

Investigative Questions Activity (CED Topics 1.1 and 1.10)
(Adapted from *The Practice of Statistics* 8e by Starnes/Tabor)

The investigative question serves three important functions in a statistical study: it guides the data collection process; it guides the choice of data analysis methods; and it indicates the types of conclusions that can be made. Consequently, there are three components of an investigative question. To identify these components, you should:

1. Identify the variable(s) of interest.
2. Identify the type of inference, including parameter(s) and/or direction when applicable.
3. Indicate the type of conclusion that can be made, including the population(s) to which the results of the statistical study can be generalized, and the possibility of a cause-and-effect conclusion.

Identify the 3 components of the following investigative questions.

- What are the plausible values for the mean weight (in grams) of all candy bars produced by a factory today?

1. *Variable(s):*
2. *Type of inference:*
3. *Type of conclusion(s):*

- Is there a difference in the mean GPA for students in School A and students in school B?

1. *Variable(s):*
2. *Type of inference:*
3. *Type of conclusion(s):*

- For all pneumonia patients like the ones in this experiment, do supplemental breathing exercises cause a reduction in the proportion of patients that develop pleurisy compared to no supplemental breathing exercises?

1. *Variable(s):*
2. *Type of inference:*
3. *Type of conclusion(s):*

Which component is missing in the following investigative questions? How would you fix it?

- What are the plausible values for the difference in income for all adults in Los Angeles and all adults in New York City?
- Does taking a flu vaccine reduce the proportion who get the flu compared to taking a placebo?

Identify each of the three components in the following scenarios. Then write a valid investigative question based on the components.

- An administrator at High School A reads that 62% of high school seniors in the United States have a driver's license. To see if this percentage is different at High School A, the administrator will select a random sample of 100 seniors.
- To see if there is a relationship between generation (e.g., Gen X, Millennial) and marital status, researchers selected a random sample of U.S. adults and asked each member for their generation and marital status.
- To estimate the difference between the average effectiveness of Drug A and Drug B in reducing migraine intensity (on a scale from 0 to 10), researchers randomly assigned 100 volunteers with a history of migraines to either Drug A or Drug B.