

# Lesson 1

## What is Statistics?

### ***Learning Objectives***

Upon completion of this lesson, you should be able to do the following:

1. Recognize the usefulness of statistics by observing that statistics is used in every field to gather information from any type of variable.
2. Identify the basic purposes of statistics: to perform experiments, to describe data, and to draw conclusions from data.

### ***Key Words***

statistics, variable, distribution, data description, probability, population, sample, population parameters, sample statistics, inferences, inferential statistics, estimation, and tests of hypotheses

### ***Concepts***

**Statistics** is the science of gathering usable information from phenomenon that occurs all around us in our daily lives. The field of statistics includes not only describing observations but also generating conclusions based on those observations. Organizing and designing experiments in order to obtain useful information is also a part of a statistician's job.

A **variable** is a characteristic on a thing, event, object, or being that can be measured. A variable can either have a numerical value or a value described by a word. Variables that would have certain values for you, for example, are your height, your hometown, your eye color, your preference in music, and your age.

The **distribution** of a variable is describes the possible values of the variable and relates the prevalence of those values for the variable of interest. We will be interested in the central location, spread, and shape of the distributions of many different variables. **Data description** techniques, both numbers and graphs, relate information about the shape, the middle and the spread of a data set. **Probability** helps to gauge the likelihood of certain data if specific things are true about the population being sampled.

A **population** is the entire set of values for a variable. In the field of Statistics a population is studied by observing a subset of the population known as a **sample**. Populations of variable values are described by unknown constants of interest called **population parameters**. Numbers calculated from samples are called **sample statistics**. In addition to describing data, statistics uses information from samples to form **inferences** or draw conclusions about populations. **Inferential statistics** uses observed data to form conclusions about populations. Inferential statistics uses sample statistics to **estimate** population parameters. Inferential statistics involves **tests of hypotheses**, which check values of the population parameters.