

What's the Class' Average Height?

On your way in, grab one of each color of post-it (yellow, green, blue, and pink).

Also grab the Chapter 4 notes packet and have a seat!

What's the Class' Average Height?

On the yellow post-it, write the letters A and B as follows:

A:

B:

Next to A, write your height in inches to the nearest inch.

What's the Class' Average Height?

On the green post-it:

Look around without getting up and write what you believe to be the class' average height.

Feel free to keep your original guess or modify based on what you see.

What's the Class' Average Height?

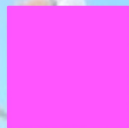
On the blue post-it:

Stand up and look around the room and write what you believe to be the class' average height.

Feel free to keep your original guess or modify based on what you see.

What's the Class' Average Height?

On the pink post-it:



Within 30 seconds, line up in the front of the room from shortest to tallest. Write what you believe to be the class' average height.

Feel free to keep your original guess or modify based on what you see.

The Class' Average Height Data

- How did the increasing information available to you change your answer on each post-it?
- Why did we do this activity?

AP Statistics

Chapter 4: Designing Studies

Day 1

HW: p. 226-230, #5, 7, 9, 27, 31, 37

Methods of Data Collection

There are four methods of data collection:

1. Census
2. Sample Survey
3. Experiment
4. Observational Study

Methods of Data Collection

A **census** is a study that observes, or attempts to observe, every individual in a population.

- A poll of all 450 National Basketball Association players is conducted in order to determine who is the best referee in the league.

The **population** is defined as the group of individuals that data is collected from.

- The entire 25-man roster of baseball players.

Methods of Data Collection

A **sample survey** studies a portion of the population in order to determine data regarding the whole population.

- Local New Jersey high school students are sampled to determine what their favorite subject is in order to make a determination regarding all high school students in the state of New Jersey.

A **sample** is a portion of a population that is examined and from which data is collected.

- The starting pitchers of a 25-man baseball team roster.

Methods of Data Collection

In **experiments**, individuals are subjected to a particular treatment and the responses to the treatment are measured.

Experiments show a cause-and-effect relationship between two variables.

- In 2002, Major League Baseball experimented with baseballs at Coors Field in Colorado by placing them in a humidor to test whether this affected the number of home runs hit at Coors Field.

Methods of Data Collection

An **observational study** is a study in which individuals are observed and specific variables of interest are measured.

The observer does not influence or bias the response of the individuals.

A direct cause-and-effect relationship cannot be determined from an observational study.

- A study to estimate long-term psychological effects on children ages 5-10 after losing a parent to a sudden death.

Sampling Methods

A **voluntary response sample** refers to individuals who choose to respond to surveys or polls.

Voluntary response sampling is biased because those with strong negative opinions usually respond.

- Examples include call-in radio or television shows.

Sampling Methods

In a **convenience sample**, individuals are chosen because they are easiest to reach.

- Sampling that is done at major public areas such as airports, mall, food stores or amusement parks.

Bias

Bias refers to sampling methods that favor a certain outcome.

A sampling method is **biased** if it tends to produce samples that do not represent the population.

- Both voluntary response sampling and convenience sampling lead to biased outcomes.

Characteristics of a Well-Designed and Well-Conducted Survey

1. Be certain that bias is not in the survey (the designer of the survey must have no personal reference or connection when designing the survey).
2. Avoid **undercoverage** (when groups of the population are left out of the process of choosing the sample).
 - Performing a survey at an amusement park in the summer might exclude those who are retired or work during the day.

Characteristics of a Well-Designed and Well-Conducted Survey

3. Avoid **nonresponse** (when specific individuals of a survey group cannot be contacted or refuse to cooperate with the survey).
 - It is more likely that people will respond to a phone poll at 6pm in the evening rather than 1pm in the afternoon because of normal work hours.

Characteristics of a Well-Designed and Well-Conducted Survey

4. Avoid **response bias** (when an interviewer or respondent behavior skews the data).
 - If an interviewer conducts a phone poll and asks respondents if they have ever cheated on their taxes, the overwhelming response to this would be "No." Individuals are not going to respond positively to swindling the government, and yet people do indeed cheat on their taxes to some degree.

Characteristics of a Well-Designed and Well-Conducted Survey

5. Wording of questions (do not confuse the respondent or lead them to an answer).
 - During a phone poll the interviewer asked the following question: "Do you think voting down the school budget and teachers losing their jobs is going to help increase mathematics scores countywide?" Obviously this question is leading the respondent to a negative answer, and only pertains to one side of the issue.

Characteristics of a Well-Designed and Well-Conducted Survey

6. The data and time of a poll (if a poll that was conducted in 2002 is used as a data point in 2010 data, that may bias the data).
 - In 2002, a poll was conducted to see how many families purchased a cell phone for each of their children. With the boom of technological advances in smart phones and the lower cost of basic cell phone data plans, more families in 2010 could afford to purchase cell phones for their children.



Characteristics of a Well-Designed and Well-Conducted Survey

7. Large random samples will give more detailed and accurate results.
 - If a high school in suburban New York has 2200 students, then taking a random sample of 220 students regarding parking privileges will provide better data than sampling one 9th grade class of 30 students.