# Analysis of Statistical Conclusion for Largemouth Bass Study

To determine the most appropriate statistical conclusion, I need to analyze whether the sample data provides sufficient evidence to support the claim that this year's largemouth bass are smaller than normal.

## Given information:

- Population parameters under normal conditions: μ = 12.3 inches, σ = 3 inches

- Sample statistics: n = 100, x̄ = 11.2 inches

- Research question: Are this year's fish smaller than normal?

## Analysis approach:

This is a hypothesis testing scenario where:

- H₀: μ = 12.3 inches (fish length is normal)

- H₁: μ < 12.3 inches (fish are smaller than normal)

## Calculating the test statistic:

When n = 100, the standard error of the mean is:

SE = σ/√n = 3/√100 = 3/10 = 0.3 inches

The z-score is:

z = (x̄ - μ)/SE = (11.2 - 12.3)/0.3 = -1.1/0.3 = -3.67

## Statistical interpretation:

A z-score of -3.67 corresponds to a p-value < 0.001, well below any conventional significance level.

## Evaluating the options:

(A) Incorrect. This confuses the standard deviation of individual measurements with the standard error of the mean. With n=100, sampling error is much smaller than individual variation.

(B) Incorrect. While the sample size is large, we still expect sampling variation. The conclusion is correct but the reasoning is flawed.

(C) Correct. The difference between the sample mean and the population mean (-1.1 inches) is indeed much larger than the expected sampling error (0.3 inches). This provides strong statistical evidence to conclude the fish are smaller than normal.

The most appropriate statistical conclusion is (C).