Date: 08.05.2014
Teacher: Ceren Özbay
Number of Students: 16
Grade Level: 9- Y
Time Frame: 40 minutes

BOX AND WHISKER PLOT

1. Goal(s)

- To develop an understanding of the topic box and whisker plot.

2A. Specific Objectives (measurable)

Students will be able to;

- Create box and whisker plots
- Compare and analyze different box and whisker plots
- Find mode, median, quartiles through box and whisker plot

2B. Ministry of National Education (MoNE) Objectives

9.6.2. Verilerin Grafikle Gösterilmesi/9.6.2.3. Kutu grafiğini açıklar, bir veri grubuna ait kutu grafiğini çizerek yorumlar ve veri gruplarını karşılaştırmada kutu grafiğini kullanır.

3. Rationale

Box and whisker plot use to show median, lower quartile, upper quartile and outliers of a large amount of population. More people in different professions are finding use for box and whiskers plots. It can be used very effectively in time series analysis, which may include engineers, economists, earth scientists, statistician, social sciences and medicine, to name a few professions.

4. Materials

- Board.
- At least two different colored board markers.
- One worksheet to each student
- Projector
- Computer

5. Resources

- TED textbook, Harris and Hease HL book

6. Getting Ready for the Lesson (Preparation Information)

- Teacher should make sure that she gets the worksheets.
- Teacher will check the computer.
- Teacher will be sure that board markers are working.
- Teacher will remind students they are supposed the do the rest of questions on the questions as homework.

7. Prior Background Knowledge (Prerequisite Skills)

It is assumed the students' have a basic understanding of statistics including the following term:

- Median
- Minimum Value
- Maximum Value

- Lower quartile
- Upper quartile
- Outliers

It is also assumed students are capable of finding mode, lower quartile, and upper quartile.

Lesson Procedures

Transition: Good morning class! Today, we are going to learn vectors.

8A. Engage (5 minutes)

- Write on the board " why do we need box and whiskers plot ?"
- let student think about the idea:

 Let's say you have an extreme number of data set.

- Ask to students:

How do you show them? Using diagram or bar char? Is not it hard?

- Gather answer from the students and explain usage of the box and whiskers plot
- Add that through box and whisker plot, you can give information about mean, quartiles, the min and max value of the data set.

Transition: Let's have a look at the questions.

B. Explore (10 min.)

- Distribute the worksheet given the last page.
- Students will try to solve the question.
- Walk around and ask "how did you get this answers?" and help students.
- Let students solve the question.
- If somebody solves the question, let her /his solve it on the board.

Transition: have you realized any features?

C. Explain (10 min.)

- Reflect the page and teach the topic.

6.2.3. Box and Whisker Plot

Box and whisker plot is a convenient way of graphically depicting groups of numerical data through their quartiles. It is used to display differences between populations without making any assumptions of the underlying statistical distribution.
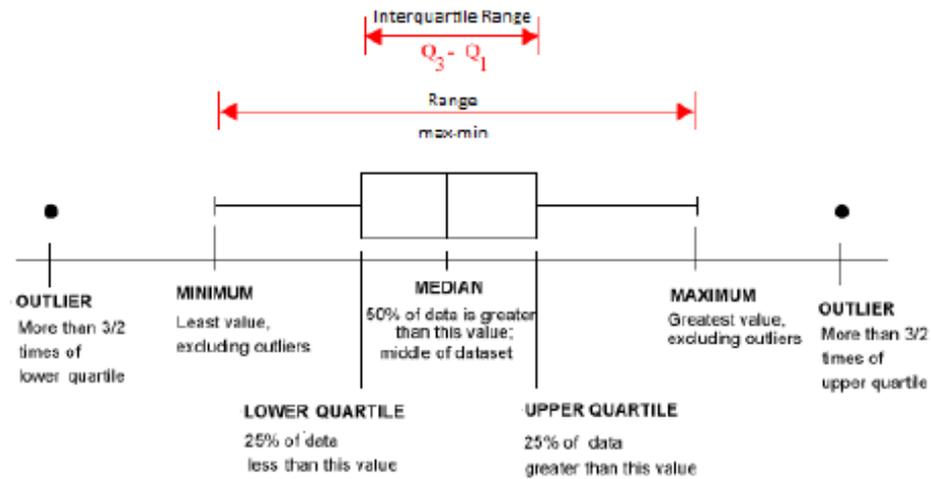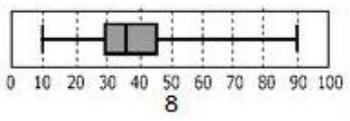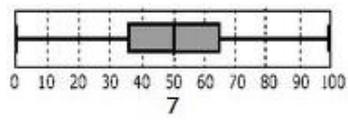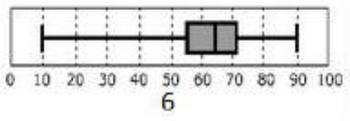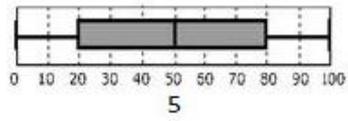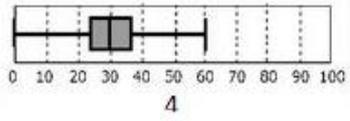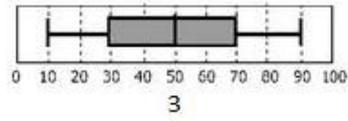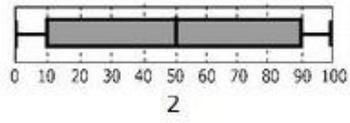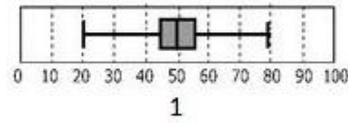

Outliers are the points lying more than 1,5 times the IQR above Q3 or below Q1. Mark any outlier with '•' or '*' .

- Ask students why we nedd box and whisker plot
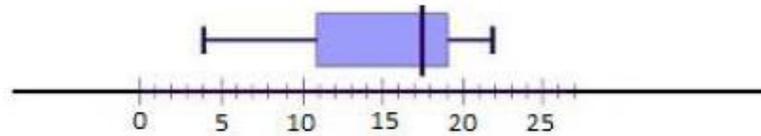
- Reflect two question and solve them.

Ex(22): Comment on the following box and whisker plots

Ex(23): A box and whisker plot has been drawn to show the heights of a special plant, in cm

a) What is the *i)* tallest height :

        ii) shortest height :

        iii) 75th percentile :

        iv) median height :

        v) range :

        vi) IQR :

b) Give an example for any outlier

- Asks for justification and clarification from students.

Transition: If you have no questions, let's solve more problems.
D. Extend (15 min)
- Students will try to solve questions about vectors on their workbooks :

Ex(24): Make the box and whisker plot of the following data
44, 28, 51, 62, 60, 43, 51, 66, 32, 57, 54

Ex(25):

A class of students have played a computer game wich tested how quickly they reached to a visual instruction to press a particular key. The box and whisker plot shows their reaction times in seconds.
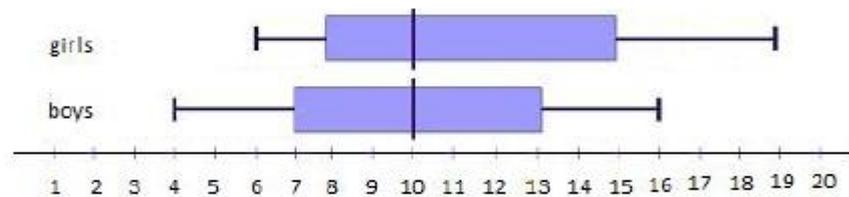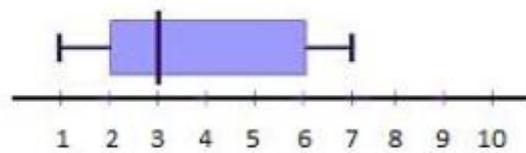

a) Explain the performance of the boys and girls in this game.

b) Find the IQR of the reaction times of the boys and girls.

Ex(26):

The box and whisker plot shown below represents the marks received by 32 students

a) Write down the value of the median mark.

b) Write down the value of the upper quartile.

c) Estimate the number of students who received a mark greater than 6.

Ex(27):

The box and whisket plot of the data

48, 48, 49, 49, 50, 52, 52, 53, 57, 58, 58, 61, 64, 64, 66

is shown below

a) Write down the values of A, B, C, D and E.

b) Find the IQR.

- Walk around and ask "how did you get this answers?"
- Check the students whether they solve the problems or not.
- answers will be checked on the board by writing the questions on the board

Transition: good job! Thank you, class. Have a nice day!

E. Evaluate (During the whole lesson):
- Assesses students' knowledge and skills through oral questions.
- Observe the students during the lesson.
- Take notes students' name if they have a problem when they solve questions.

9. Closure & Relevance for Future Learning
- Ask students to explain what they learn today.
- Then, want students to write 3 key words that they have learned this lesson a piece of paper.
- Assign students to do the rest of the questions on the workbook.

11. Modifications
- If students cannot remember previous lesson, give them some clues.
- If students do not give answer to your questions, wait 20 seconds more.
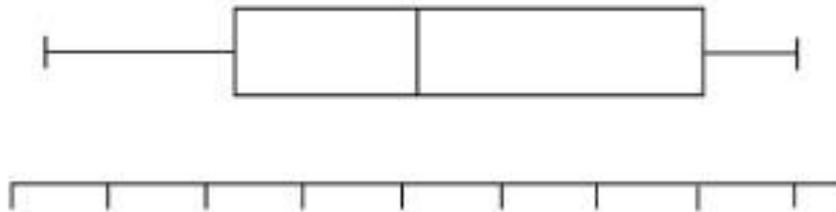- Choose simple questions firstly to solve on the board.

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Question:

Julie examines a new variety of bean and does a count on the number of beans in 33 pods. Her results were:

5, 8, 10, 4, 2, 12, 6, 5, 7, 7, 5, 5, 5, 13, 9, 3, 4, 4, 7, 8, 9, 5, 5, 4, 3, 6, 6, 6, 6, 9, 8, 7, 6

   a. Find the minimum and maximum value of the data set.

   b. Find the median, lower quartile and upper quartile of the data set.

   c. Try to put each value that you find part **a** and part **b** on the box and whisker plot. Remember the definition of each term!

   d. Justify your answers briefly.