

AP Statistics Summer Assignment

Welcome to AP Statistics! In this course we will be collecting data from samples and analyzing it to find out what we can expect from the entire population, without collecting data from everyone in the population (because that would take forever or be impossible!)

The course lessons are designed for you to experience/explore the objectives on your own through a guided worksheet first. Then I will provide you with notes, formulas, and important ideas. Lastly, we will check your understanding through an example problem. We will typically go through 2 lessons during 80 minutes.

Attached you will find Chapter 1 Notes. There are videos on Math Medic website for you to watch while filling in the notes. The url for the videos are at the top of the worksheet. Copy and paste it into your browser. At times during the video you will be prompted to pause the video and work on a task. Please actually use this time as it its intended try to answer the questions before the videos reveal the answers. (This is how you will learn the content) This is a similar format that we will be using when we are in class only, I will be teaching you in person instead of you watching a video.

I ask that you write down any questions you have about Chapter 1 so I can answer them on the first week of class. If you have any questions, please feel free to e-mail me. Our first full week of school we will jump into Chapter 2!

Enjoy your summer! I look forward to spending the school year with you!

God Bless,

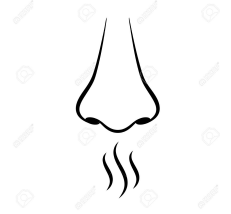
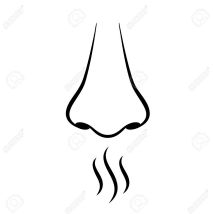
Mrs. Moore

VIDEO:

<https://portal.mathmedic.com/lesson-plans/course/AP-Statistics/unit/1/day/1/video>

Name: _____ Hour: _____ Date: _____

Can Joy Smell Parkinson's Disease?



Joy Milne participated in a study where she was given 12 t-shirts, half of which were worn by Parkinson's patients, and half of which were worn by a control group. Joy correctly identified 11 out of the 12 shirts. Does this provide *convincing* evidence that Joy can smell Parkinson's?

1. Why would it be important to know that someone can smell Parkinson's disease?
2. How many correct decisions would you expect Joy to get out of 12 if she really couldn't smell Parkinson's (she was just guessing)? Explain.
3. Do we have some evidence that Joy can smell Parkinson's? Why?
4. How many correct decisions out of 12 would it take to *convince* you that Joy really could smell Parkinson's?

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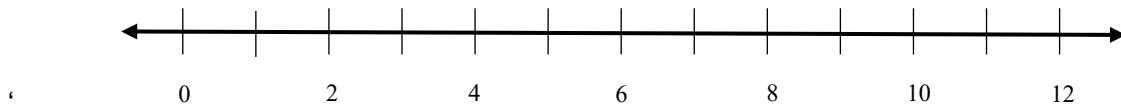
Let's investigate whether Joy's result could have happened purely by chance, just by guessing. Working in pairs, you will simulate this study. One person will be the experimenter and one person will be Joy and then you will switch.

Important: the experimenter should not reveal the truth for each shirt. They should simply record whether the guess was correct or incorrect.

4. As the experimenter, keep track of the results:

Correct	Incorrect

5. Count up the number of correct decisions. Write the number on a sticker dot and bring it to the poster at the front of the room. Copy the dotplot here.



6. What does each dot represent?

7. Based on the class simulation, what proportion of the simulations resulted in 11 or more correct identifications?

8. Based on these results, do we have convincing evidence that Joy can smell Parkinson's? Explain.

VIDEO:

<https://portal.mathmedic.com/lesson-plans/course/AP-Statistics/unit/1/day/2/video>

How are your favorite classes related?



Is your favorite elective class associated with your favorite core class? Collect class data to see if there is a relationship.

1. Which of the following is your favorite elective class? You must choose only one and mark your choice on the board.

Art	Music	Physical Education	Foreign Language	Technology

2. Identify the individuals and variable?
3. Is the variable categorical or quantitative?
4. Go to stapplet.com to enter the class data. Make a bar graph and a pie chart. Sketch them below.

5. Sometimes it is helpful to investigate more than one variable. Come to the board and put a tally mark where you belong.

Find each of the following:

% of all students who chose P.E.:

% of all students who chose Math and chose Art:

% of the students who prefer math that chose Tech.

Name: _____ Hour: _____ Date: _____

6. How many variables does the table have? Are the variables categorical or quantitative?

7. Which variable would best explain or predict the other variable?

8. Go to stapplet.com and enter the data. Make a side-by-side bar graph and a segmented bar graph. Sketch them below.

9. How do the bars in the side-by-side-bar graph relate to the bars in the segmented bar graph?

10. Is there an association between favorite core subject and favorite elective? If so, describe it.

11. If there was not an association between favorite core subject and favorite elective, what would the graphs look like? Explain.

Analyzing Categorical Data

Important Ideas:

Check Your Understanding:

- The following graph was displayed by a national news organization. Explain why the graph may be misleading, and sketch a corrected version of the graph.



- A real estate agent is collecting data on the number of houses built in his town's three neighborhoods during three different decades. The table below gives information.

	1960s	1970s	1980s
Shady Lane	40	30	10
Oakcrest	60	15	5
Pinewood Estates	0	45	15

- What proportion of the houses shown were built in Pinewood Estates?
- Find the distribution of Decade Built for the houses in this town using relative frequencies.
- What percent of homes were built in Oakcrest and in the 1960s?

VIDEO:

<https://portal.mathmedic.com/lesson-plans/course/AP-Statistics/unit/1/day/3/video>

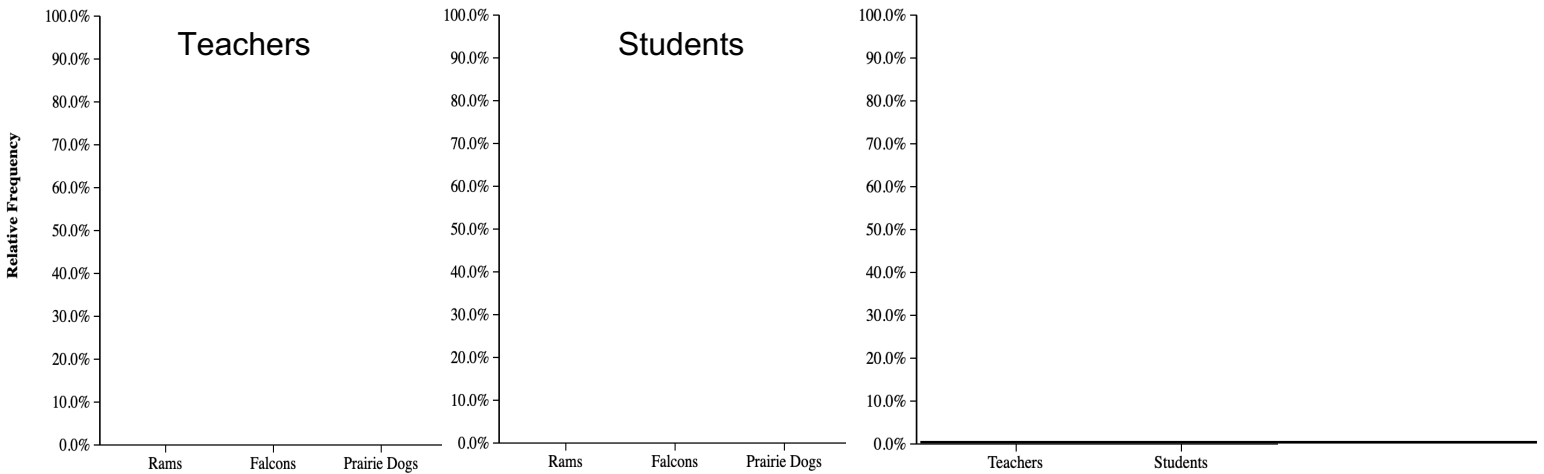


What will be the EK mascot?

When the high school was built in 1969, the school needed to pick a mascot. The principal decided to have the students and teachers vote between three choices: rams, falcons, or prairie dogs. He took a random sample of students and a random sample of teachers. The results of the surveys are given in the table.

	Rams	Falcons	Prairie Dogs
Teachers	80%	10%	10%
Students	30%	60%	10%

1. Create two bar graphs below to display the results. Use three different colors for the bars.
2. Complete the third graph by taking each bar from the teacher sample and stacking them. Use the colors to mark each section. Do the same for the student sample.



3. According to your displays, which mascot appears to have the most support? Explain.
4. Upon hearing the results of the surveys, the students argued that the decision was incorrect because 100 teachers had been surveyed and 500 students had been surveyed. Use this information to fill in the table below with the number of responses.

	Rams	Falcons	Prairie Dogs
Teachers			
Students			

5. How many times more students were sampled than teachers? _____. How can you update the third graph in #1 to take into account the sample size? Adjust your graph.
6. What should they make the EK mascot? Explain.

Representing Two Categorical Variables

Important Ideas:

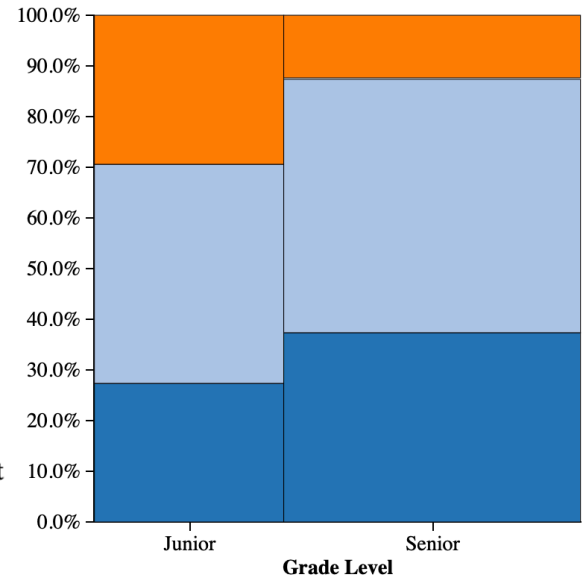
Check Your Understanding:

The following table gives the result of a random sample of upper level students at Rocky Vista University (the Fighting Prairie Dogs!), along with a mosaic plot.

Employment Status	Grade Level	
	Junior	Senior
Currently working	14	30
Not working but have had a job	22	40
Never had a job	15	10

Employment status

- Never had a job
- Not working but did in the past
- Currently working



- a. Calculate the proportion of Juniors that are currently working, not working but have had a job, and never had a job.
- b. Calculate the proportion of Seniors that are currently working, not working but have had a job, and never had a job.
- c. Write a few sentences summarizing what the display in part (a) reveals about the association between grade level and job experience for the students in the sample.

VIDEO:

<https://portal.mathmedic.com/lesson-plans/course/AP-Statistics/unit/1/day/4/video>

How many pairs of shoes do you own?



1. How many pairs of shoes do you own? Record your answer on the board.
2. Is “Number of pairs of shoes” a categorical or quantitative variable?
3. Enter the data at www.stapplet.com. Make a dotplot, stemplot, and histogram and sketch each below.

4. List the mean and median of the distribution. Which value do you think is a more appropriate measure of center? Explain.

5. Describe the distribution of the number of pairs of shoes for your class.

Shape:

Outliers:

Center:

Variability (spread):

6. Which of the three types of display do you prefer? Why?

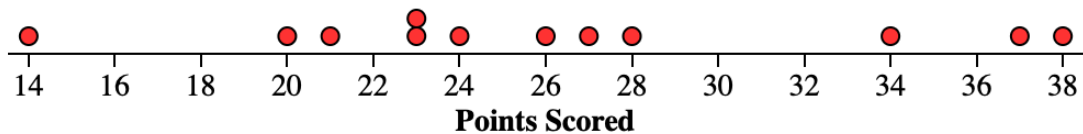
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Displaying Quantitative Data

Important Ideas:

Check Your Understanding:

1. Mr. Wilcox is a huge fan of University of Michigan football. His favorite season was the 1997 season (a perfect season!). The dotplot shows the number of points scored by the U of M team in the 12 games that season.



- (a) Use the dotplot to create a stemplot of the distribution.
- (b) Describe the shape of the distribution.
- (c) Are there any potential outliers? Why?
- (d) What measure of center is most appropriate to describe the distribution? Explain.

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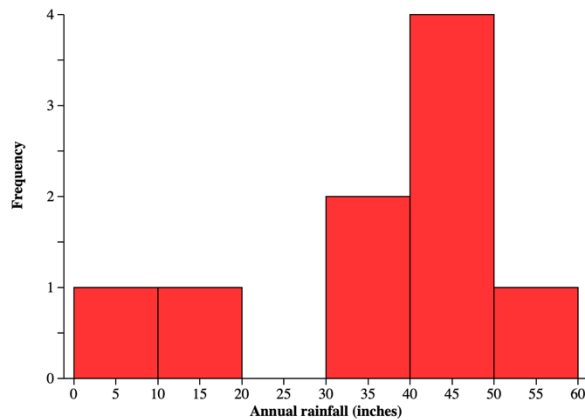
Describing Quantitative Data

Important Ideas:

Check Your Understanding:

A researcher is interested in how much annual rainfall is typical in the United States. She takes a random sample of 9 cities in the U.S. and records the annual rainfall, in inches.

8.2
10.3
33.5
39.1
40.5
41.9
42.4
44.9
53.7



1. Calculate the mean annual rainfall for these cities.
2. Find the median annual rainfall for these cities.
3. Would you use the mean or the median to summarize the typical annual rainfall for a U.S. city? Explain.
4. The standard deviation of the annual rainfall for these 9 cities is 15.52 inches. Interpret this value.

VIDEO:

<https://portal.mathmedic.com/lesson-plans/course/AP-Statistics/unit/1/day/6/video>

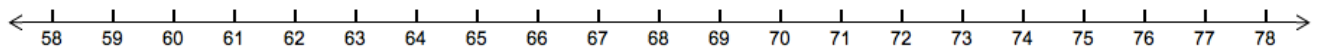


Where Do I Stand?

How does my height compare with the other AP Stats students in my class? In order to answer this question, Ashmita, a student in 4th hour AP Stats, recorded the heights of everyone in her class. The heights (in inches) were:

68 72 61 62 63 63 64 64 59 62 61 60 65 62 57 77 62 71 65 62 70

1. Create a dotplot to display the class distribution of heights.

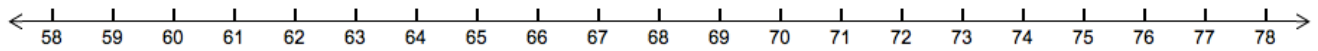


2. What is the median height? Describe how you found it.

3. What is Q_1 and Q_3 ? Describe how you found them.

4. Record the following values and then use them to make a boxplot.

Minimum: Q_1 : Median: Q_3 : Maximum:



4. The **interquartile range** (or *IQR*) is defined as $Q_3 - Q_1$. Find the *IQR*. Where do you see the *IQR* in the boxplot?

5. An **outlier** is a data value that is way too small or way too big (using the rules below). Are there any outliers? Show your work.

$$\text{Way too small} < Q_1 - 1.5IQR$$

$$\text{Way too big} > Q_3 + 1.5IQR$$

6. Ashmita is 63 inches tall. How does her height compare with the other AP Stats students in her class?

Describing Quantitative Data

Important Ideas:

Check Your Understanding:

Mr. Wilcox is a huge fan of University of Michigan football. His favorite season was the 1997 season (a perfect season!). Here is a back-to-back stemplot of the points scored by the 1997 University of Michigan football team and the archrival Michigan State University football team. Write a few sentences comparing the distributions.

