - The Rams had a better season because they consistently scored higher.
Comparing and Contrasting Box and Whisker Plots

Fuel Economy: City MPG of Small Cars and Sport Utility Vehicles for 2002

1. Describe the overlap between the two sets of data.
   The overlap is from 19-25 mpg. The bottom 50 percent of the small cars is the same as the top 25 percent of the SUV's.

2. Which is a more realistic measure of central tendency for small cars, mean or median? Why?
   Median — mean will be skewed

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Mr. McPic and Mrs. Frizzle’s Algebra 1 Equation Test Scores

Both classes have 25 students in each class.

1. If you are in Mr. McPic’s class would you rather he gave everyone the median grade or the mean as the grade?
   The median grade will be higher. The lower extreme will bring down the class average.

2. If you are in Ms. Frizzle’s class would you choose the mean or the median?
   In Ms. Frizzle's class the box and whisker plot is balanced so the mean and median will be fairly close.

3. What percent of Mr. McPic’s class performed the same as the top 25 percent of Ms. Frizzle’s class?
   The top 50 percent of Mr. McPic’s class performed the same as the top 25% in Ms. Frizzle’s class.
Comparing and Contrasting Box and Whisker Plots

1. If both shops are reputable and you only have a budget of $400, which shop will have a better inventory from which you can choose? Shop B is more affordable, the median price is lower.

2. Will the inventory report for shop A look more valuable if they use the mean price of the surfboard to calculate or if they use the median price? Which would be the more accurate measure if they were to purchase insurance? Mean is higher, median more accurate.

Car Sales per Month at a Dealership in Bargaintown
Sales Rep A has worked for 1 year; Sales Rep B has worked for 2 years. Data points represent sales in a given month.

1. If you decide to start selling cars, how many cars will you probably sell in an average month? Probably 14

2. During how many months did Sales Rep A sell 14 to 16 cars? During how many months did Sales Rep B sell 14 to 16 cars? 3 months

Ages of U.S. Olympic Soccer Team Players

1. Can you make any conjectures about women's fitness over a broad age span as compared to men's fitness? Women's ability to play soccer spans a much broader age range than the men's ability to play.

2. What statement could you make about the ability of men to play competitive soccer after age 22, as compared with the ability of women to play competitive soccer after the age of 22? Women are much more likely to play competitive soccer after age 22 than men.
Comparing and Contrasting Box and Whisker Plots

Use a graphing calculator to make a box-and-whisker plot of the data below. Find the five number summary.

10 26 18 35 14 11 17 29 31 25 27 20 19 12 13 26

Step 1
Press \text{STAT} 1: 	ext{Edit} \rightarrow \text{ENTER}.
Enter data under L1. (To clear L1, move the cursor over L1 and press \text{CLEAR}, then \text{ENTER}.)

Step 2
Press \text{2nd} \ Y= for \text{STAT PLOTS}.
Enter 1. Highlight ON and also Type: box-and-whisker plot. Press \text{ENTER}.

Step 3
Press \text{ZOOM} and enter 9. Press \text{TRACE} and move the cursor across the box-and-whisker plot to find the five number summary.

The five number summary is minimum = 10, Q_1 = 13.5, median = 19.5, Q_3 = 26.5, maximum = 35.

Step 4
Use a graphing calculator to find the five number summary for the following set of student test grades shown below.

98 92 76 84 93 82 74 68 85 91 77 83 94 97 72 88 70 84 87 82