

### 3.1 Introduction to Data Collection Part 1: Asking Statistical Questions

Tommy and Hannah go off campus to eat lunch every day. Because the lunch period is short, they wonder if it would be faster to go inside their favorite fast-food restaurant to order or use the drive-thru. Each day, they flip a coin to determine which method (inside or drive-thru) to use and record the total length of time it takes from the moment they enter the parking lot to the moment they exit the parking lot with their food.

After several weeks of collecting data, they analyze their results and determine that going inside to order took about 2 minutes and 34 seconds less than using the drive-thru, on average. Their conclusion: It's faster to go inside.

Tommy & Hannah's study illustrates the four steps of the statistical problem-solving process!

Ask. Collect. Analyze. Interpret.

#### How to Complete the Statistical Problem-Solving Process

- 1.) **Ask Questions:** Clarify the research problem and ask one or more valid statistical questions.
- 2.) **Collect data:** Design and carry out an appropriate plan to collect the data.
- 3.) **Analyze data:** Use appropriate graphical and numerical methods to analyze the data.
- 4.) **Interpret results:** Draw conclusions based on the data analysis.

A statistics problem starts with a statistical question. Not just any questions will do. *A valid statistical question is based on data that vary.*

That is, the answer to the questions won't be the same each time an observation is recorded.

Tommy and Hannah asked a valid statistical question because their answer was based on data that vary - the length of time it takes to order and receive their food, from the moment they enter the parking lot to the moment they leave it.

**Example:** Determine if each of the following is a valid statistical question. Justify your answer.

1.) How much money does Mr. Tagawa have in his wallet right now?

No because we can get an immediate answer that doesn't vary.

2.) How long can students at your school hold their breath?

Yes because each student that we ask could be different & that varies.

3.) Do most U.S. adults engage in vigorous exercise at least once a week?

Yes because the data can vary (Each person can workout different amounts of time.)