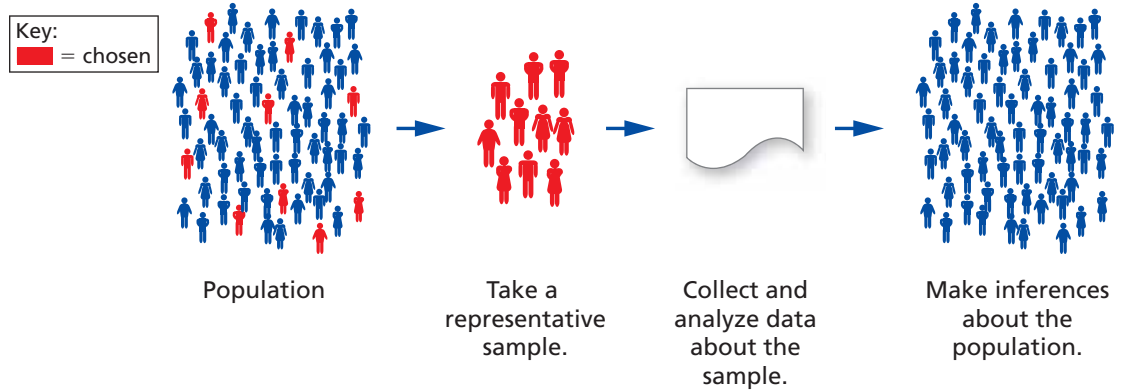


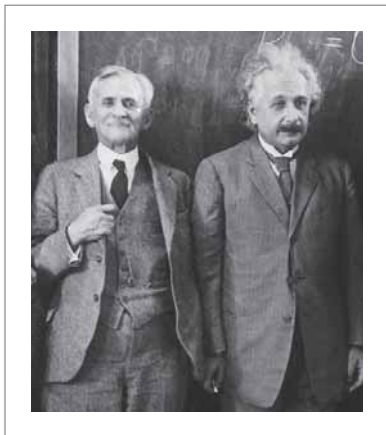
Here is the basic idea of statistical sampling.

1. Take a representative sample of the population.
2. Find the mean and the standard deviation of the sample.
3. Determine how confident you want to be of your *inference* (90%, 95%, 99%).
4. Use a confidence interval calculator to determine the margin of error.
5. *Infer* that the mean of the population is equal to the mean of the sample (\pm the margin of error).

This process is called **statistical inference**.

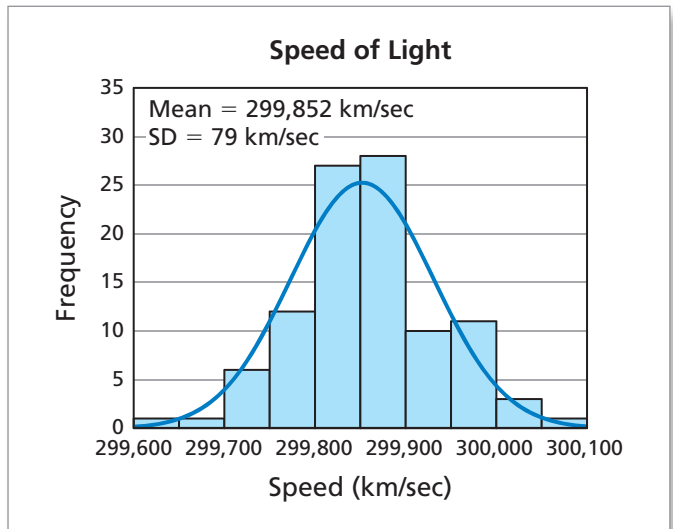


EXAMPLE 2 Estimating by Sampling



Albert Michelson and Albert Einstein met at Mount Wilson Observatory in 1931, shortly before Michelson’s death that same year.

In 1879, Albert Michelson conducted an experiment to measure the speed of light. He conducted the experiment 100 times and obtained the data represented in the histogram. Use a 95% confidence level to estimate the speed of light.



SOLUTION

Using a confidence interval calculator and a 95% confidence level, you can infer that the speed of light is

$$299,852 \text{ kilometers per second} \pm 15 \text{ kilometers per second.}$$

In 1926, Michelson improved his estimate to $299,796 \pm 4$ kilometers per second. The accepted value today is 299,792.458 kilometers per second.

✓ Checkpoint

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A researcher records the temperature of 130 people. The mean of the sample is 98.25°F and the standard deviation is 0.73°F. Does this study allow for the accepted human body temperature of 98.6°F? Explain your reasoning.