Box and Whisker Plot, Marissa Watson
High School Geometry
90 minute lesson

Big Idea: This lesson unit is intended to help you assess how well students are able to interpret data using frequency graphs and box plots. In particular this unit aims to identify and help students who have difficulty figuring out the data points and spread of data from frequency graphs and box plots.

Learning Goal:
      Students will be able to interpret numerical data on a real number line as a box plot.
      Students will be able to identify a box and whisker plot when given data.

Common Core Standard:
S-ID: Summarize, represent, and interpret data on a single count or measurement variable.

Materials:
   The note sheet
      Ruler
      Whiteboard with pen and eraser.
      Card Set: Frequency Graphs and Card Set: Box Plots
      A large sheet of paper for making posters

Introduction:
- Hand out the Cell Phone 2 Work Sheet. Have students complete this worksheet with a partner for 10 minutes.
- After ten minutes have a short discussion with students about what they struggled with and what they learned.
  - Questions:
    - What data values are represented on a box plot?
    - What do the vertical/horizontal lines represent?
    - The two horizontal lines on the box plot are of different lengths. What does this mean?
    - How many students spend between $20 and $24 a month? How do you know?
    - What does the median represent?
    - How can you show the median value on the graph?
    - What does the lower quartile represent?
    - What does the upper quartile represent?

Cell Phones 2

1. The box plot shows the monthly spending of a group of 120 students on their cell phones:

0   4   8   12   16   20   24   28   32   36   40

Amount spent ($)
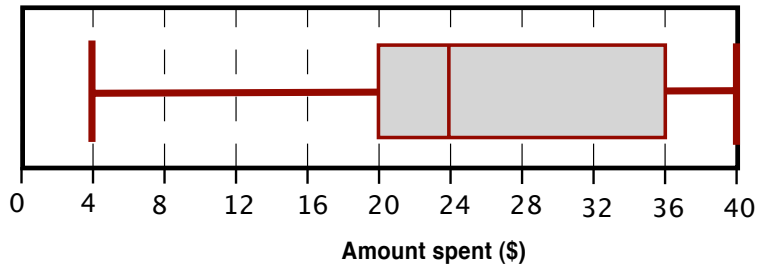
What does the box plot tell you about the students' monthly spending?

The quartile that shows the biggest spread in spending is the

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I know this from the box plot because

For the 60 students who spent the least, the spread of data is   **greater / less** (*circle*) than the
spread of data for the 60 students who spent the most each month.

I know this from the box plot because

--------------------------   (*add number*) students spend more than $20.

 I know this from the box plot because

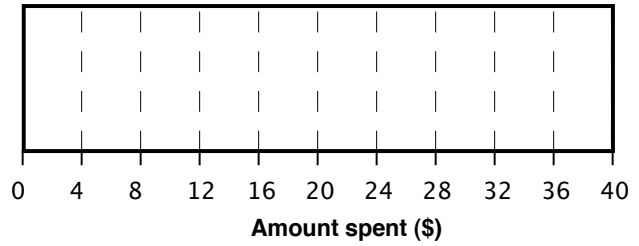--

2. Here is a frequency graph of the monthly spending of a group of students on their cell phones:
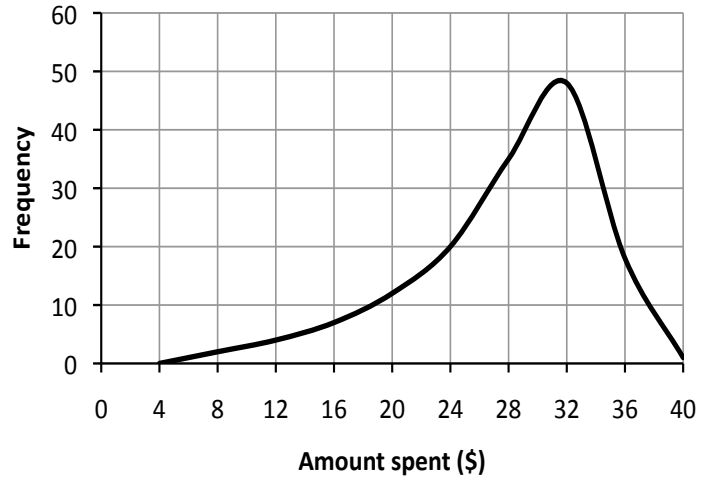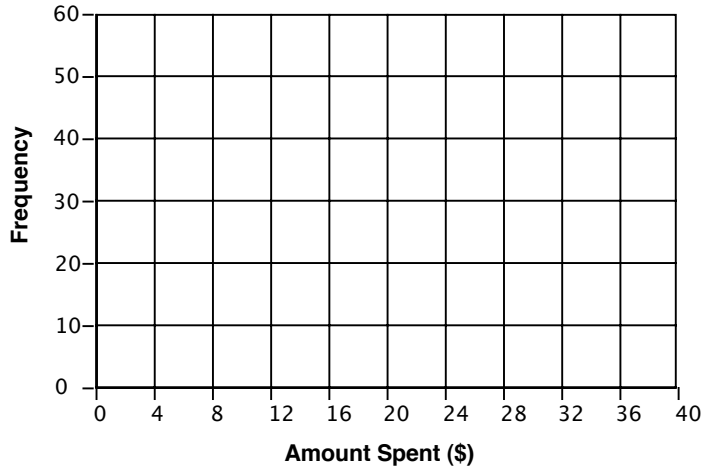

a. Draw a possible box plot for this graph.

Describe your box plot, by adding explanations to the graph or box plot.

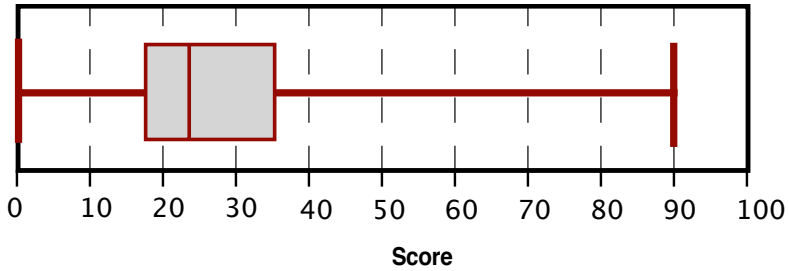b. Sketch another possible frequency graph for your box plot.
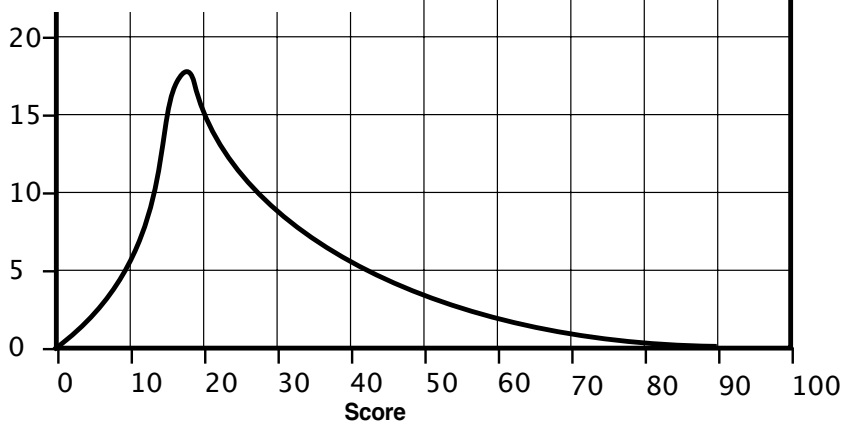

I have drawn the graph this shape because _____
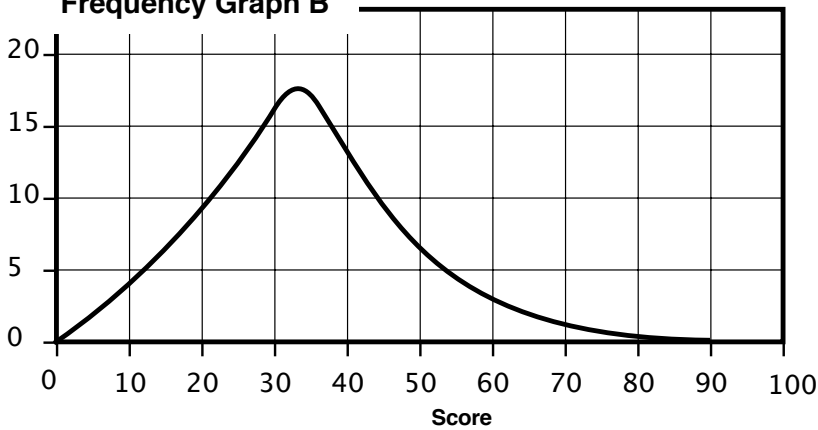
_____

_____

Matching a Box Plot to a Frequency Graph

Show students the box and whisker plot along with the four graphs. Have students discuss in their groups which graph is best represented by the box and whisker plot.
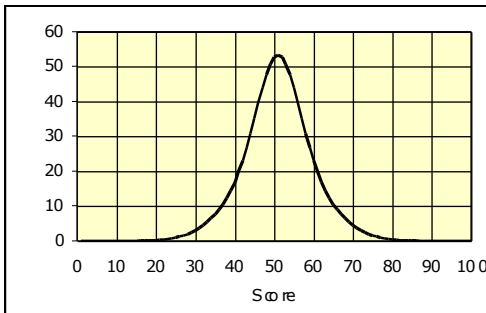
Frequency Graph A

Frequency Graph B

Frequency Graph C
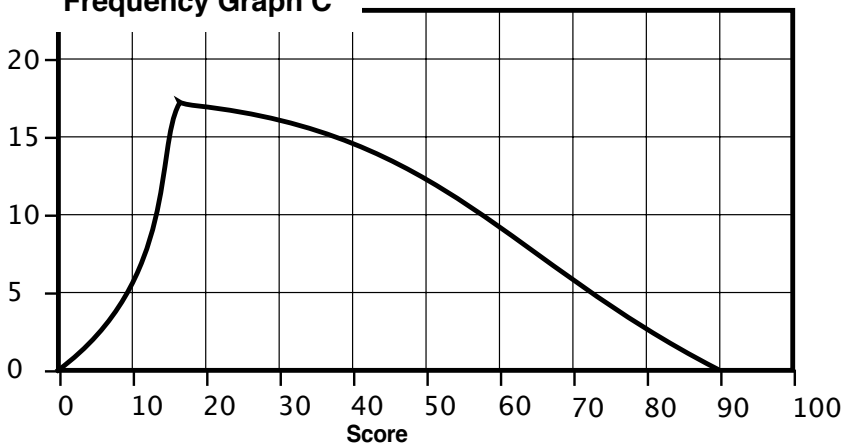
Matching Cards

1. Take turns at matching pairs of cards that you think belong together.

2. Each time you do this, explain your thinking clearly and carefully.

3. Your partner should either explain that reasoning again in his or her own words, or challenge the reasons you gave.

4. Write your reasons for each match on the poster provided.

You both need to be able to agree on and explain the placement of every card.
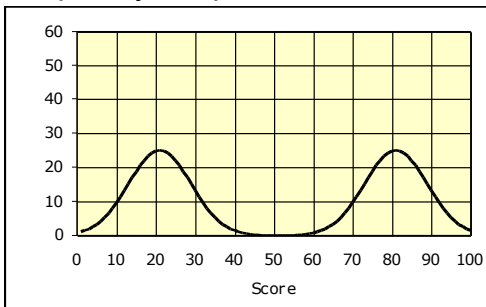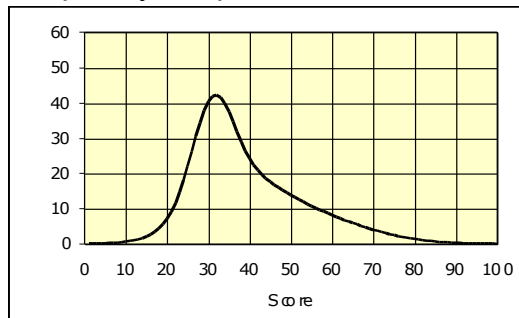
Card Set: Frequency Graphs

Frequency Graph A
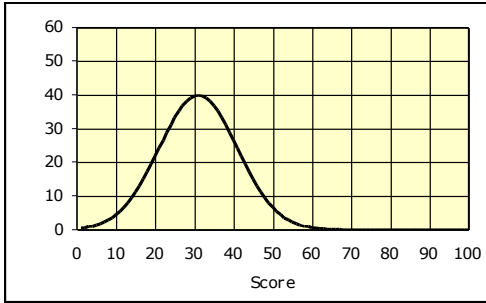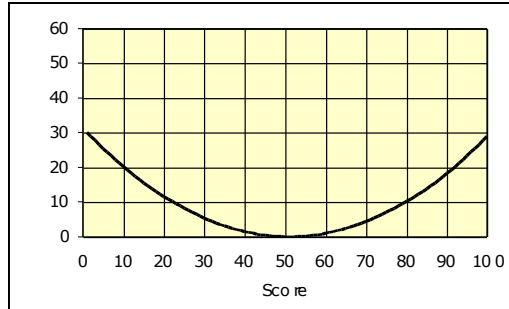
Frequency Graph B

Frequency Graph C

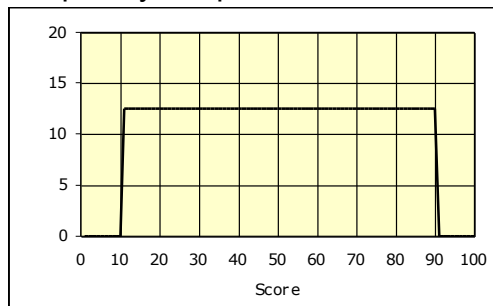## Frequency Graph D
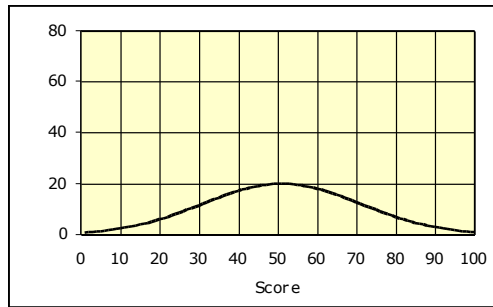
Frequency Graph E
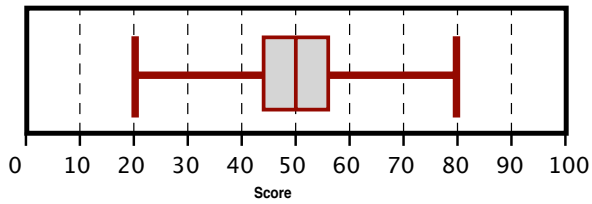

Frequency Graph F

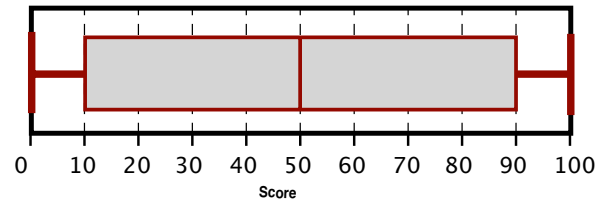## Frequency Graph G
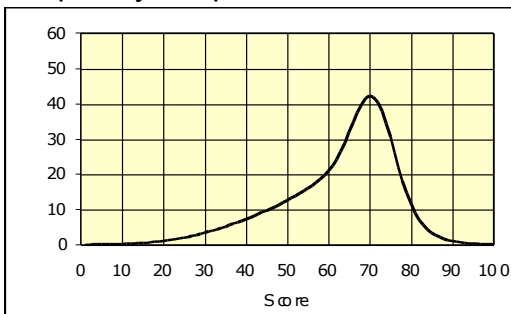
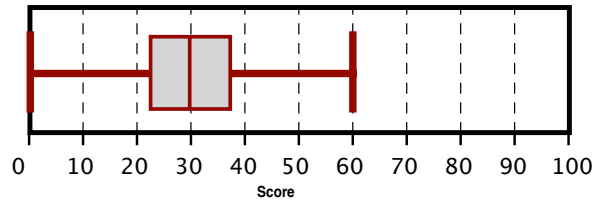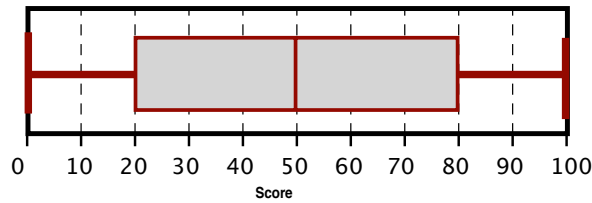## Frequency Graph H

Card Set: Box Plots

Box Plot 1

Score

Box Plot 2

Score

Box Plot 3

Score

Box Plot 4

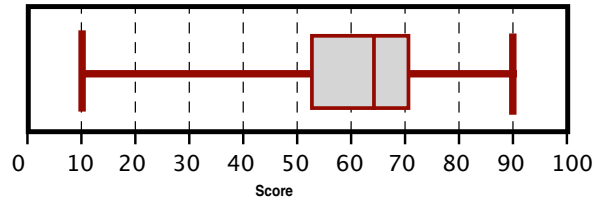
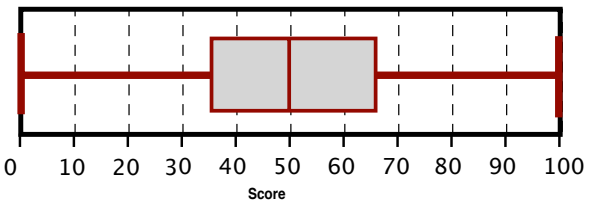Score

Box Plot 5

Score

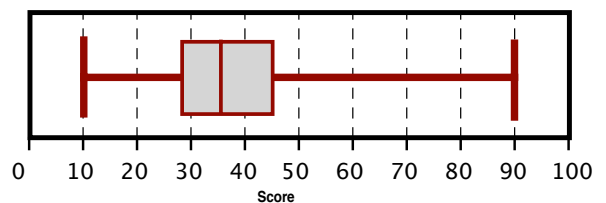## Box Plot 6

Score

Box Plot 7

Score

Box Plot 8

Score
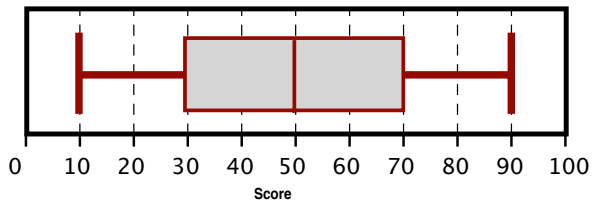
- Have students walk around and explore other peoples posters. Use sticky notes to have groups make notes to other groups about whether they agree or disagree.

- Have students examine their poster and the comments other students made.

End:

Have an end of class discussion to clarify which cards should be matched together and why.
Questions:
How did you decide to match this card?
Can someone else put that into their own words?
Could this card be matched with another one?

Discuss how there could be different matches.

What does a box plot tell you for definite about the data?
What does a box plot not tell you about the data?
Do you know if the scores in the top quartile are evenly distributed? What about outliers?

Exit Task: Suppose the median is 34 instead of 24. How would this change the graph? Sketch it.