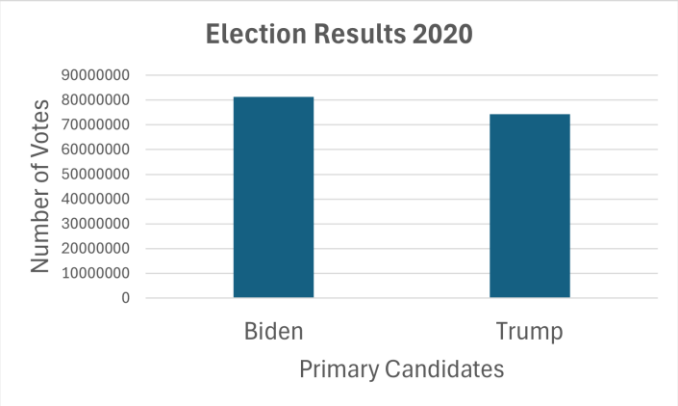
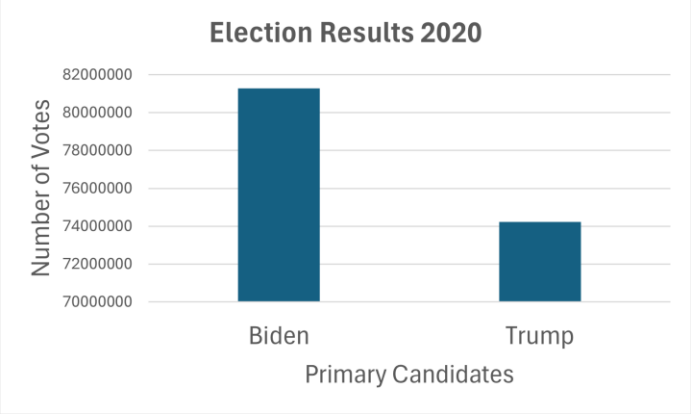
ACTIVITY: Lying with Graphs – Worksheet

Examine the graphs and answer the questions.

Bar Graph: Simple





1. What variable was used to collect the data for creating these graphs?

2. Is the variable quantitative or qualitative? Explain.

3. Approximately how many more votes did Biden get compared to Trump?

4. Approximately 155,000,000 people voted for either Trump or Biden. Approximately what percent of the total votes was the difference you calculated above?

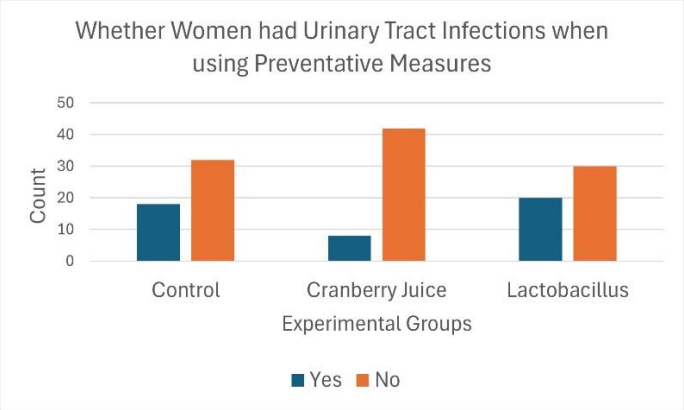
5. Does it appear that Joe Biden won the popular vote by a landslide on the first graph?

6. Does the second graph make it appear that Biden won the popular vote by a landslide? Why or why not?

7. What has changed that makes this graph look so different?

8. Which graph do you think more accurately depicts the data? Why?

Bar Graph – Grouped



9. What two variables were used to collect the data for creating this graph?

10. Are the variables quantitative or qualitative? Explain.

11. For the graph, does it appear that regardless of which measure is used, the woman is less likely to have a urinary tract infection? Why or why not?

12. Approximately how many women had urinary tract infections?

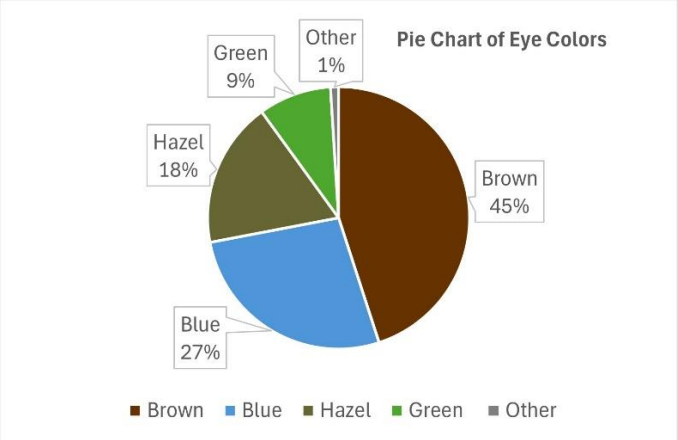
13. Approximately what percent of the women who had urinary tract infections were in each of the experimental groups?

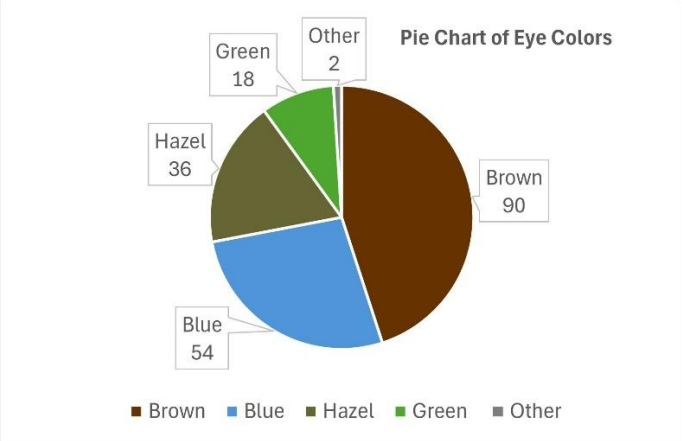
14. Approximately how many women were in each experimental group?

15. For each experimental group, compute the percentage of women who had a urinary tract infection.

16. Which treatment appeared to be the most effective in preventing urinary tract infections? Explain.

Pie Graphs:





17. What variable was used to collect the data for creating this graph?

18. Is the variable quantitative or qualitative? Explain.

19. If 1,000 individuals were used to determine these percentages, how many of the 1,000 people would have green eyes?

20. Using the first chart, what percent of the people have green eyes?

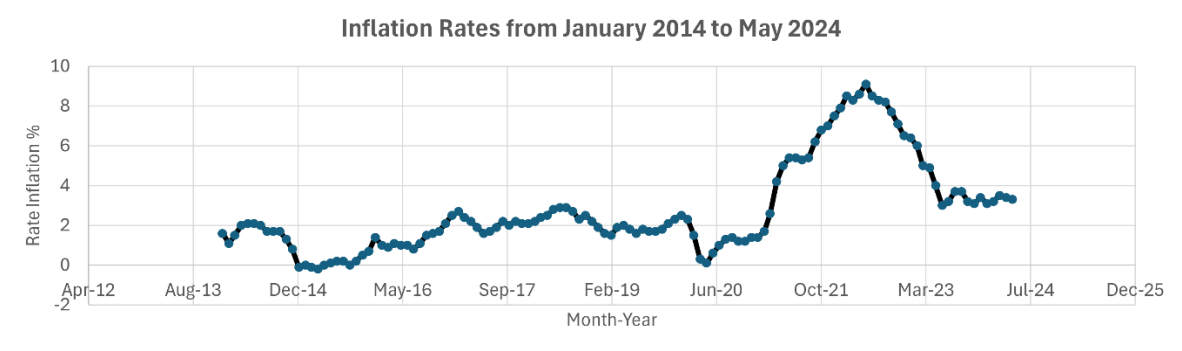
21. Using the second chart, what percent of the people have green eyes? Explain how you obtained your answer.

22. If out of all the people who were selected to determine these percentages, 54 of them had blue eyes, how many total people would have been surveyed?

23. Do the two charts provide equivalent data?

24. Which pie chart do you believe represents the data more clearly?

Line Graphs:



25. What two variables were used when collecting the data for this graph?

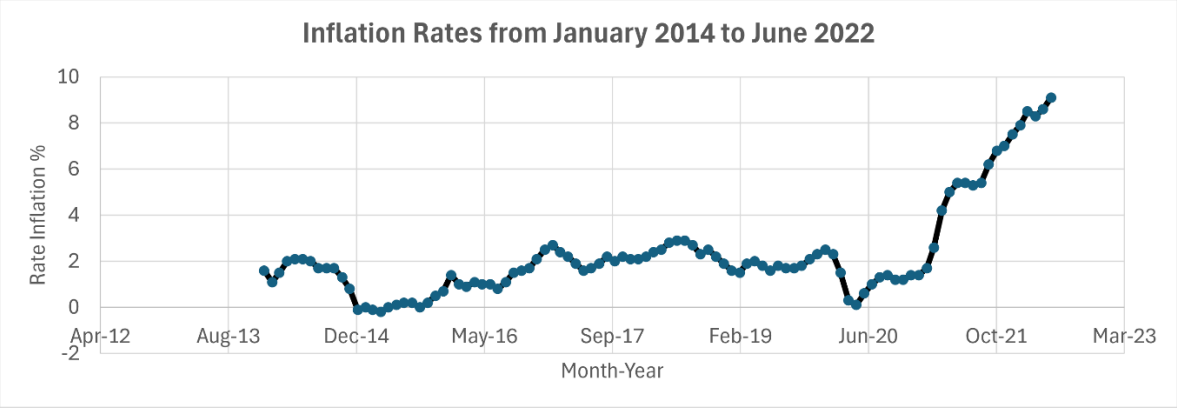
26. Are the two variables quantitative and qualitative? Explain.

27. Suppose this graphic was provided in a news article regarding inflation rates before, during, and after the COVID-19 pandemic. Make three claims based on the graph and justify those claims.

28. Does this graph support the possibility that the COVID-19 pandemic caused inflation? Why or why not?

29. What are some top causes of inflation according to the internet?

30. Could the COVID-19 pandemic have been a catalyst to any of the reasons mentioned in question 29? Explain.



31. How might you use the graph above to criticize Biden's economic policies? Justify your answer.

32. What changed from the first graph on the previous page to the second graph shown above?

33. Do you think this would be an accurate reflection of Biden's time in office? Why or why not?

34. When reading line graphs that show a trend over time, what do you need to pay attention to?

It is now your turn to create some graphs. The data you will use is provided for you on an Excel Spreadsheet.

<u>Graph 1</u>:
On Sheet 1 of Excel, is some data regarding the Titanic. Answer the questions based on the data provided.

1. What **<u>two</u>** variables are in this data set?

2. Are the **<u>two</u>** variables quantitative or qualitative?

3. If you wanted to create a graph, like the ones studied in this lesson, that compared the number of passengers who died or survived based on their class, which graph would work best.

Create the graph in Excel and answer the questions below concerning your graph. Instructions on Excel are towards the end of this activity.

1. What class had more people survive than die?

2. Which group had the biggest difference between the number of passengers who died versus survived?

Graphs 2 and 3:

On Sheet 2 of Excel, is some data that looks at the level of education among people aged 25 years and older in Oklahoma. The data is represented in thousands.

1. What is the variable for this data?

2. Is this variable quantitative or qualitative?

3. If you wanted to create a graph that showed the percentage of people who have each level of education, which graph would work best out of the ones presented in this lesson?

4. If you wanted to create a graph that showed the total number of people in each group, which graph would work best out of the ones presented in this lesson?

Create both graphs you indicated above in Excel and answer the questions below concerning your graphs. Instructions on Excel are towards the end of this activity.

1. What percentage of Oklahomans 25 years or older have a Master's degree as their highest level of education?

2. What percentage of Oklahomans 25 years or older have a High School diploma as their highest level of education?

3. How many Oklahomans have a Doctorate degree?

Graph 4:

On Sheet 3 of Excel, is some data that shows the year and the average 30-year fixed mortgage rate.

1. What **two** variables are in this data set?

2. Are the **two** variables quantitative or qualitative?

3. If you wanted to create a graph, like the ones studied in this lesson to look at the trend for 30-year mortgage rates since 1976, which graph would work best?

Create the graph in Excel and answer the questions below concerning your graph. Instructions on Excel are towards the end of this activity.

1. Are the mortgage rates in 2023 the highest they have ever been?

2. Why do you think people in the year 2023 felt that the interest rates were too high that year?

3. One of the reasons to increase interest rates is to control inflation. Compare the graph you created to the one showing inflation rates. Did the recent increase in mortgage rates correspond with a decrease in the inflation rate?

Bar Graphs: Simple

Examples:

Brown	45
Blue	27
Hazel	18
Green	9
Other	1

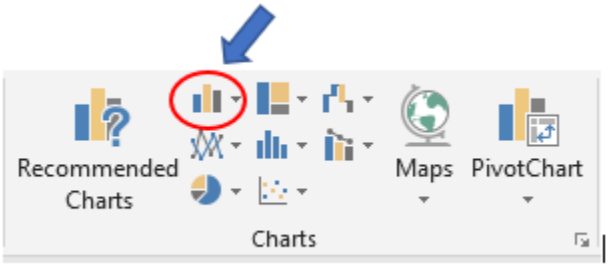
1. Format your data so that you have the groups in one column and the frequency in the second column.

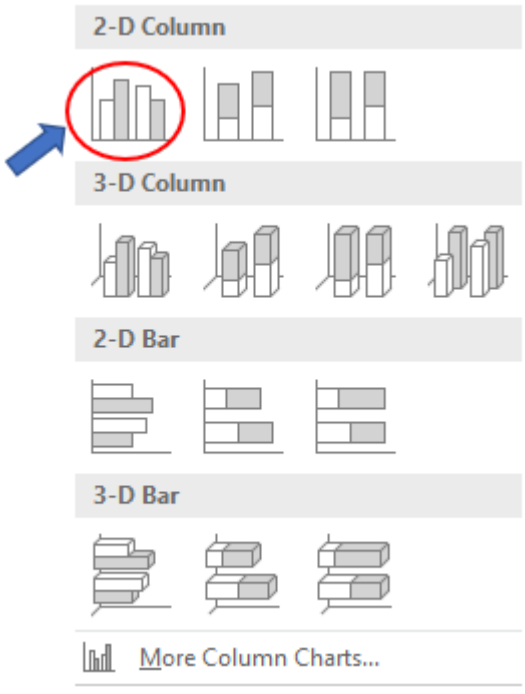
Brown	45
Blue	27
Hazel	18
Green	9
Other	1

2. Highlight the data (Both the group names and frequencies).

3. Select "Insert."

4. Select the bar graph icon that shows three colors as indicated below and choose the top left option.





Bar Graphs: Grouped

Examples:

	Control Group	Cranberry Juice Group	Lactobacillus Group
Yes	37	17	56
No	31	40	29

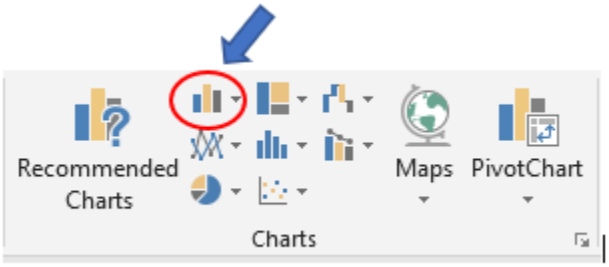
1. Set up your data like a contingency table as shown on the right. Notice that the upper left square is left blank.

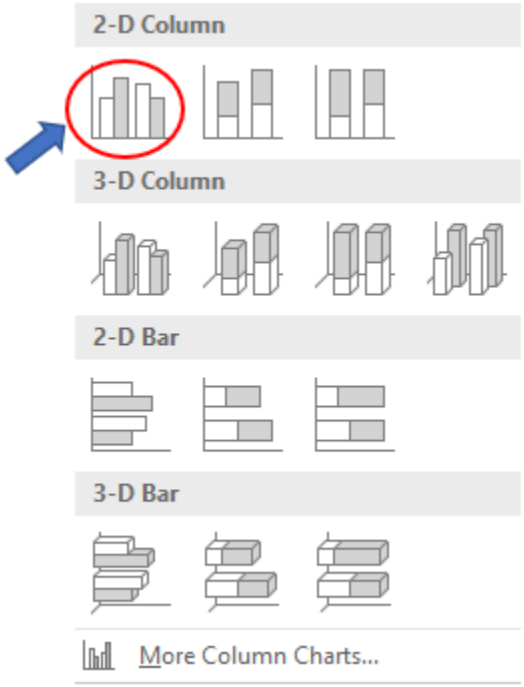
2. Highlight the data

	Control Group	Cranberry Juice Group	Lactobacillus Group
Yes	37	17	56
No	31	40	29

3. Select “Insert.”

4. Select the bar graph icon that shows three colors as indicated below and choose the top left option.





Pie Graphs

Examples:

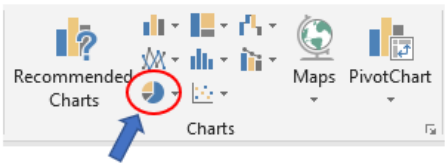
1. Format your data so that you have the groups in one column and the frequency in the second column.

Brown	45
Blue	27
Hazel	18
Green	9
Other	1

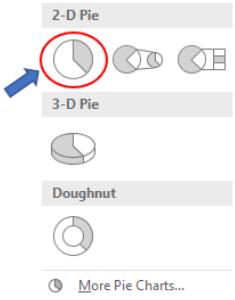
2. Highlight the data (Both the group names and frequencies)

Brown	45
Blue	27
Hazel	18
Green	9
Other	1

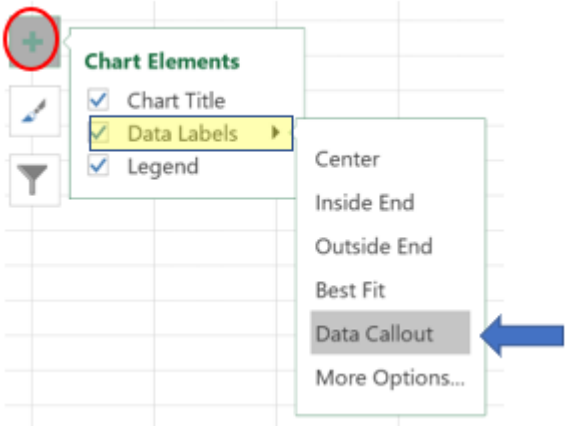
3. Select “Insert.”



4. Select the pie graph icon and choose the top left option.



5. To include the percentage for each group, follow the steps below.
   - Click on “+” – Chart Elements
   - Check the box for “Data Labels.”
   - Click on the right arrow next to data labels and choose “Data Callout.”



Line graphs

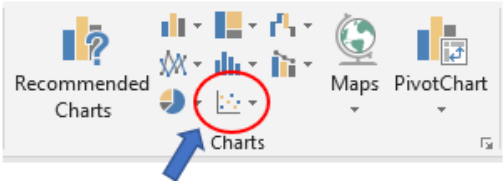
Examples:

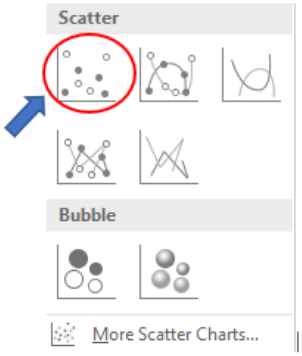
1. Type your data into two long columns. The left column data will be plotted on the x-axis and the right column data will be plotted on the y-axis.

2. Highlight both columns. Note: Do not include the headings.

3. Select “Insert.”

4. Select the icon that looks like random dots plotted on a graph (scatter chart) and choose the upper left picture.

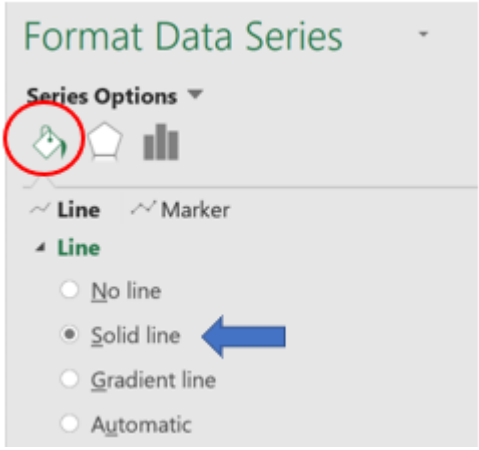




5. To add the line, double click on one of the points to bring up the “Format Data Series” option (it will appear on the right-hand side of the screen).

6. Click on the Paint bucket (Fill and Line).

7. In the “Line” dropdown menu, select “Solid line”.



References for data used in this ARC

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