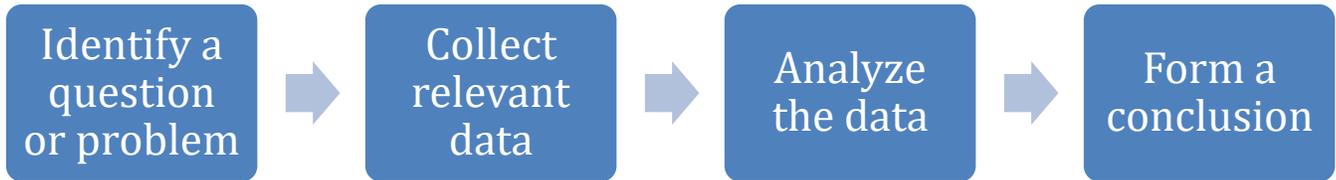


## Chapter 5 Group Activity

## 5A: Fundamentals of Statistics

Group Activity

Statistics is the study of how to collect, analyze and make conclusions from data. Here is a diagram of the statistical process.

**Identify the Population, Sample, Parameter and Statistic**

1. For each scenario, a question or problem has been identified. Draw a diagram and describe the population, sample, parameter and statistic. Be specific with units for the parameter and statistic.

a. An insurance company wants to know whether households have two cars. A survey of 976 American households found that 32% of households have two cars.

b. A local toy store owner wants to know how much money kids in Portland get as an allowance per week.

c. A beverage company wants to see if people in the United States liked their new logo.

**Sampling Methods**

2. Identify the sampling method used:

a. All the Redland High School students were assembled in the gym, and then separated into groups by grade. Each student was assigned a number, and 25 numbers were randomly drawn from the students in each grade. They were asked if they planned to go to college.

b. You are standing outside of the grocery store and stop every third person leaving to ask if they purchased milk.

c. At his book club meeting, Dan asked each member if they had seen the movie made from their current book.

d. Instead of the method in part a, the administrator at Redland High School chose 100 student numbers randomly and asked those students to report to the office for the survey.

3. You are a statistical consultant and you have been hired to collect data on employee satisfaction. The company has 1000 employees at two buildings, East and West. There are 4 departments and 5 levels of employees. Identify the population, sample, parameter and statistic, then describe a sampling method.

4. For each of the following, identify the **type of study** and fill in the corresponding boxes. Leave the remaining boxes blank.

Study	Observational	Observational: Case study		Experimental		
		Controls	Cases	Control Group	Treatment Group	Blinding
Over a 6-month period, among 100 people with bipolar disorder, patients given a high dose of omega-3 fats improved more than those given a placebo. Patients didn't know which they were given, but the experimenters knew.						
A National Cancer Institute study of 716 melanoma patients and 1014 cancer-free patients found that those having a single large mole had twice the risk of melanoma.						
Over the period of one-year, researchers determined which airline had the lowest percentage of canceled flights.						
1000 people were randomly separated into two groups—one group was assigned to exercise for 45 minutes daily, and the other group was instructed not to exercise. The participants in the exercise group reported falling asleep within 15 minutes of going to bed, but those not exercising laid awake for at least 30 minutes.						
500 patients with migraine headaches receive a shot to see if it helps reduce the frequency of the headaches. The nurses giving the shots write down the code on each syringe and the patient name. The syringes look identical, but half contain the new medicine and half contain saline.						

**Confidence Intervals**

5. The table below lists results for a Gallup poll conducted via random telephone interviews in October 2015. Assume that the margin of error is 4 percentage points.

a. Find the confidence interval for each category.

	American adults	18-34 years old	35-49 years old	50-64 years old	65+ years old
Support Legalizing the use of Marijuana	58%	71%	64%	58%	35%
Confidence Interval					

b. For which age group(s) can you claim that over half of the people support legalization of marijuana? Explain.

c. For which age group(s) can you claim that the majority of people do not support legalization of marijuana? Explain.

d. Explain why the percentage for all American adults isn't exactly the average of all the categories.

6. Go to Gallup.com or pewresearch.org and look up a poll about students. Give the percentage, margin of error and confidence interval. What do you think about the survey methods used?

**5B: Types of Bias**

7. In each situation, identify a potential source of bias. You will use each type from the class prep once.
- Trident gum did a survey of dentists to see how many would recommend their gum.
  - A boss asks their employees if they have taken drugs in the last week.
  - A researcher on a phone survey asks, "Do you plan to vote for the school district bond or would you rather see our schools crumble?"
  - A survey was given to a random sample of students but three students didn't return the survey.
  - A survey about PCC student's experiences in Math 105 was given to students at Rock Creek and Sylvania.
  - A survey asks people for their weight.
  - A broadcast email was sent to all PCC students with a satisfaction survey.

**5C: Statistical Tables and Graphs**

Please complete the anonymous survey online. The link is in D2L. This will give our class some data to work with.

**Types of Data**

8. For each question in the survey, determine whether the data is qualitative or quantitative.
- How do you identify your gender?
  - What is your age?
  - How many credits are you taking this term?
  - What is your main mode of transportation to campus?
  - How long is your pinky finger to the nearest half-centimeter?

**Frequency Tables and Graphs of Qualitative Data**

9. For one of the sets of qualitative data, make a frequency table using a spreadsheet. Use your table to make a pie chart and a bar chart. Write a sentence or two about any patterns or observations you make from the graph.

**Quantitative Variables and Histograms**

10. For the pinky length data, make a histogram by hand and/or using a spreadsheet. Write a sentence or two about any patterns or observations you make from the graph.


**Time Series Plots**

11. The data below show the number of people diagnosed with cancer each year. Make a time series plot in Excel. Write a sentence or two about any patterns or observations you make from the graph.

United States and Puerto Rico Cancer Statistics, 1999-2013 Incidence

Year	Number of people diagnosed with cancer
1999	18,162
2000	17,982
2001	18,463
2002	18,457
2003	18,155
2004	19,058
2005	19,258
2006	19,811
2007	20,067
2008	21,120
2009	20,630
2010	20,398
2011	21,290
2012	20,739
2013	21,155

Source: <https://wonder.cdc.gov/controller/datarequest/D121>

**Show Cara your graphs when completed.**

12. What is wrong with these graphs?

a. Ticket Prices



b. Percentage of Victories

