Summer 6-12-2015

Data Displays [6th grade]

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UNDERSTANDING BY DESIGN

Unit Cover Page

Unit Title: Data Displays, Can I Get a Visual?!

Grade Level: 6th Grade

Subject/Topic Area(s): Math

Designed By: Melanie Webb

Time Frame: 13-15 Days

School District: Spring Branch ISD

School: Spring Branch Middle School

School Address and Phone:
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Houston, TX 77024

Brief Summary of Unit (Including curricular context and unit goals):

This unit was created to cover the data displays portion of statistics and measurement standards. Students will create data displays correctly, and use their knowledge to decide which data displays works best for their data and why.

The students will focus to understand that
- Not every data display is appropriate for data given.
- Each data display has its own purpose.
- The way information is displayed can skew a person's perception of it.

They will do this through representing numeric data graphically including dot plots, stem-and-leaf plots, histograms, and boxplots, and using the graphical representation of numeric data to describe the center, spread, and shape of the data distribution. The will also analyze the shape and what that tells us about the data.

Data Displays – 6th Grade: "Can I Get a Visual?!"

Stage 1 – Desired Results

Established Goals (e.g., standards)	

Established Goals (e.g., standards)

6.12 Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:

(A) represent numeric data graphically, including dot plots, stem-and-leaf plots, histograms, and boxplots;

(B) use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution;

(C) summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution

6.13 Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to solve problems. The student is expected to:

(A) interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots; and

(B) distinguish between situations that yield data with and without variability.

Transfer

Students will independently use their learning to…
Create data displays correctly, and use their knowledge to decide which data displays works best for their data and why

Meaning

Understandings	Essential Questions
Students will understand that….	How can we use different data displays to convey the message we want at a glance?
Not every data display is appropriate for data given.	How does data influence the type of graph? How does a graph influence perception?
Each data display has its own purpose.	What question can each data display answer?
The way information is displayed can skew a person's perception of it.	Can the statistics presented be a lie?

Acquisition

Knowledge	Skills
Students will know…	*Students will be able to…*
A Dot Plot is a visual display of a distribution of data values where each data value is shown a dot or other mark.	Represent numeric data graphically including dot plots, stem-and-leaf plots, histograms, and boxplots.
Stem-and-Leaf Plots order data from least to greatest and are organized by place value.	Use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution.
Histograms is a type of bar-graph used to represent numerical data that have been organized in equal intervals. The visual is a frequency distribution of the data. Does not show individual data.	Analyze the shape and what that tells us about the data.
Box Plots uses a number line to show the distribution of a set of data by using the median, quartiles, and extreme values	

Stage 2 – Evidence		
CODE (M or T)	**Evaluative Criteria** (for rubric)	
T	Correctly create the 4 data displays Perform correct mathematical operations (MMMR) Analyze which display works best for the time of data collected.	Performance Task(s) *Students will demonstrate meaning-making and transfer by…* Students will survey their class (for at least 20 pieces of individual data), and use the data to create the four data displays covered in the unit. From this, the goal is to recognize the difference between the different data displays and choose the best one to represent the data. Reflect on each display's impact in discussion and written paragraph, be able to justify reasoning. ---
M/T	Justify reasoning	Other Evidence (e.g., formative) Warm-Ups Homework Exit Tickets Statistics and Data Displays Test
Stage 3 – Learning Plan		
CODE (A, M, T)	Pre-Assessment *How will you check students' prior knowledge, skill levels, and potential misconceptions?* The students should have just completed learning about Statistical Measures: Measures of Center (Mean, Median, and Mode) and Measures of Spread (Range). As we move into Data Displays, these will play a major role. Suggested continued review through daily warm-ups.	
A M	**Learning Activities** **Day One - Intro to data Displays** **Warm Up -** Two problems on Median and Mode **Discussion -** PowerPoint or SMART Slides Show first data with a question, unorganized. Allow students to Think/Pair/Share on what they noticed (Measures of Center of Spread) What does the data tell us? So What? Next show data organized on a data display. **EQ focus -** How can a display convey the message at a glance? **Activity -** Continue with comparing loose data to data displays. Give students recording sheets to write down thoughts. Have them use data to find their measures of center (mean, median,	Progress Monitoring (e.g., formative data)

mode) and measures of spread (range). Pair thoughtfully with data displays that would show these measures intuitively if possible. (Example: Dot plots show mode easily. Box plots show range easily)

Homework – Possible Pre Assessment

Day Two - Dot Plots

Warm Up - Continue review of MMMR with two problems from a small set of data

A **Discussion -** Prep butcher paper of large posters with question and number line. Give students 2 dots (or Post-Its) and have them place them on the number lines to make a dot plot. Discuss what this shows about the class.

EQ focus - <mark>How does data influence the type of graph? What question can each data display answer?</mark>

Lesson - Graphic Organizer Introduction

A Discuss what a dot plot looks like, what it's used for, and the rules of creating one. Which measures of center or spread are easily identifiable?

Activity – Given data, create dot plots. The students will write a

M question they think will be able to be answered by the dot plot. Students can switch papers and answer each other's questions if time permits

T **Homework –** Dot Plot HW

Day Three – Dot Plots and Shape

Warm Up - Continue review of MMMR with two problems from a small set of data

Discussion – Talk about Shape of the display and the vocabulary:

A Cluster, Gap, Peak, Symmetry, Outlier, and Skew. Start by defining each term with its meaning outside mathematics. Give the option to draw the word. After the words have been discussed, have them draw what they think it means to a dot plot. Bonus points if they can draw and label five or six terms in the same dot plot.

ELL VOCAB GAME

EQ focus - <mark>How can a display convey the message at a glance?</mark>

Activity – Have students pull dot plots out of a bag and have to

M use two or three vocab words to describe it to their partner. Students can switch partners each time if desired.

Homework – More dot plot practice

Day Four – Stem and Leaf Plots

Warm Up – Continue review of MMMR with two problems from a small set of data

Discussion – Have kids answer a question on the front board –

A Think about what kind of question would yield good results to make a stem-and-leaf plot. Use student data to create stem and leaf plot. Add to Graphic Organizer at the end of the discussion. Discuss what a stem-and-leaf plot looks like, what it's used for,

and the rules of creating one. Which measures of center or spread are easily identifiable? Could we have used the same data we used with the dot plots? Why or why not?

EQ focus - ==How does data influence the type of graph?== ==What question can each data display answer?==

Activity – Stem and Leaf Match. Students match Stem and Leaf plot to its Mode, Median, Range, and Key. From one of the Stem-and Leaf-Plots, they must find mean.

Homework – Stem and Leaf HW

Day Five – Stem and Leaf Plots and Shape

Warm Up - Continue review of MMMR with two problems from a small set of data

Discuss –Show a stem and leaf plot on the board. Have students vote on what vocabulary word they think would best describe the shape. Think/Pair/Share could work well for this as there will likely be more than one correct answer. Repeat for 3 or 4 stem and leaf plots

EQ focus - ==How can a display convey the message at a glance?==

Lesson – Creating Stem and Leaf Plots.

Homework – Finish Classwork

Day Six - Histograms

Warm Up - Continue review of MMMR with two problems from a small set of data

Discussion – Go through Interpreting Histograms PPT, discussing along the way. Add to Graphic Organizer. Discuss what a histogram looks like, what it's used for, and the rules of creating one. Which measures of center or spread are easily identifiable?

EQ focus - ==What question can each data display answer?== ==How does data influence the type of graph?==

Activity – Interpreting Histograms

Homework – Histogram HW

Day Seven – Histogram Practice

Warm Up – Given data, tell what interval you think you would split it into to make a histogram.

Discussion – What's important to remember when creating a histogram? If you change the intervals used, would it change the perception? Using one set of data – pre-determined or collected from the class – create two or three histograms with different intervals. Have students compare and contrast. Focus on shape vocabulary if possible. Words that work well with histograms: gap, peak, symmetry

EQ focus - ==How can we use different data displays to convey the message we want at a glance?==

Activity – Creating Histograms. Students will receive data and create a frequency table and histogram. They will need to write two sentences to state what they understand from the histogram and verbally share with their partner or group.

Homework – Creating Histograms HW

Day Eight – Box Plots
Warm Up - Continue review of MMMR with two problems from a small set of data, today use range and median
Discussion – Box plots are not as intuitive as the other data displays we have learned about. Because of this, we break down creating a box plot to its simplest terms.
Lesson – Box plot notes. Add to Graphic Organizer. Discuss what a box plot looks like, what it's used for, and the rules of creating one. Which measures of center or spread are easily identifiable?
EQ focus - How can we use different data displays to convey the message we want at a glance?
Activity – Box Plot Match
Homework – Box Plot HW

Day Nine – Box Plot Practice
Warm Up - Continue review of MMMR with two problems from a small set of data, focus on quartiles
Discussion – Focus on shape of the box plot, stressing quartiles. Individual data disappears once the box plot is created and what does that mean for the visual? Possible idea is showing a box plot and ask where the data is most concentrated. The same amount of data is in each quartile, but some quartiles are across a smaller range of numbers. Would this be a peak on another display? Does a quartile with a large range represent gaps?
EQ focus - How does data influence the type of graph? How does a graph influence perception?
Activity – Box Plot Activity/Practice TBD
Homework – Finish Classwork

Day Ten – Test Review
Warm Up – Continue review of MMMR with two problems from a small set of data. Today find 1st and 3rd Quartiles
EQ focus - What question can each data display answer?
Activity – You Choose Two Data Displays Activity. Students are given cards with different test-like questions on them. They choose two out of each set to complete for their test review
Homework – Pick a Display

Day Eleven-
Statistics and Data Displays Test

Day Twelve – Fifteen Project
Day Twelve – Brainstorm questions that yield numeric responses (and not categorical) with plenty of variability. Can do this in groups. Have students eliminate questions that may not be good or are overdone or don't pertain to the population in the classroom. Once they do that, each student picks one and begins to collect their data from their classmates.

A

A

M

M

M

T

T

| | **Day Thirteen** – Finish collecting data, calculate measures of center and measures of spread from data, and begin rough drafts of data displays.
Day Fourteen – Create and finish final data displays. Students may have to do some work at home.
Day Fifteen – Discuss with group about their topic and data displays. Which worked best, how does each one convey the message? Students should use their EQs as sentence stems for their paragraph. Teacher discretion whether everything is due at the end of class or beginning of next day. | |

Data Displays Project

Goal: Recognize the difference between the different data displays we have learned about this quarter and choose the best one to represent our data.

The Process:

1. Survey Question

You will create a survey question that will have **numeric** responses. It is your job to think of a survey question that will yield **variability** among your classmates. Try to think of new ones – not the ones we used for your notes, get creative!

Once you have a question you know will work, we will spend the class period interviewing your classmates to collect the data for your survey question. You need to interview **AT LEAST 20** classmates.

2. Calculations

You will take your data and calculate the mean, median, mode, and range.

3. Data Displays

You will also use your data to create the 4 types of data displays we studied: Dot Plot, Stem-and-Leaf Plot, Histogram, and Box Plot.

You may do this on a poster board you bring from home, or on four different letter sized papers. Either way, you should use a ruler to make nice, straight, neat lines. Your displays should be easy to read and something you would be proud to have displayed in our classroom.

4. Conclusion

Not all of your data displays will be easy – but this will help you recognize why we have different data displays.

You will write one paragraph telling which data display worked best for your data **and why**. Address each display and what the person looking at it might be able to see about the data. What would you want them to see from the data? You may also include which, if any, displays did not work for your data **and why**. Your paragraph should be at least 10 sentences long.

Consult your rubric to make sure you have included everything to be successful.

We will be working on the project in class and it is due by the end of the period:

Date: _____

Data Displays Project

Student Checklist – Turn this in with your final project!

My question:

```
[empty box]
```

Is this a question that would yield <u>numeric</u> results? Yes □   No □

Is this a question that would yield <u>variability</u>? Yes □   No □

My Data (find a way to list your data in this space):

```
[empty box]
```

From my data

Measures of Center:

Mean, show formula NEATLY	Median
	Mode

Measure of spread:

Range:

> You will include your 4 data displays separately.
>
> On the back of this page, you will write your paragraph. <u>Please write a first draft on a separate piece of paper before transferring your final draft to this Project Checklist.</u>

My paragraph:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

My paragraph included

□ Which data display worked best for my data **and why**

□ If any, displays did not work for my data **and why**

□ At least one sentence about EACH data display, telling what the reader would be able to see

□ At least 10 sentences

□ My paragraph was edited for grammar and spelling errors

Criteria for Success: NAME: Period:

	Not Included = 0	Below Expectations = 2	Approaching Expectations = 3	Meeting Expectations = 4	Exceeding Expectations = 5
Question x 1		Question does not yield variability	Question yield variability, but only 2 or 3 possible responses	Question yields variability with 4 – 9 possible responses	Question yields variability with 10 or more possible responses. Creative
Data Collection x 1		Surveyed less than 15 classmates	Surveyed 16 – 19 classmates	Surveyed 20 classmates	Surveyed more than 20 classmates
MMMR x 2		Calculated measures of center and spread 2 out of 4 correctly	Calculated measures of center and spread 3 out of 4 correctly	Calculated measures of center and spread correctly 4 out of 4	Calculated all measures correctly and showed all work, neatly
Dot Plot x 3		Range of numbers used does not reflect data well, data is missing	Range of numbers is acceptable, though spacing between numbers is not measured. Displayed data correctly	Used an acceptable range of numbers on well-spaced number line, displayed all data correctly	Everything included correctly, colored, very neat, visually appealing
Stem and Leaf x 3		Range of numbers of stems used does not reflect data well, data is missing	Range of numbers is acceptable, though spacing between leaves is not measured. Displayed data correctly	Used an acceptable range for stems, displayed all data correctly, leaves are measured and spaced evenly	Everything included correctly, colored, very neat
Histogram x 3		Range of numbers and intervals used does not reflect data well, data is missing	Range of numbers is acceptable, though intervals are not equal.	Used an acceptable range of number/intervals, displayed all data correctly	Everything included correctly, colored, very neat
Box Plot x 3		Range of numbers used does not reflect data well, data is missing	Range of numbers is acceptable, though spacing between numbers is not measured. Displayed data correctly	Used an acceptable range of numbers on well-spaced number line, displayed all data correctly	Everything included correctly, colored, very neat
Paragraph x 4		Does not meet length requirement OR does not show reflection of data	Meets length requirement, but reflections on data are shallow	Meets length requirement, reflects on data, includes errors in grammar and spelling	Meets or exceeds length requirement. Reflects on data. Well-written without grammar or spelling errors

Total/Comments:

Example slides for PPT

Slide 1: Data Displays — Why make a visual representation?

Slide 2: Data without a display:
- What measures of center or spread can you see quickly?
- What can be done to make this more useful?

Number of Pets table

Slide 3: Data with a display:
- Does this give us a good visual?
- Are there answers about measures of center and spread we could give just by looking?

Slide 4: Compare these two

Slide 5: Compare these two
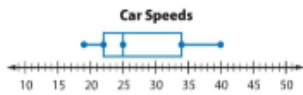
Slide 6: What about these?
Car Speeds
25 35 27 22 34 40 20 19 23 25 30

Dot Plot

- Looks Like:

- Use:

- Rules:

Stem-and-Leaf Plot

- Looks Like:

- Use:

- Rules:

DATA DISPLAYS

Histogram

- Looks Like:

- Use:

- Rules:

Box Plot

- Looks Like:

- Use:

- Rules:
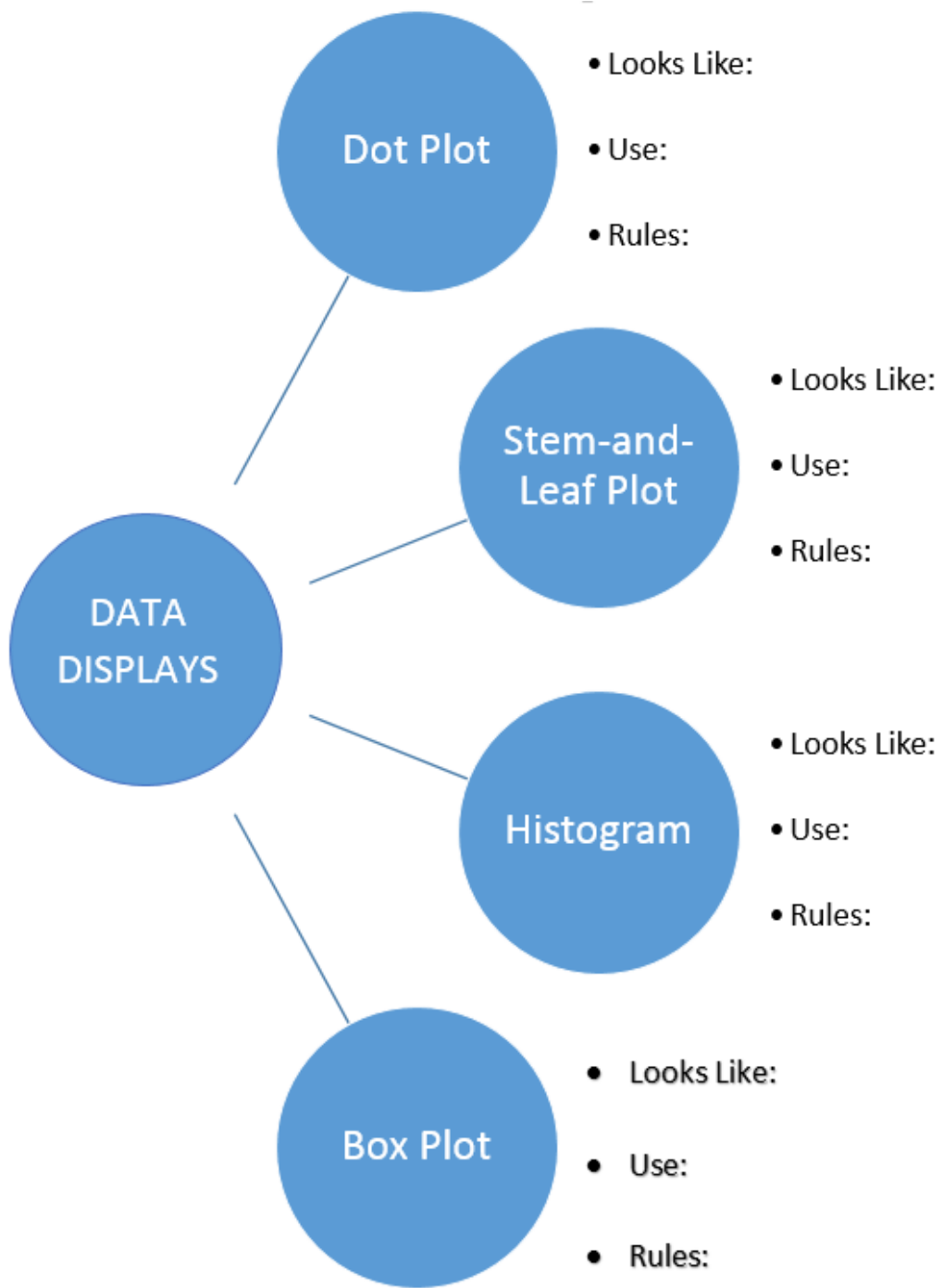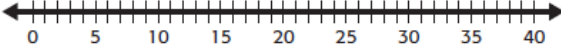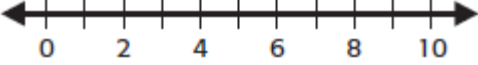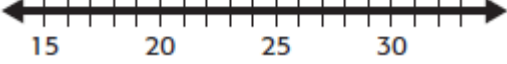
Name: Date: Period:

Making Dot Plots

Using the data in the first column, make a dot plot in the second column. In the third column, write a question you think could be answered using the dot plot you drew. Every question needs to be different! When you finish, switch with a partner and try to answer their questions.

Student Height (in inches) for Mrs. Foster's Sixth Grade Class			
52	48	52	51
52	65	58	48
60	45	50	52
56	48	53	58
62	49	51	49

Student Height in Inches

45   50   55   60   65

Question:

Daily Low Temperatures (°F) for November					
23	17	30	20	17	14
22	31	32	22	32	20
8	31	32	33	27	15
32	30	32	28	20	40
27	33	29	18	14	15

Daily Low Temperatures (°F)

0   5   10   15   20   25   30   35   40

Question:

Distances of Paper Airplanes (ft)					
1	5	5	8	3	2
1	4	3	3	6	9
0	2	2	6	3	1
4	7	5	2	4	8

Distances of Paper Airplanes (ft)

0   2   4   6   8   10

Question:

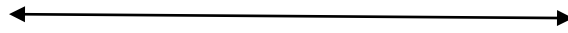| Number of Birds Counted			
30	20	18	22
20	18	21	23
20	20	21	19
18	19	20	23

Number of Birds Counted

15   20   25   30

Question:

Dot Plot HW

1. Javier asked the members in his 4-H club how many projects they were taking. The results are in the table below. Represent the data in a dot plot.

Number of Projects				
2	4	3	3	1
0	5	4	2	2
1	3	2	1	2

2. The dot plot below shows the number of songs in a play list. Use that data to find the mean, median, mode, and range.

Number of Songs in Play Lists

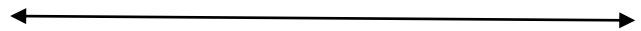26 28 30 32 34 36 38 40 42 44 46 48 50
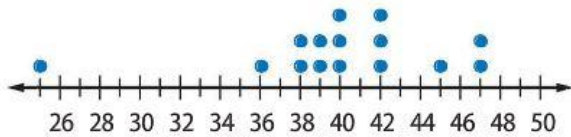
Mean: _____

Median: _____

Mode: _____

Range: _____

3. Jasmine asked her class how many pets they have. Use the results from the table to create a dot plot. Then, answer the question below.
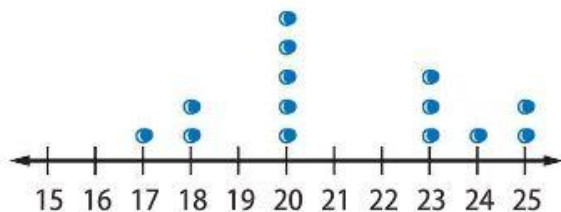
Number of Pets					
3	2	2	1	3	1
0	1	0	2	3	4
0	1	1	4	2	2
1	2	2	3	0	2

What do you think does this tells us about the data?

4. The dot plot shows the number of magazines sold. Determine the mean, median, mode, and range of the data.

Number of Magazines Sold

15 16 17 18 19 20 21 22 23 24 25

Mean: _____

Median: _____

Mode: _____

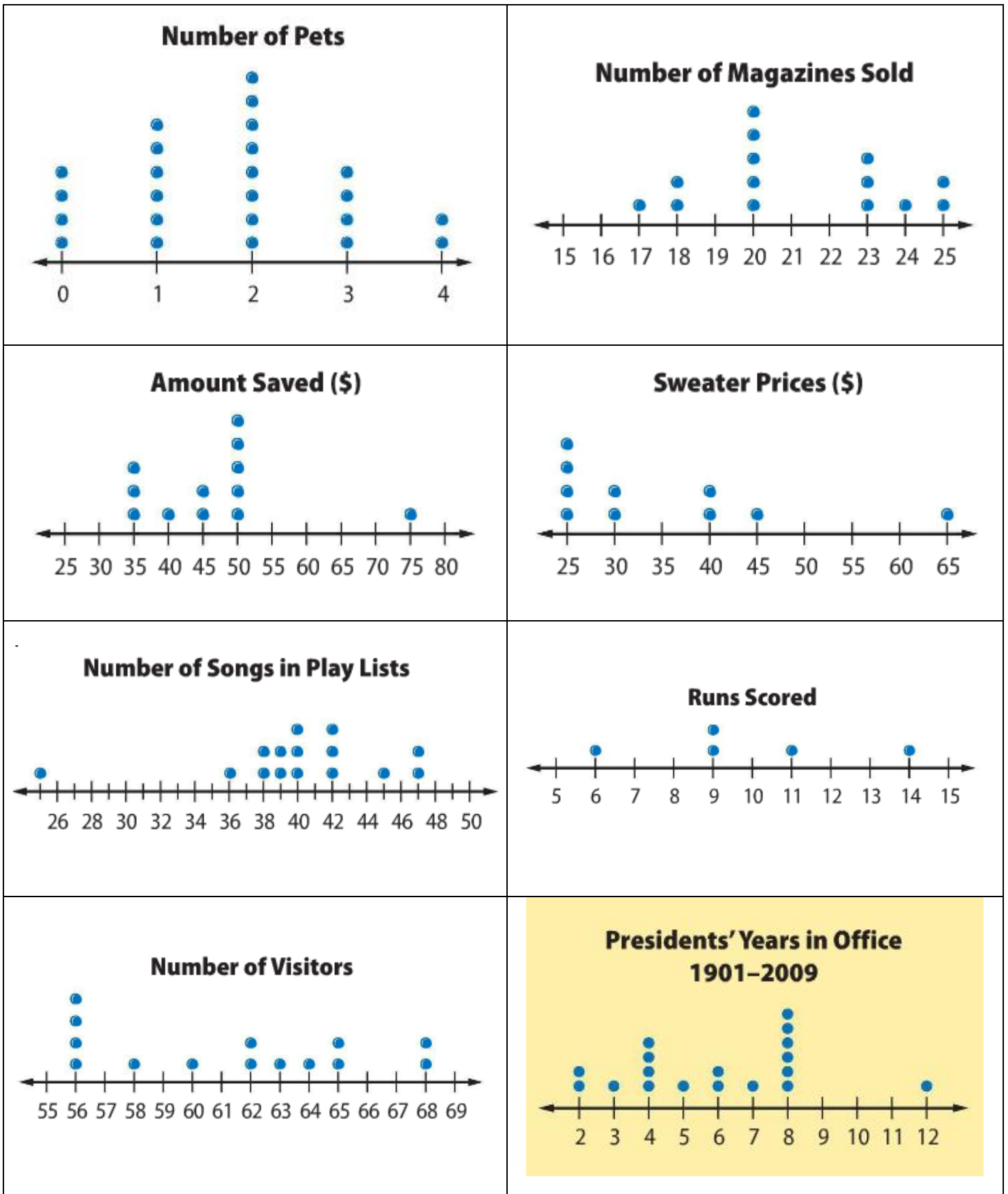Range: _____

Name: Date: Period:

Data Display Vocabulary

WORD	MY PICTURE	Have I heard this word outside of math? What did it mean?	MATH MEANING IN DATA DISPLAYS
Cluster			
Gap			
Peak			
Symmetry			
Outlier			
Skew			

Practice using these words when we discuss data displays along with your measures of center and spread ☺

Dot Plots to use to describe shape.

Number of Pets

0 1 2 3 4

Number of Magazines Sold

15 16 17 18 19 20 21 22 23 24 25

Amount Saved ($)

25 30 35 40 45 50 55 60 65 70 75 80

Sweater Prices ($)

25 30 35 40 45 50 55 60 65

Number of Songs in Play Lists

26 28 30 32 34 36 38 40 42 44 46 48 50

Runs Scored

5 6 7 8 9 10 11 12 13 14 15

Number of Visitors

55 56 57 58 59 60 61 62 63 64 65 66 67 68 69

Presidents' Years in Office 1901–2009

2 3 4 5 6 7 8 9 10 11 12

Number of Instant Messages Sent Each Day for Three Weeks

Stem	Leaf
0	2 3 5 7
1	0 2 4 7
2	0 1 1 1 4 5 7 7
3	1 2 3 5
4	5

Median: 21

Mode: 21

Range: 43

$2 \mid 7 = 27$ messages

Approximate Height of the 20 Tallest World Waterfalls

Stem	Leaf
4	6 7 9 9
5	0 3 6 8
6	0 1 1 5 6
7	0 4 6 7
8	0
9	5 8

Median: 610

Mode: 490 and 610

Range: 520

$4 \mid 6 = 460$ meters

Miles Driven on Vacation

Stem	Leaf
34	0 0 1 5 8
35	8 8 9
36	1 1 2 6 7

Median: 358

Mode: 340, 358, and 361

Range: 27

$35 \mid 6 = 356$ miles

Test Scores

Stem	Leaf
7	6
8	0 4 8 8
9	2 2 2 6
10	0

Median: 90

Mode: 92

Range: 24

$8 \mid 4 = 84\%$

Name: Period:

Stem-and-Leaf Match Recording Sheet

Stem-and-Leaf Plot Title	Key	Median	Mode	Range

Choose ONE stem-and-leaf plot and find the <u>mean</u>:

Stem and Leaf Plot	Show Work	Mean

What does this number tell us?

_____

_____

Think about it! A stem-and-leaf plot has a leaf of 0 for the stem 5. It has no leaves for the   stem 6. Explain the difference between having a leaf of 0 and no leaves for a stem.

_____

_____

Name: Date: Period:

Stem and Leaf HW

1.   Interpret the data shown in the stem-and-leaf plot below.

Number of Base Hits

Mean: _____

Stem	Leaf
0	8 9
1	0 3 4 5 7 7
2	0 1 4 6

Median: _____

Mode: _____

Range: _____

1 | 3 = 13 hits

2.   Determine the median, mode, and range of the data shown

in the stem-and-leaf plot below.

History Test Scores

Stem	4th Period
6	4
7	5 7 7 8
8	0 3 4 5 6 7 8 8 9
9	1 2 3 4 5 5 5 7

Median: _____

Mode: _____

Range: _____

8 | 3 = 83%

Interpret the data shown in each stem-and-leaf plot.

3.

4.

Free Throws Made

Stem	Leaf
1	4 8
2	0 1 3 5 5
3	0 1 2 3 4 5
4	2

3 | 2 = 32 free throws

Mass of Apples (kg)

Stem	Leaf
4	0 2
5	2 6 7 8 9 9
6	4 4 4 5 6
7	0 3 4 9
8	0 1 2 3 5
9	0 9

6 | 5 = 65 kilograms

5. Why is it important to include a "key" when using a stem-and-leaf plot to represent data?

🍃 Creating Stem-and-Leaf Plots 🍃

Represent the data sets in a stem-and-leaf plot. Remember to make a <u>key</u> and give it a <u>title</u>!

1. Minutes spent on homework: 37, 28, 25, 29, 31, 45, 32, 31, 46, 39

    A. What is the longest time spent on HW?

    B. What is the shortest time spent on HW?

    C. Most values occur in what interval?

    D. Find the: Median: _____

                     Mode: _____

                     Range: _____

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2. Wait time for amusement park rides (min): 81, 76, 55, 90, 71, 80, 83, 85, 79, 99, 70, 75, 70, 92

    A. What is the longest wait time?
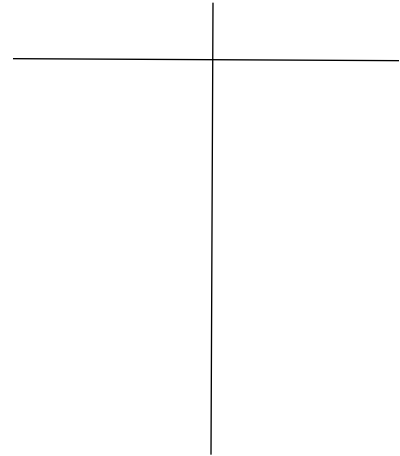
    B. What is the shortest wait time?

    C. Most values occur in what interval?

    D. Find the: Median: _____
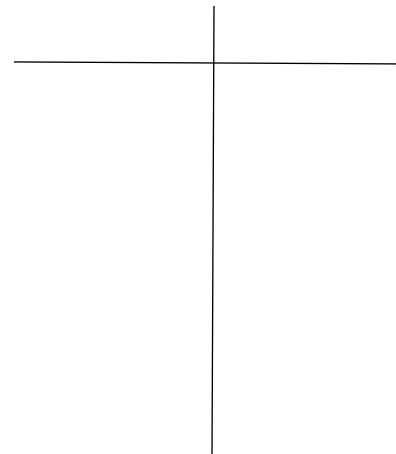
                     Mode: _____

                     Range: _____

3. Weight of potatoes (oz): 10.5, 11.7, 12.9, 10.4, 14.4, 12.3, 10.8, 11.6, 12.0, 11.9, 11.0

    A. What is the weight of heaviest potato?

    B. What is the weight of the lightest potato?

    C. Most values occur in what interval?

    D. Find the: Median: _____

                 Mode: _____

                 Range: _____

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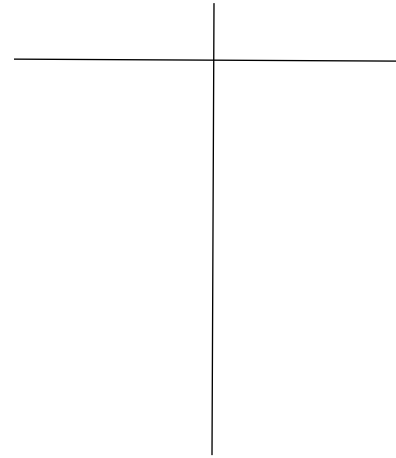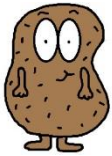
4. Points scored by the Spurs: 80, 70, 65, 52, 66, 86, 74, 54, 77, 88, 78, 58, 89

    A. What was the highest points scored?
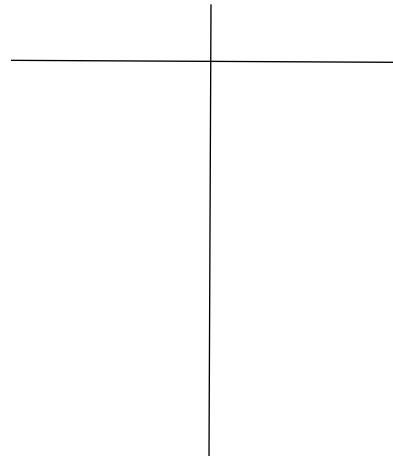
    B. What was the lowest points scored?

    C. Most values occur in what interval?

    D. Find the: Median: _____

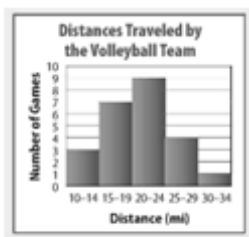   Mode: _____

                 Range: _____

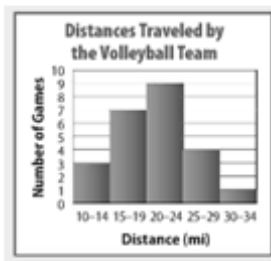Example Power Point Slides to Introduce Histograms

Interpreting Histograms

What is a histogram?

A type of bar graph used to represent numerical data that have been organized into **equal intervals**

Distances Traveled by the Volleyball Team
Number of Games
10 9 8 7 6 5 4 3 2 1 0
10-14 15-19 20-24 25-29 30-34
Distance (mi)

Let's READ the histogram!

- Is there space between the bars?
- Why not?
- Do the bars have the same width?
- Why is that?
- What is this histogram showing us?
- Turn to your partner and tell them what you think this histogram is about according to the title

Distances Traveled by the Volleyball Team
Number of Games
10 9 8 7 6 5 4 3 2 1 0
10-14 15-19 20-24 25-29 30-34
Distance (mi)

Reading the histogram – Let's Analyze!

- The histogram shows us the distance a volleyball team travels to their games.
- How many games did they travel between 10 and 14 miles?
- How many games did they travel less than 20 miles?
- How many games did they have in all?

Distances Traveled by the Volleyball Team
Number of Games
10 9 8 7 6 5 4 3 2 1 0
10-14 15-19 20-24 25-29 30-34
Distance (mi)
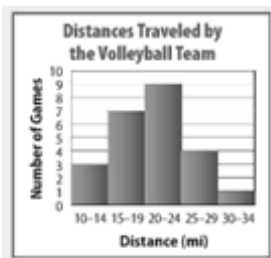
Choose the correct data to use!

- Which distance interval included the most games?
- Which interval had 4 games?
- What is the difference between the number of games in the interval with the MOST games and the interval with the least games?

Distances Traveled by the Volleyball Team
Number of Games
10 9 8 7 6 5 4 3 2 1 0
10-14 15-19 20-24 25-29 30-34
Distance (mi)
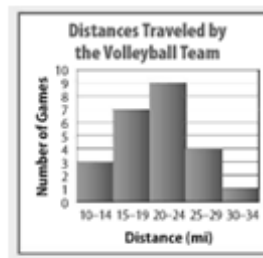
Now you try!

- Using the cards provided, read the histograms!
- Find the questions that match the title of the histogram on your recoding sheet.
- Work with a partner to interpret and analyze the histograms!

Interpreting Histograms, Possible Cards or Class set Reference

Sixth Grade Class Sales

Number of Students

Sales ($)

0–199, 200–399, 400–599, 600–799, 800–999

Seventh Grade Class Sales

Number of Students

Sales ($)

0–199, 200–399, 400–599, 600–799, 800–999

Trees Planted in Parks

Number of Parks

0–9, 10–19, 20–29, 30–39, 40–49, 50–59

Number of Trees

Olympic Men's Cycling Time Trials

Frequency

55–59, 60–64, 65–69, 70–74, 75–79

Finishing Times (min)

August Average Temperature of Cities

Number of Cities

60–69, 70–79, 80–89, 90–99, 100–109

Temperatures (°F)

Class Heights

Number of Students

48–51, 52–55, 56–59, 60–63, 64–67

Height (in.)

Interpreting Histograms Recording Sheet

Sixth and Seventh Grade Class Sales

1. About how many sixth grade students earned $400-599 in sales? _____

2. About how many seventh grade students earned $200-399 in sales?_____

3. What is the interval for the sales? _____

4. About how many students from BOTH grades earned $600 or more? _____

5. About how many more students in the sixth grade earned between $400 and $599 than in the seventh grade? _____

Trees Planted in Parks

1. What is the total number of parks? _____

2. Which interval has 12 trees planted? _____

3. How many parks have more than 40 trees? _____

4. How many parks have less than 20 trees? _____

5. What is the difference in the number of parks that had the most trees planted and the least trees planted? _____

Olympic Men's Cycling Times

1. How many men had finishing times between 60 and 64 minutes? _____

2. How many men had finishing times between 75 and 79 minutes? _____

3. Which interval has 7 cyclists? _____

4. Which interval represents the greatest number of cyclists? _____

5. How many cyclists had a time less than 70 minutes? _____

August Average Temperature of Cities

1. What is the total number of cities included in the histogram? _____

2. How many cities have a monthly temperature of less than 80°F? _____

3. Which interval has the most cities? _____

4. What is the difference in the number of cities with the lowest temperatures and highest temperatures? _____

5. How many cities have temperatures between 70°F and 99°F? _____

Class Heights

1. How many students are between 56 and 59 inches tall? _____

2. How many students are shorter than 56 inches tall? _____

3. Which interval has 4 students? _____

4. How many more students are between 52 and 55 inches tall than 48 and 51 inches tall? _____

5. How many students are taller than 59 inches? _____

Histogram HW

For Exercises 1–5, use the histogram shown at the right.

1. What is the interval used?

2. Which age group had the most children visit the zoo?

3. How many children between 7 and 10 years old visited the zoo?

4. How many more children from the 5–6 age group visited than the 9–10 age group?

5. How many children older than 8 visited the zoo?
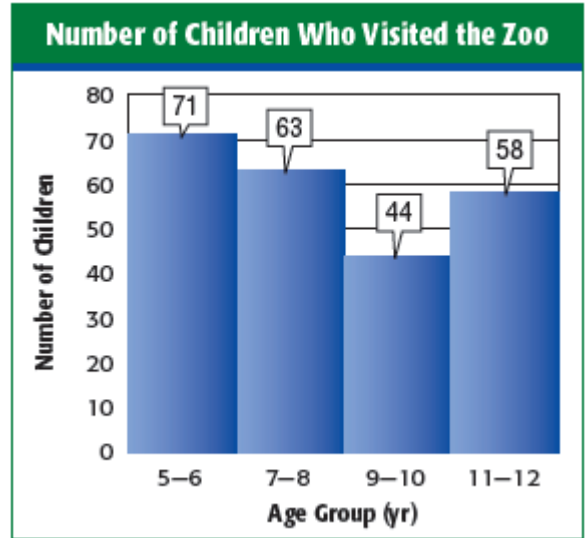
6. Refer to the histogram below. In one or two sentences, write a conclusion you can make about the data.
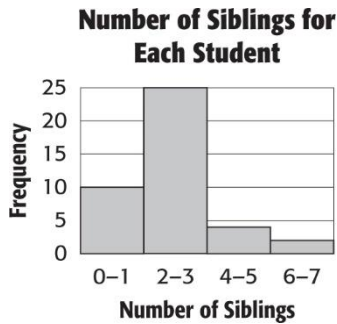
For Exercises 7–10, use the histogram shown at the right.

7. Which interval represents the most number of students?

8. Which interval has three students?

9. How many students went to a pool at least ten times last summer?

10. How many students went to a pool less than ten times last summer?

Creating Histograms. Students can do one or multiple if time allows.

Your data! Look at this data and decide what intervals you will use.

number of points scored in each basketball game: 28, 16, 38, 44, 21, 38, 35, 48, 33, 29, 37, 39, 18, 38, 42, 37, 32

Frequency Table

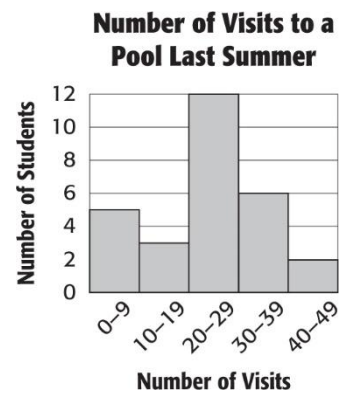| Interval	Tally	Amount

Histogram
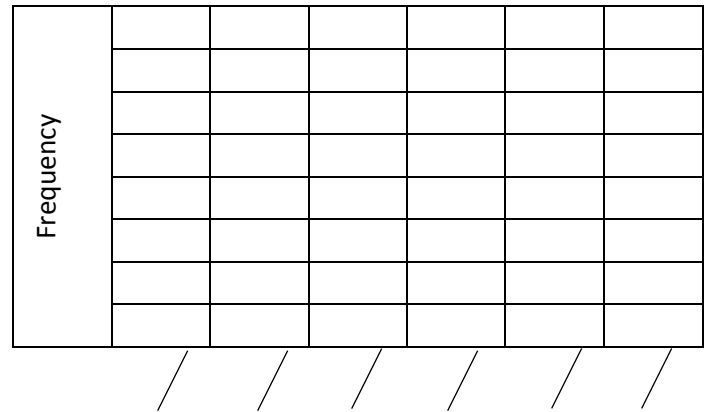
Frequency

What does this display tell you about this data?

Your data! Look at this data and decide what intervals you will use.

speeds of roller coasters (mph): 62, 64, 72, 75, 71, 68, 55, 58, 68, 72, 70, 60, 72

Frequency Table

Interval	Tally	Amount
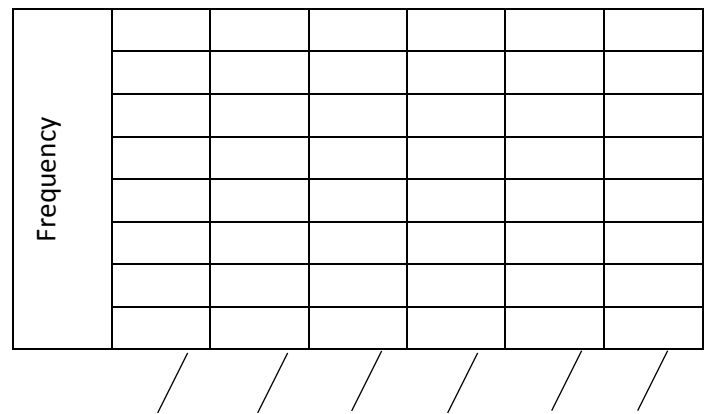
Histogram

Frequency

What does this display tell you about this data?

Creating Histograms

Draw Histograms to represent the data.

1. .

Highest Recorded Wind Speeds for Selected U.S. Cities (mph)		
Speed (mph)	Tally	Frequency
40-49	IIII	5
50-59	IIII IIII	10
60-69	II	2
70-79	IIII	4
80-89	II	2
90-99	I	1

Highest Recorded Wind Speeds
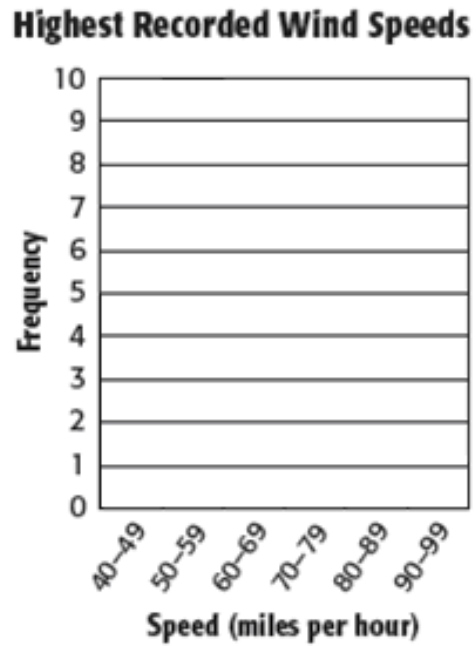
2. .

Number of Candy Bars Sold		
Bars	Tally	Frequency
50–69	IIIII IIIII	10
70–89	IIIII III	8
90–109	IIIII II	7
110–129	IIIII IIIII	10
130–149	IIIII	4

3. .

Weekly Earnings ($)					
95	120	96	100	90	105
145	185	160	98	104	130
115	106	97	118	125	134
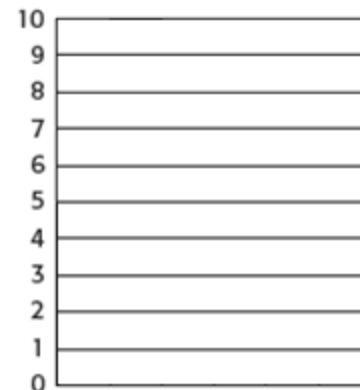
Box Plots Notes

Definitions

- Box plot: or box-and-whisker plot, uses a _____ _____ to show the distribution of a set of data by using the _____ , quartiles, and _____ _____ . Box plots separate data into _____ parts.
- Quartiles: values that divide the data set into _____ equal parts.
- 1st quartile: the _____ of the data values less than the median
- 3rd quartile: the _____ of the data values greater than the median
- Interquartile Range (IQR): the _____ between the 1st and 3rd quartiles
- Outlier: data value that is either much _____ or much _____ than the median. These are represented on the box plot with an asterisk (*)
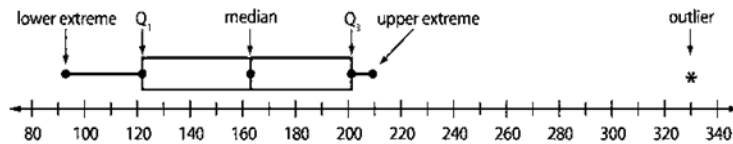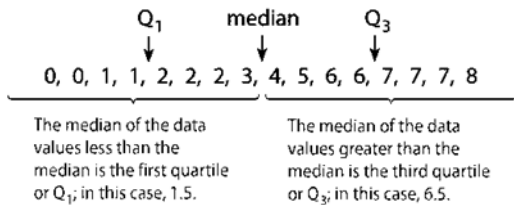
Steps to Draw Box Plot

1. Order the numbers from least to greatest. Then draw a number line that covers the range of the data.
2. Find the median, the extremes, and the 1st and 3rd quartiles. Mark these points above the number line using a dot.
3. Draw the box so that it includes the quartile values.
   Draw a vertical line through the box at the median value.
   Extend the whiskers from each quartile to the extreme data points.
4. Include a title.

Example Data: ages of children taking dance classes are 10, 8, 9, 7, 10, 12, 14, 14, 10, 16, 4, and 15
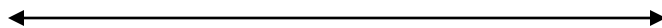
Examples

1. Represent the car speed data in a box plot.

   25 35 27 22 34 40 20 19 23 25 30

   Median: _____
   Lower Extreme: _____
   Upper Extreme: _____
   1st Quartile: _____
   3rd Quartile: _____
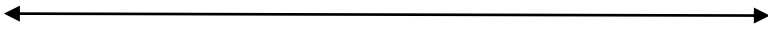
2. Represent the depth of recent earthquakes (km) in a box plot.

   5 15 1 11 2 7 3 9 5 4 9 10 5 7

   Median: _____
   Lower Extreme: _____
   Upper Extreme: _____
   1st Quartile: _____
   3rd Quartile: _____

Teacher: Copy on colored paper and cut apart

Ages of U.S. Vice Presidents		Lower Extreme: 36	1st Quartile: 49
Median: 53	3rd Quartile: 60	Upper Extreme: 72	Range: 36
American Football Conference Wins		Lower Extreme: 1	1st Quartile: 5.5
Median: 8.5	3rd Quartile: 11	Upper Extreme: 13	Range: 12
Field Hockey Goals		Lower Extreme: 0	1st Quartile: 1
Median: 3	3rd Quartile: 4	Upper Extreme: 10	Range: 10
Car Speeds		Lower Extreme: 19	1st Quartile: 22
Median: 25	3rd Quartile: 34	Upper Extreme: 40	Range: 21

Box Plot Match Recording Sheet

Box Plot	Lower	1st Q	Median	3rd Q	Upper	Range

1. According to the box plot, what percent of US Vice Presidents were between 48 and 60 years old?

   _____

2. According to the box plot, what percent of Field Hockey Games had 4 or more Goals?

   _____

3. According to the box plot, what percent of cars drive 34 miles per hour or slower?

   _____

4. According to the box plot, what's the most conference wins a team has had? _____

5. According to the box plot, what percent of teams have had more than 8 wins? _____

Name: _____   Date: _____   Period: _____

Box Plot HW

Draw a box plot for each set of data. Title the box plot something that would represent the values in the data.

1. {23, 19, 20, 22, 26, 17, 15}

Median: _____

Lower Extreme: _____

Upper Extreme: _____

1st Quartile: _____

3rd Quartile: _____

15 16 17 18 19 20 21 22 23 24 25 26

2. {54, 61, 58, 68, 66, 51, 66}

Median: _____

Lower Extreme: _____

Upper Extreme: _____

1st Quartile: _____

3rd Quartile: _____

50   52   54   56   58   60   62   64   66   68
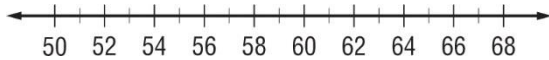
3. {2, 3, 5, 4, 3, 3, 2, 5, 6}

Median: _____
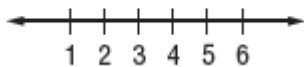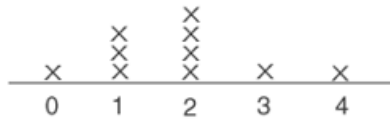
Lower Extreme: _____

Upper Extreme: _____

1st Quartile: _____
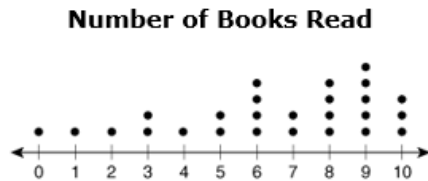
3rd Quartile: _____

1 2 3 4 5 6

Problem #1

The dot plot above shows the number of pets in each of ten households. The dot plot shows which set of data?

A. 1, 0, 1, 1, 2, 2, 3, 4, 1, 2
B. 1, 0, 2, 2, 3, 4, 1, 1, 2, 3
C. 1, 0, 1, 2, 1, 2, 2, 2, 2, 3
D. 2, 1, 0, 1, 2, 3, 4, 1, 2, 2

Problem #2

The dot plot shows the numbers of books read by a group of students.

Number of Books Read

Which statement is true?

A. The graph is symmetrical.
B. The mean is 9.
C. The range and IQR are the same.
D. The graph is skewed to the left.

Problem #3
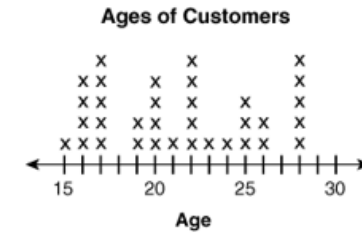
Ages of Customers

The dot plot shows the ages of the first 34 customers at a music store sale. Which question CANNOT be answered by the data in the dot plot?

A. What is the range of the ages of the customers?
B. What was the age of the first customer?
C. What was the median age of the customers?
D. How many more 25-year-olds were customers than 19-year-olds?

Problem #4

Mr. Peterson displayed test scores on a dot plot.

Test Scores
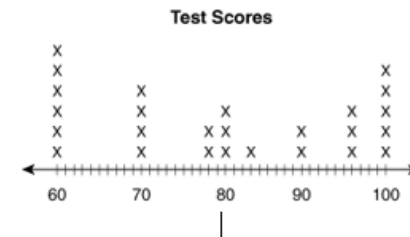
What conclusion can he draw?
A. More students made Cs (70–79) than any other letter grade.
B. About half the students made As (90–100) and Bs (80–89).
C. The data are clustered around 75 because that is the score that best represents the class performance.
D. Because it is so difficult to make a 100 on a test, the 100s can be considered outliers.

Problem #5

Stem	Leaf
A	
3	9
4	0, 1, 5, 7, 7, 7, 9
5	2, 6, 6

Stem	Leaf
B	
3	9
4	0, 1, 5, 7, 9
5	2, 6

Stem	Leaf
C	
3	9
4	0, 1, 5
5	6

Stem	Leaf
D	
3	9
4	7, 7, 7
5	2, 6, 6

Coach Carlson gathered data on the basketball players on his team who scored the greatest number of points in a single game last season. His data is shown below.

39, 40, 41, 45, 47, 47, 47, 49, 52, 56, 56

Which stem-and-leaf plot correctly displays the data?

Problem #6

Michael made the stem-and-leaf plot above to display the favorite numbers of the students in his class, based on a survey he did.
His results:
38, 11, 28, 45, 12, 18, 6, 32, 6, 18, 43, 7, 13, 18, 20, 25

What is wrong with the stem-and-leaf plot that Michael made?

A. The key is incorrect.
B. The stems are not in order.
C. All numbers are not represented.
D. Some numbers are shown more than once.

Stem	Leaf
0	6 6 7
1	1 2 3 8 8 8
2	0 5

KEY
2	5 = 25

Problem #7

**Short Stories Read by
Mrs. Moriarty's Class**

Stem	Leaf
4	4 8
5	1 2 3 3 4
6	4 8
7	3

The stem and leaf plot above shows the number of short stories read by students in Mrs. Moriarty's language arts class during the first ten months of school.
Which of the following is true?

A. Mean > median
B. Mode > mean
C. Mode
D. Median > mean

Problem #8

The stem-and-leaf plot below shows the ages of the people attending a charity dinner.

**Ages of People at a
Charity Dinner**

Stem	Leaf
2	3 5 7
3	0 0 0 2 4
4	4 8
5	3 5

Which of the following statements is supported by the information in the stem-and-leaf plot?

A. The most common age was 30.
B. The range of the ages was 28.
C. There were more people in their twenties than in any other age group.
D. The oldest person at the charity dinner was 48.

Problem #9

It started to snow, and Ramon wanted to know when it snowed the most. So, he made a tally of the number of snowflakes that landed on his glove every few minutes for the first 30 minutes of the storm. When he went inside, he made the following histogram.
Which tally chart matches Ramon's histogram?

Snowflakes Falling on Ramon's Glove
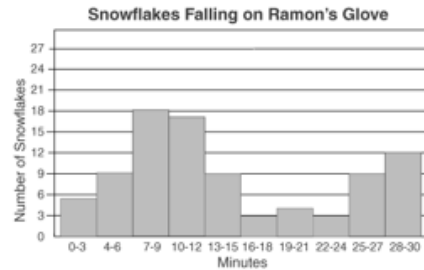
A.

Minutes	Tally of Snowflakes
0-3	JHT
4-6	JHT IIII
7-9	JHT JHT JHT III
10-12	JHT JHT JHT II
13-15	JHT IIII
16-18	III
19-21	IIII
22-24	III
25-27	JHT IIII
28-30	JHT JHT II

B.

Minutes	Tally of Snowflakes
0-3	JHT I
4-6	JHT IIII
7-9	JHT JHT JHT III
10-12	JHT JHT JHT III
13-15	JHT IIII
16-18	III
19-21	III
22-24	III
25-27	JHT IIII
28-30	JHT JHT II

C.

Minutes	Tally of Snowflakes
0-3	JHT
4-6	JHT IIII
7-9	JHT JHT JHT II
10-12	JHT JHT JHT III
13-15	JHT IIII
16-18	IIII
19-21	III
22-24	IIII
25-27	JHT IIII
28-30	JHT JHT II

D.

| Minutes	Tally of Snowflakes
0-3	JHT I
4-6	JHT I
7-9	JHT JHT JHT III
10-12	JHT JHT JHT III
13-15	JHT IIII
16-18	III
19-21	III
22-24	III
25-27	JHT IIII
28-30	JHT IIII

Problem #10

Alex collected the following data about the ages of people who came to the beach on Friday afternoon.

19, 25, 32, 35, 7, 10, 35, 42, 39, 15, 12, 18, 49

He wants to put this data into a histogram. Which would be the **best** intervals for him to use?

A. 0 to 10, 11 to 20, 21 to 30, and 31 to 40
B. 10 to 20, 20 to 30, 30 to 40, and 40 to 50
C. 0 to 10, 11 to 20, 21 to 30, 31 to 40, 41 to 50
D. 0 to 20, 20 to 50

Problem #11
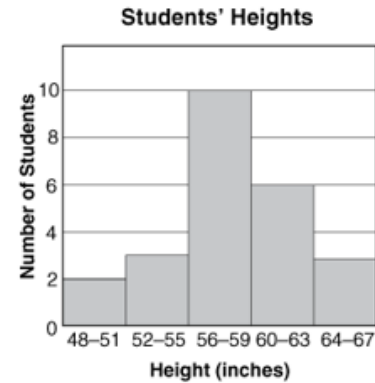
Students' Heights

Marcus gathered information on the heights of all the students in his class. He put his data in this histogram. Which of the following statements is true about the histogram?

A. Most of the students in Marcus's class are between 56 and 59 inches tall.
B. There are more students that are 64–67 inches in height than students 52–55 inches tall.
C. There are more students in the 56-to-59-inch height range than in any other height range.
D. There are 2 students in the class with a height greater than 67 inches.

Problem #12

Hours of Battery Life
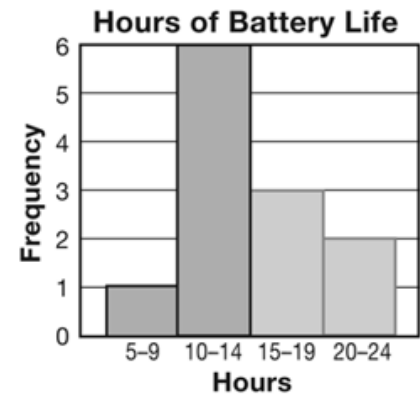
A battery company tracked the battery life on 12 of its batteries. The data is displayed in the histogram above. Which statement is true about the life of the batteries?
A. Most batteries last less than 10 hours.
B. Most batteries last more than 15 hours.
C. Most batteries last between 15 and 24 hours.
D. Most batteries last more than 10 hours.

SET FOUR

Problem #13
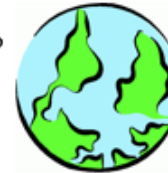
Which data set has no variability? **Tell how you know.**

A. The number of days in March each year
B. The heights of several plants in a park
C. The ages of different students in a school
D. The number of daily visitors to a museum in a given week

Problem #14

Which question would yield a data set with variability? **Tell how you know.**

A. What were the daily high temperatures in Houston for one year?
B. What is the distance from the Earth to the Moon?
C. How many legs does an octopus have?
D. How many inches are in a foot?

Problem #15

Which question will result in a data set with the least variability? **Tell how you know.**

A. Do you drink a sports drink?
B. What sports drinks do you drink?
C. When do you drink a sports drink?
D. What is your favorite flavor for a sports drink?

Problem #16

Which data set is most likely to have the greatest variability? **Tell how you know.**

A. The number of pencils in 27 sixth graders' desks
B. Measuring 27 sixth graders' pencils to the nearest quarter of an inch
C. Measuring 27 sixth graders' pencils to the nearest sixteenth of an inch
D. Measuring 27 sixth graders' pencils to the nearest inch

Problem #17

Hiroshi looked at the following set of data and determined some measures:

89, 93, 99, 110, 128, 135, 144, and 159.

Determine his mistake and correct it.

Median: 128

Mode: No Mode

Range: 70

Problem #18

AMY'S SCORES

	85	83	90	82	80

Ⓐ

JULIE'S SCORES

	87	93	95	100	90

Ⓒ

GARY'S SCORES

	78	83	79	82	83

Ⓑ

MALIK'S SCORES

	90	95	100	90	95

Ⓓ

In which set of test scores are the median and the mean the same?

Problem #19

First Half

Player	Points
Ben	6
Damon	4
Mike	5
Pedro	12
Shaun	8

Second Half

Player	Points
Ben	5
Damon	8
Mike	12
Pedro	6
Shaun	14

The tables above show how many points the players on a basketball team scored in the first and second halves of a game. By how much did the **mean** number of points for the players change from the end of the first half to the end of the game?
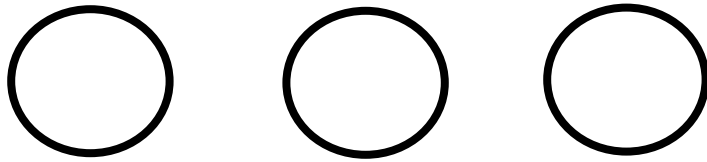
A. 1
B. 2
C. 9
D. 10

Problem #20

You have taken 4 quizzes in math. Your quiz grades so far are 84, 91, 92, and 87. Your parents tell you they will give you $100 if you have a 90 or above for your quiz average. What do you need to make on your next quiz to have an average of 90?

Name: _____ Period: _____

Answer Sheet (with 3 lifelines)

◯   ◯   ◯

Set 1: Choose 2.

#_____	#_____

Set 2: Choose 2.

#_____	#_____

Set 3: Choose 2.

#_____	#_____

Set 4: Choose 2.

#_____	#_____

Set 5: Choose 2.

#_____	#_____

Name: Date: Period:

Pick a Display

Select an appropriate type of display for data gathered about each situation. Choose from the four displays we have learned about in this unit (Dot plot, Stem-and-Plot, Histogram, Box Plot). Be sure to justify your reasoning. Refer to your graphic organizer if you need help!

Situation	Display	Justification
heights of buildings in town		
number of cars a dealer sold each month over the past year		
number of scores made by each team member in a basketball season		
the different price of a music CD at five different stores?		

Select and make an appropriate type of display for the following data and create it.

Steepness of Wooden Roller Coasters		
70°	63°	61°
59°	57°	56°
55°	55°	54°

A graphic organizer to show similarities of data displays
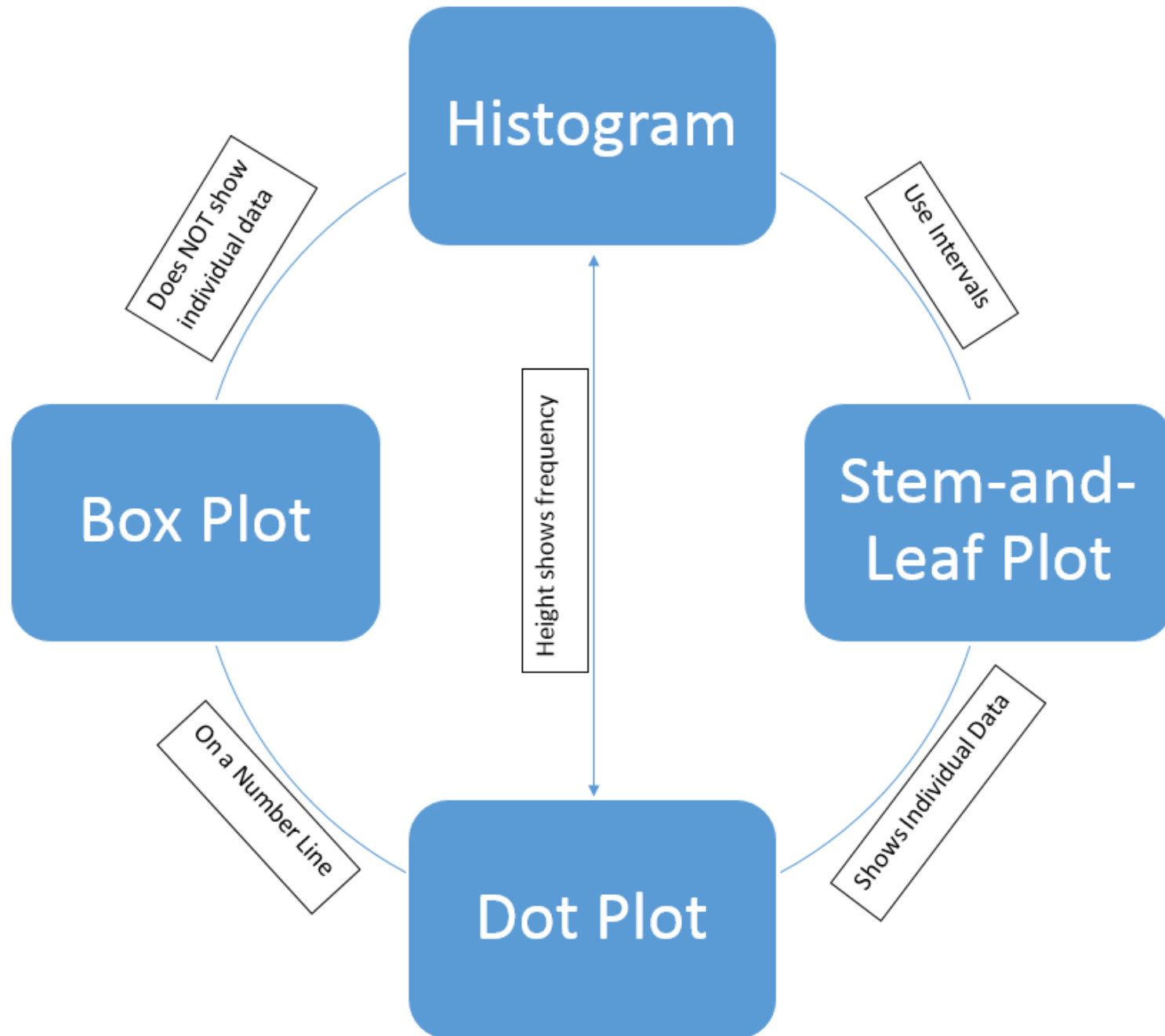
Data and Statistics Test

1. Wendy kept track of the number of text messages she sent each day for two weeks. The data is listed below.
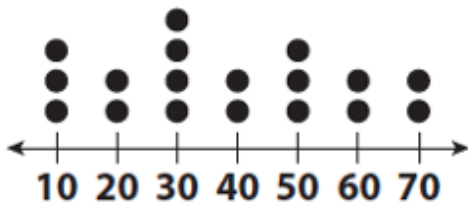
35, 20, 46, 29, 27, 33, 15, 52, 27, 30, 35, 24, 34, 42

Complete a stem-and-leaf plot for the number of text messages Wendy sent.

Wendy's Text Messages

Stem	Leaves

Key:

2. What is the median of the data represented by the dot plot?

3. Ed counted the number of seats available in each café in his town. The data is listed below.

$$18, 20, 22, 26, 10, 12, 16, 18, 7, 8$$

Complete the frequency table and the histogram.

Interval	Frequency
1–7	
8–14	
15–21	
22–28	

Cafe Seats
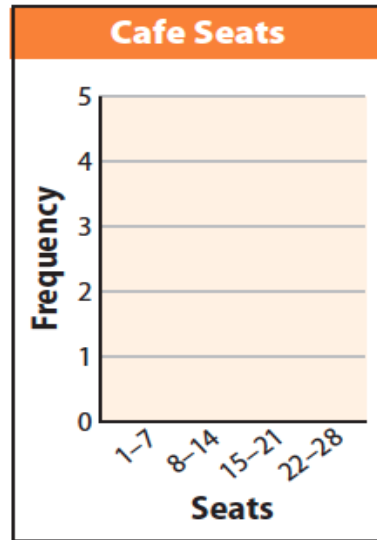
4. Samira recorded the number of likes her recent profile pictures have received. She placed the data in the stem-and-leaf plot below.

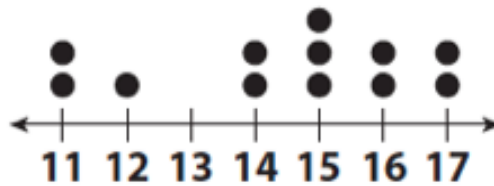| Stem	Leaf
3	3 5 7 9
4	8 9
5	1 1 2 3 3 5 6
6	0 3 7 9

Key: 3 | 5 = 35

What is the range of the data represented by the stem-and-leaf plot?

A 27
B 30
C 33
D 36

5. The dot plot shows the number of participants in each age group in a science fair.

11 12 13 14 15 16 17

Which of the following statements is not supported by the dot plot?

A The range is 6.

B The mean of the ages is about 14.4.

C The mode of the ages is 13.

D The median of the ages is 15.

6. A local TV station reported the average monthly high temperatures for two cities, over the last 13 months. The data is listed below.

Average Monthly High Temperature (°F)	
Miami, FL	76, 78, 80, 83, 87, 90, 91, 91, 89, 86, 82, 78, 84
Chicago, IL	31, 35, 47, 59, 70, 80, 84, 82, 75, 62, 48, 35, 59

Based on the information in the data, which statement is true?

A The mean and range of the average temperatures in Chicago are the same.

B Typically, Chicago's temperatures are warmer than Miami's.

C Both cities have two mode average temperatures.

D The spread of Chicago's average temperatures is smaller than the spread of Miami's average temperatures.

7. The heights (in inches) of 8 students are 50, 53, 52, 68, 54, 49, 55, and 51. What is the mean height if the outlier is removed from the data?

A 52

B 54

C 45.5

D There's not enough information given.

8. Which situation does NOT yield data with variability?

A The number of cars that go through the intersection of Vance Jackson and Jackson Keller during different times of the day

B The type of dog owned by students in Ms. Bailey's class.

C The number of students in Ms. Webb's 4th period on April 1.

D The average number of hours that students at Jackson Middle School spend on the Internet each day during the week

9. A baseball coach recorded the number of homeruns the team made last season. The data is shown in the stem-and-leaf plot below.
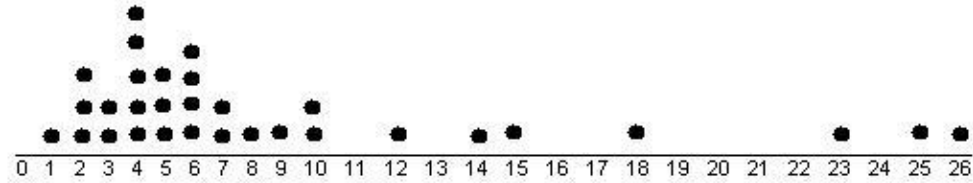
Home Runs

Stem	Leaves
0	0 5 5 7 7 8 9
1	0 0 7 9
2	
3	
4	4

Key: 1|7 means 17

What is the mean number of homeruns the team made last season?

A 12.8 homeruns

B 10.1 homeruns

C 9 homeruns

D 11.8 homeruns

10. Oliver recorded the number of minutes he was on social media sites each day over the last few weeks. The data is shown in the dot plot below.

What is the shape of the data?

A It is symmetrical.
B It is skewed right.
C It is skewed left.
D None of these.

SPIRAL BACK BONUS (+5 each)

11. A trapezoid shaped window has a height of 16 feet and bases of 16 feet and 20 feet. What is the area of the window?

12. The area of a triangular pennant is 24 square feet. If the base is 8 feet, what is the height?