Good morning and welcome back!

Please have out your transcript and something to write with.

Statistical Reasoning
Chapter One

Chapter One Vocabulary

Word	Definition
Statistics	The science of dealing with data - collecting, analyzing, and presenting it.
Individuals	Objects described by a set of data.
Variables	Any characteristic of an individual - can be quantitative or categorical.
Categorical Data	Variables that take on values that are names or labels and is used to place individuals into one of several groups.
Quantitative Data	Variables that are measured on a quantitative or numerical scale.
Observational Study	A study in which researchers observe individuals and measure variables without interfering.
Experimental Study	A controlled study in which researchers often try to determine a cause and effect relationship by imposing a treatment on a group of individuals.
Treatment Group	The group that receives the treatment in an experiment.
Control Group	A baseline group that receives no treatment or a neutral treatment in an experiment.
Populations	The entire group that you want to study.
Samples	A part of the population that is used to collect data.
Census	A survey that includes the entire population rather than just a sample.

Statistical Reasoning Name:

1.1 – guided notes

Individuals and Variables.

Example 1: The following represents a data set from the Cyber Stat Corporation:

	A	B	C	D	E	F
1	Name	Job Type	Age	Gender	Race	Salary
2	Cedillo, Jose	Technical	27	Male	White	52,300
3	Chambers, Tonia	Management	42	Female	Black	112,800
4	Childers, Amanda	Clerical	39	Female	White	27,500
5	Chen, Huabang	Technical	51	Male	Asian	83,600
6						

a) What are the individuals:

the people

b) What are the variables:

job type, age, gender, race, salary

c) Which data is categorical:

job type, gender, race

d) Which data is quantitative:

age, salary

Classify each of the following as either categorical or quantitative.

a) the number of goals scored each week by a basketball team Q

b) the number of children in an Australian family Q

c) the number of bread rolls bought each week by a family Q

d) the pets owned by students in a class C

e) the number of leaves on the branches of a magnolia tree species Q

f) the most popular colors of cars C

Jake's Car Inventory

Jake is a car buff who wants to find out more about the vehicles that students at his school drive. He gets permission to go to the student parking lot and record some data. Later, he does some research about each model of the car online. Finally, Jake makes a spreadsheet that includes each car's model, year, color, number of cylinders, gas mileage, weight, and whether it has a navigational system.

a) Identify the individuals. the cars

b) Identify the variables, then determine whether they are categorical or quantitative.

Model → C

year → Q

color → C

# of cylinders → C

gas mileage → Q

weight → Q

nav → C

Use good judgement when deciding what variables to consider.

Do wealthier people recycle more than others? Researchers weighed the items put out for recycling in two neighborhoods in California

a) Who are the individuals?

items out for recycling

b) What is the variable?

weight

The wealthier households contributed more pounds per week on average than the other households of lower income. Are the wealthier more serious about recycling? Explain your answer.

No → wealthier people may be recycling heavier items like glass

They should measure the # of items recycled

Experiments versus Observational Studies.

Identify each of the following as an observational study or an experiment. If it is an experiment, determine the treatment group and control group.

a) A researcher wants to know if a soil additive makes a fern grow more quickly. He grows one specimen in treated soil and one in untreated soil.

experiment

b) To find out whether car accidents are more likely on rainy days, a researcher records the weather conditions during 50 randomly selected accidents for the past year.

observational study

c) One hundred arthritis sufferers reported the severity of their symptoms daily for a month. Fifty of the subjects were given Epsom salt to bathe in at least every other day. At the end of the month, 30% of the subjects who used Epsom salt reported a decrease in their symptoms.

experiment

d) Compare the grades on a final math test of 25 students who use calculators and 25 students who do not use calculators. The students decide which group they are in.

observational study

e) Determine which brand of orange juice people prefer. The people are randomly chosen at the supermarket and are asked to taste both brands without knowing which brand they are drinking.

experiment

f) Compare voter satisfaction levels between people assigned to use either paper ballots or touchscreen machines.

experiment

g) A Math 113 professor announces a study session to be held the night before a test. The professor lists the students who attend the session and compares their scores to the remaining students' scores.

observational study

h) To determine whether a review session will improve his students' scores, a Math 113 professor divides his class into two groups. He then requires one group to attend a study session and compares the test results of each group.

experimental

Populations versus Samples.

Example: A truckload of apples arrives at an apple juice production plant. The plant's quality control team selects three large buckets of apples from various locations within the truck. These apples are inspected carefully. Based on inspection results, the entire truckload is either accepted or rejected by the plant.

a) What is the population?

entire truckload of apples

b) What is the sample?

3 selected buckets of apples

More Practice.

Identify the population and the sample:

a) A survey of 1353 American households found that 18% of the households own a computer.

Population: all American households

Sample: 1,353 American households

b) A recent survey of 2625 elementary school children found that 28% of the children could be classified obese.

Population: all elementary school children

Sample: 2625 elementary school children

c) The average weight of every sixth person entering the mall within 3 hour period was 1 46 lb.

Population: every person entering the mall within 3 hr.

Sample: every 6th person entering the mall within 3 hr. per.

d) A survey of 2104 households in the United States found that 65% subscribe to cable television.

Population: _____

Sample: _____

You want to estimate the number of students in a high school who ride the school bus. Which sample is best?

(a) 4 students in the hallway
(b) All students in the marching band
(c) 50 seniors at random
(d) 100 students at random during lunch