AP Statistics Summer Assignment
2025 – 2026

Congratulations on choosing to take AP Statistics! As an advanced placement class, you can expect that AP Stats will be fast paced and challenging, but also very real-world orientated. Statistics is a type of mathematics that is required for virtually all careers. We will be using the TI-83, TI-83 Plus or the TI-84 Graphing calculator in class. These calculators are required on the AP exam as well. Don't worry if you do not know how to use the statistical applications on the calculator, we will teach it to you during the school year.

The study of statistics is unlike any math class that you have taken before. AP Stats acquaints students with the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There is heavy emphasis on the ability to think, reason, explain and support your conclusions as opposed to just performing rudimentary computations. Writing and reading comprehension are important components to the course as a large part of this class is clear communication and interpretation of data.

This summer assignment covers the first two sections in our textbook *The Practice of Statistics (6th Edition)*. You should read each section completely while completing the notes and examples outlined throughout the assignment. After each section, there is a set of "practice problems" to complete on a separate piece of paper. These problems can be found in the textbook on the designated pages.

This assignment is due on **Wednesday, September 3rd 2025.**

Please note: There will be a quiz on this material the first week of school.

We look forward to getting to know each of you and introducing you to AP Statistics!

Mrs. Melen
Mrs. Schulien

Introduction to Statistics

Textbook Section "Introduction"

Complete the following definitions. Then complete the "practice problems" on a separate piece of paper.

Individual: An individual is an _____ described in a set of data. Individuals can be people, animals, or things.

Variable: A variable is an _____ that can take _____ values for different individuals.

Categorical Variable: A categorical variables assigns labels that place each individual into a _____, called a _____.

Quantitative Variable: A quantitative variable takes _____ values that are quantities - _____ or _____.

Discrete Variable: A _____ variable that takes a _____ set of possible values with _____between them is a discrete variable.

Continuous Variable: A _____ variable that can take _____ value in an interval on the number line is a continuous variable.

Introduction Practice Problems: Pages 7-8 #1, 9, 10

Lesson 1.1 – Displaying and Analyzing Categorical Data

Learning Targets:

Textbook Section 1.1

AP Topics 1.1 – 1.4 & 2.2 – 2.3

1. Become familiar with vocabulary used to describe data
2. Make and interpret bar graphs for categorical data
3. Calculate marginal, joint, and conditional relative frequencies from a two-way table
4. Make and interpret bar graphs and mosaic plots for categorical data
5. Use bar graphs and mosaic plots to compare distributions of categorical data
6. Describe the nature of the association between two categorical variables.

Complete each definition and example problem below. Then complete the "practice problems" on a separate piece of paper.

Frequency Table: Shows the number of _____ having each value.

Relative Frequency Table: Shows the _____ or _____ of individuals having each value.

Example 1: Below is data collected on preferred communication method for 10 randomly selected Canadian students. Complete the frequency table and relative frequency tables.

Preferred Method	Tally
Cell Phone	II
Facebook	I
In person	III
Text messaging	IIII

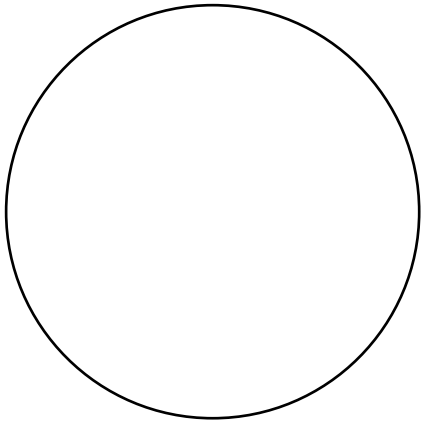
Preferred Method	Frequency
Cell Phone	
Facebook	
In person	
Text messaging	

Preferred Method	Relative Frequency
Cell Phone	
Facebook	
In person	
Text messaging	

Bar Graph: Shows each category as a _____. The _____ of the bars show the category _____ or _____ _____.

Pie Chart: Shows each category as a _____ of the "pie". The _____ of the slices are proportional to the category frequencies or relative frequences.

Example 2: Using the data above (in Example 1), create a bar chart and pie chart to display the data. Do not forget to draw and label the axes and scale correctly!



Two-way table: A table of counts that _____ data on the relationship between two _____ variables for some group of individuals.

Example 3: Yellowstone National Park staff surveyed a random sample of 1526 winter visitors to the park. They asked each person whether he or she belonged to an environmental club. Respondents were also asked whether they owned, rented, or had never used a snowmobile. Complete the two-way table below which summarizes this data.

Environmental Club				
Snowmobile Use		No	Yes	Total
	Never used	445	212	
	Snowmobile renter	497	77	
	Snowmobile owner	279	16	
	Total:			

Marginal relative frequency: Gives the _____ or _____ of individuals that have a specific value for one _____ variable.

Example 4: Find the following marginal relative frequencies.

a. What percent of people in the sample are environmental club members?

b. What proportion of people in the sample never used a snowmobile?

Joint relative frequency: Gives the _____ or _____ of individuals that have a specific value for one categorical variable and a specific value for another categorical variable.

Example 5: Find the following joint relative frequencies.

a. What proportion of people in the sample are environmental club members and own snowmobiles?

b. What proportion of people in the sample are not environmental club members and never use snowmobiles?

Conditional relative frequency: Gives the _____ or _____ of individuals that have a specific value for one categorical variable _____ individuals who share the same value of another categorical variable (the _____).

Example 6: Find the following conditional relative frequencies.

a. What percent of environmental club members in the sample are snowmobile owners?

b. What proportion of snowmobile renters in the sample are not environmental club members?

Relative Frequencies Summary

- Marginal Rel. Freq: A/B
- Joint Rel. Freq: A/C
- Conditional Rel. Freq: A/B

	Variable 1		Total
Variable 2	A		B
Total			C

There are three main ways to display distributions of two categorical variables (outlined below).

Side-by-side bar graph: Displays the distribution of a categorical variable for _____ _____ of another categorical variable. The bars are grouped together based on the _____ of one of the categorical variables and placed side by side.

Example 7: Create a side-by-side bar graph using the data from *Example 3*.

Segmented bar graph: Displays the distribution of a categorical variable as _____ of a _____, with the _____ of each segment proportional to the _____ of individuals in the corresponding category.

Example 8: Create a segmented bar graph using the data from *Example 3*.

Mosaic Plot: A modified _____ _____ _____ in which the _____ of each rectangle is _____ to the number of individuals in the corresponding category.

Example 9: Create a mosaic plot using the data from *Example 3*.

Association: There is an association between two variables if knowing the value of one variable helps us _____ the value of the other. If knowing the value of one variable does not help us predict the value of the other, then there is no association between the variables.

Important Note: Association does not imply causation!

Example 10:

a. Is there an association between environmental club membership and snowmobile use in this random sample of 1526 winter visitors to Yellowstone National Park? How can you tell from side-by-side bar graph, segmented bar graph, and mosaic plot from the examples above?

b. What would the graph in *Example 8* (segmented bar graph) look like if there were no association?

1.1 Practice Problems: Pages 24-30 #13, 15, 17, 23, 27, 29, 31, 40, 42, 43

Lesson 1.2 – Displaying Quantitative Data with Graphs

Learning Targets:

Textbook Section 1.2

AP Topics 1.5 – 1.6

1. Make and interpret dot plots, stemplots, and histograms of quantitative data.
2. Identify the shape of a distribution from a graph.
3. Describe the overall pattern (shape, center, and variability) of a distribution and identify any major departures from the pattern (outliers).

Complete each definition and example problem below. Then complete the "practice problems" on a separate piece of paper.

Dotplot: A dotplot shows _____ data value as a _____ above its location on a _____ _____.

How to make a dotplot:

1. Draw and label the axis – Draw and label a horizontal axis and don't forget the variable name and units of measurement for continuous variables!
2. Scale the axis – Place tick marks at equal intervals.
3. Plot the values – One dot for each value in the data set.

Example 1: The EPA is in charge of determining and reporting fuel economy ratings for cars. To estimate fuel economy, the EPA performs tests on several vehicles of the same make, model, and year. Here are the data on the highway fuel economy ratings for a sample of 25 model year 2018 Toyota 4Runners tested by the EPA:

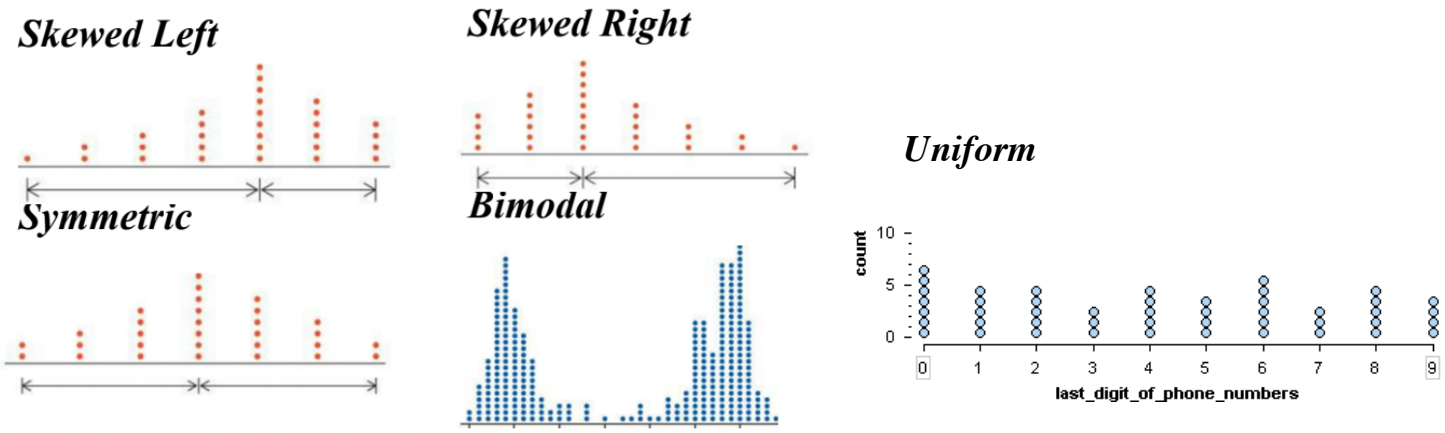
22.4	22.4	22.3	23.3	22.3	22.3	22.5	22.4	22.1	21.5	22.0	22.2	22.7
22.8	22.4	22.6	22.9	22.5	22.1	22.4	22.2	22.9	22.6	21.9	22.4	

a. Make a dotplot of these data.

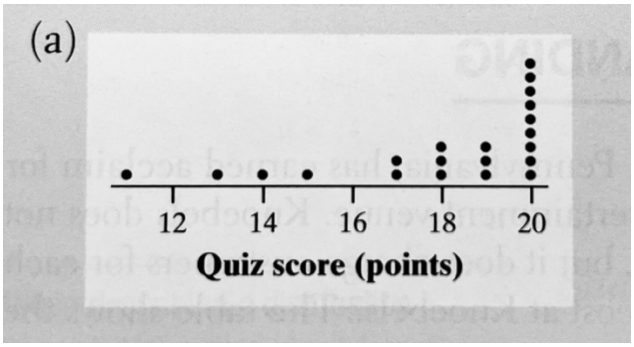
b. Toyota reports the highway gas mileage of its 2018 model year 4Runners as 22 mpg. Do these data give the EPA sufficient reason to investigate that claim?

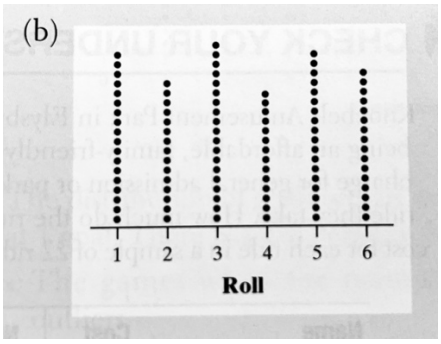
Describing Shape: When describing the shape of a graph of quantitative data, look for the following main features:

1. Major peaks - Decide if the distribution is roughly ***symmetric*** or clearly ***skewed***.
    a. If there is one major peak, we consider the distribution unimodal
    b. If there are two major peaks, we consider the distribution bimodal
    c. If there are no major peaks, we consider the distribution uniform
2. Clusters
3. Gaps



Example 2: The dotplots display two different sets of quantitative data. Graph (a) shows the scores of 21 statistics students on a 20 point quiz. Graph (b) shows the results of 100 rolls of a 6-sided die. Describe the shape of each distribution.



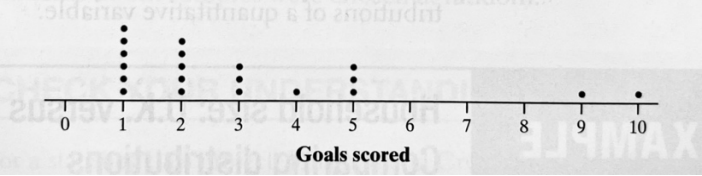


Describing Distributions:
In any graph, look for the *overall pattern* and for clear *departures* from that pattern. When describing the shape of a distribution we look for 4 main things:

Shape
Center
Variability
Outliers

We often remember this with the abbreviation "SOCV" !
Note: we will discuss more formal ways to measure center, variability, and outliers later in the course.

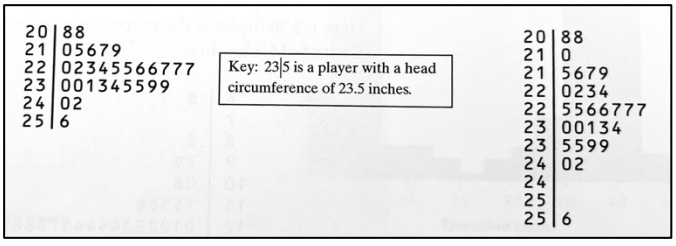
Example 3: Describe the distribution of goals scored in 20 games played by the 2016 U.S. women's soccer team as shown in the dotplot below.



Stemplots: a stemplot shows _____ data value separated into two parts: a _____, which consists of all by the final digit and a _____, the final digit. The stems are ordered from _____ to _____ and arranged in a _____ column. The leaves are arranged in _____ order out from the appropriate stems. *Don't forget a key!*

How to make a stemplot:

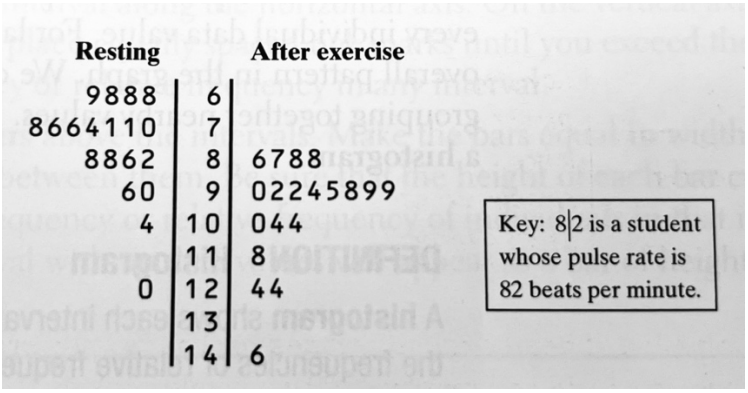
1. Make stems – Separate each observation into a stem, consisting of all but the final digit, and a leaf, the final digit. Write the stems in a vertical column with the smallest at the top. Draw a vertical line at the right of this column. *Do not skip any stem! Even if there is no data value for that stem*.
    a. If there are a large number of values for stems or too few stems, you can "split stems". If you do, be sure that each stem is assigned an equal number of possible leaf digits. (see example below)
2. Add leaves – Each in a row to the right of its stem
3. Order leaves – Arrange leaves in increasing order
4. Add a key! – Identifies the variable and explains what the stem and leaves represent.



Example 4: Here are the data on the resting pulse rates (beats per minute) of 19 middle school students. Create a stemplot for this data.

71	104	76	88	78	71	68	86	70	90	74	76	69	68
88	96	68	82	120									

Back-to-back stemplot: You can use a back-to-back stemplot with common _____ to compare the distribution of a _____ variable in two groups. An example is shown below.



Histogram: A histogram shows each _____ of values as a _____. The _____ of the bars show the _____ or _____ _____ of values in each interval.

How to make a histogram:

1. Intervals – Choose equal length intervals that span the data. Five intervals is a good minimum.
2. Make a table – Summarize the frequency or relative frequency of individuals in each interval in a table. *Put values that fall on an interval boundary in the interval containing larger values.*
3. Draw and label axes – Name of the quantitative variables goes under the horizontal axis. The vertical axis will either be “frequency” or “relative frequency”
4. Scale the axes – Place equally spaced tick marks at the smallest value in each interval along the horizontal axis. On the vertical axis, start at 0 and place equally spaced tick marks.
5. Draw bars – Bars should be equal in width and have no gaps between them. The height of the bar corresponds to the frequency or relative frequency of individuals in that interval.

Example 5: Sales tax rates vary widely across the US. Four states charge no state or local sales tax: Delaware, Montana, New Hampshire, and Oregon. The table shows data on the average total tax rate for each of the remaining 46 states and the District of Columbia.

State	Tax rate (%)	State	Tax rate (%)	State	Tax rate (%)
Alabama	9.0	Louisiana	9.0	Oklahoma	8.8
Alaska	1.8	Maine	5.5	Pennsylvania	6.3
Arizona	8.3	Maryland	6.0	Rhode Island	7.0
Arkansas	9.3	Massachusetts	6.3	South Carolina	7.2
California	8.5	Michigan	6.0	South Dakota	5.8
Colorado	7.5	Minnesota	7.3	Tennessee	9.5
Connecticut	6.4	Mississippi	7.1	Texas	8.2
Florida	6.7	Missouri	7.9	Utah	6.7
Georgia	7.0	Nebraska	6.9	Vermont	6.2
Hawaii	4.4	Nevada	8.0	Virginia	5.6
Idaho	6.0	New Jersey	7.0	Washington	8.9
Illinois	8.6	New Mexico	7.5	West Virginia	6.2
Indiana	7.0	New York	8.5	Wisconsin	5.4
Iowa	6.8	North Carolina	6.9	Wyoming	5.4
Kansas	8.6	North Dakota	6.8	District of Columbia	5.8
Kentucky	6.0	Ohio	7.1		

a. Make a frequency histogram to display the data.

b. What percent of values in the distribution are less than 6.0? Interpret this result in context.

1.2 Practice Problems: Pages 47 – 54 #45, 49, 51, 59, 63, 67, 77, 80-85