Developing Essential Understandings of Statistics: Grades 6-8

Sample and Populations

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Big Idea

Inferential statistics uses data in a sample selected from a population to describe features of the population

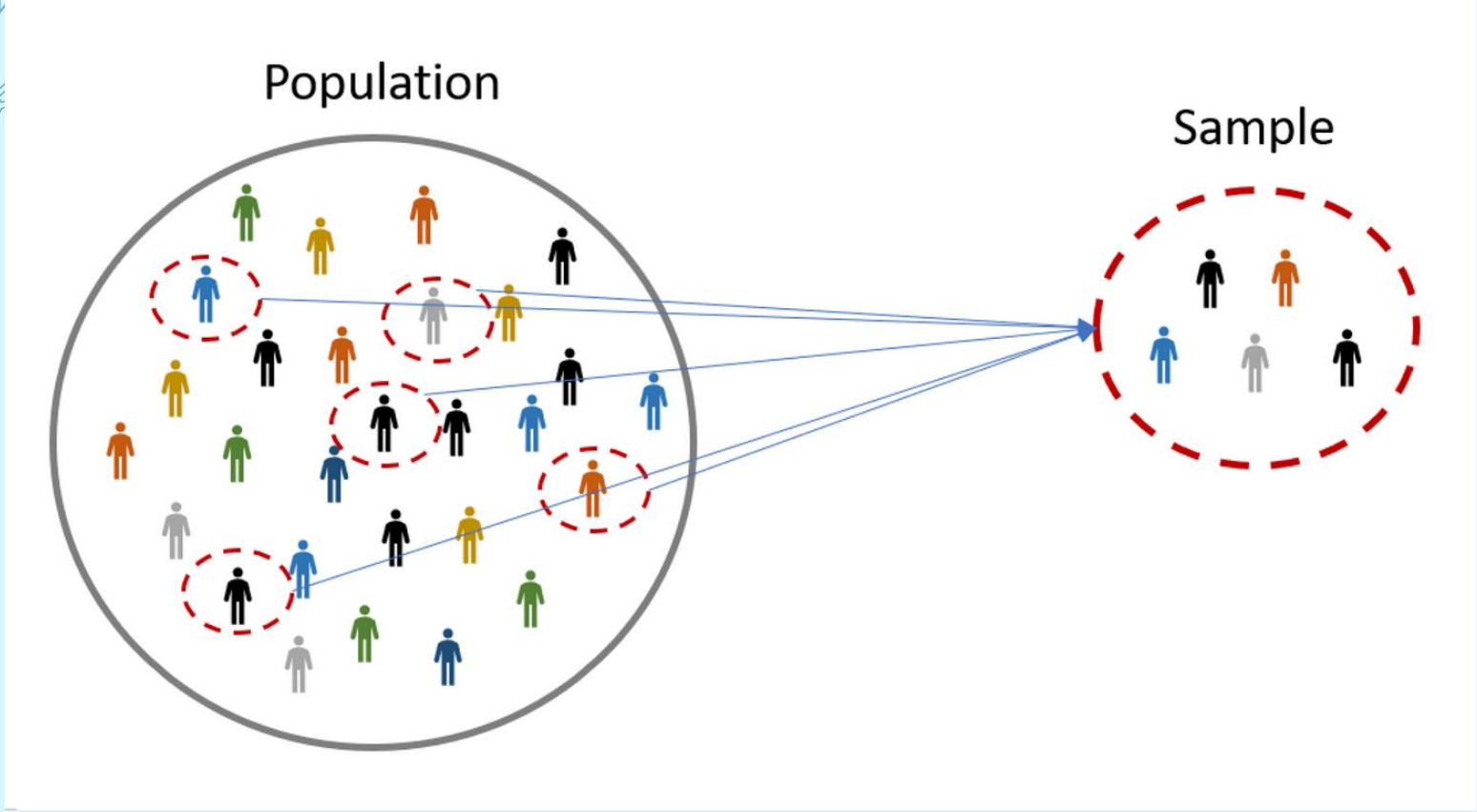
Statistical Concepts

1. Population Distribution
2. Sample Distribution
3. Sampling Distribution

Review: Population versus Sample

A **population** is the entire group you are interested in studying	A **sample** is a subset of the population

Population versus Sample



Population versus Sample Example

Suppose you are a researcher in Panem, interested in understanding the survival skills of tributes in the Hunger Games. Since it's not feasible to evaluate *every tribute who has ever participated in the games*, you decide to evaluate *tributes from the most recent set of games*.

In this example, the population of interest is _____ and the sample consists of _____.

Population Distribution

Definition

- Describes the possible values of the variable and how often each value occurred in the sample
- Describes the variability in the values of a variable for all individuals in the population

Example

- Heights of all students in a school

Knowledge Check

True or False:
A population includes every single observation of interest in a study

Sample Distribution

Definition

- Describes the values of the variable that occurred in one sample and how often each value occurred within the sample

Example

- Heights of a classroom of students

Knowledge Check

If I am interested in the average height of students in a school, does "students in one specific classroom" represent the population or a sample?

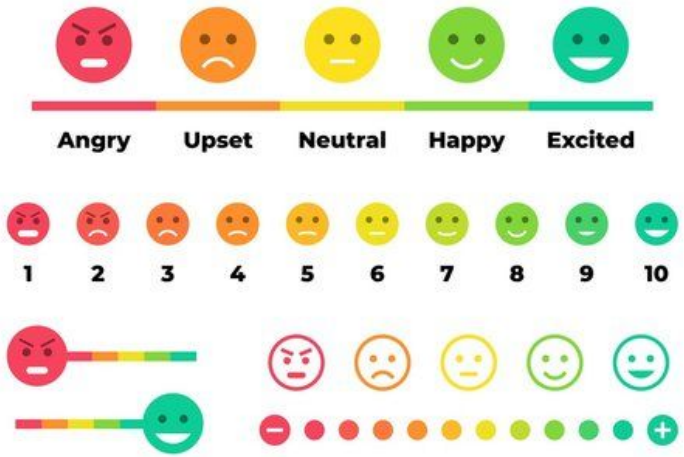
Knowledge Check

I want to know the average number of sports students play at this school. So, I sample 50 students at this school and am able to find out the mean number of sports these students play is 2.

1. What is the population?
2. What is the sample?
3. Does the value 2 represent a population mean or a sample mean?

How's Everyone Feeling?

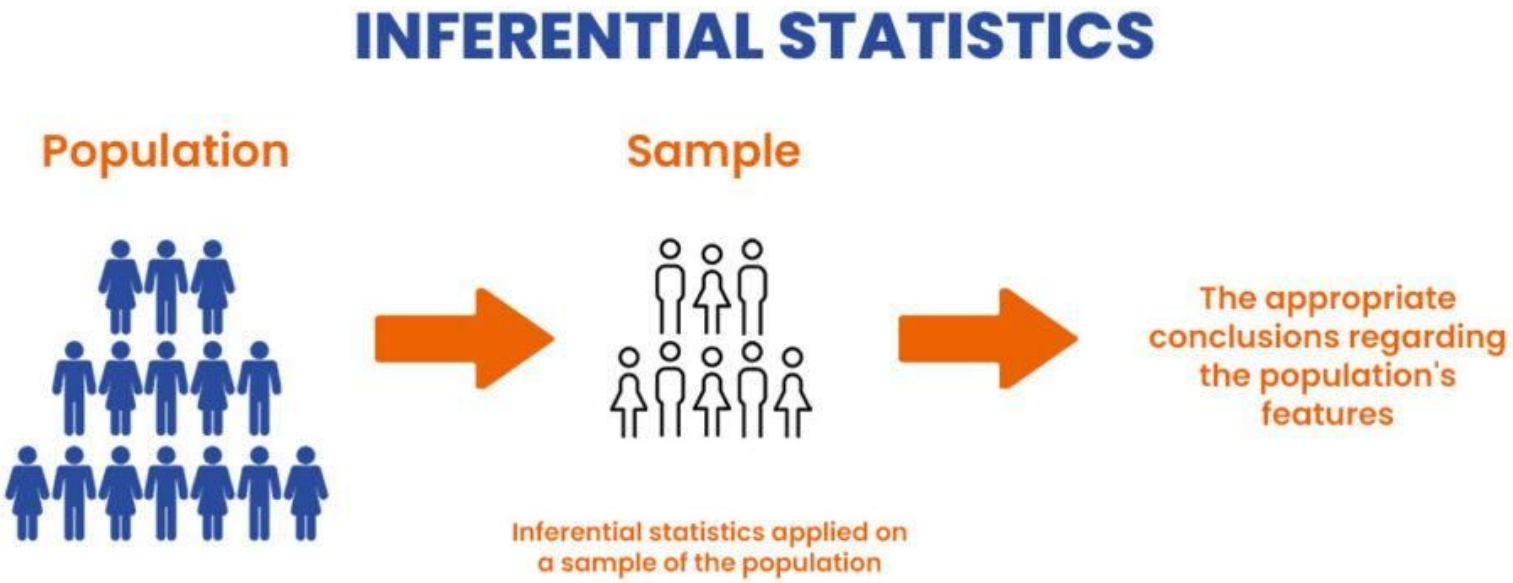
What is your current mood on a scale of 1 to 10?



Connecting Samples with Populations

- Samples provide a snapshot of the larger population
- **Example**
  - Estimating average student height in a school based on several classroom samples

Why do we have a population distribution and a sample distribution?



Sampling Distribution

Definition

- Describes the sample-to-sample variability in a statistic (e.g. the sample mean) for all possible samples of the same size from the population

Example

- Variation in average heights from different classroom samples

Knowledge Check

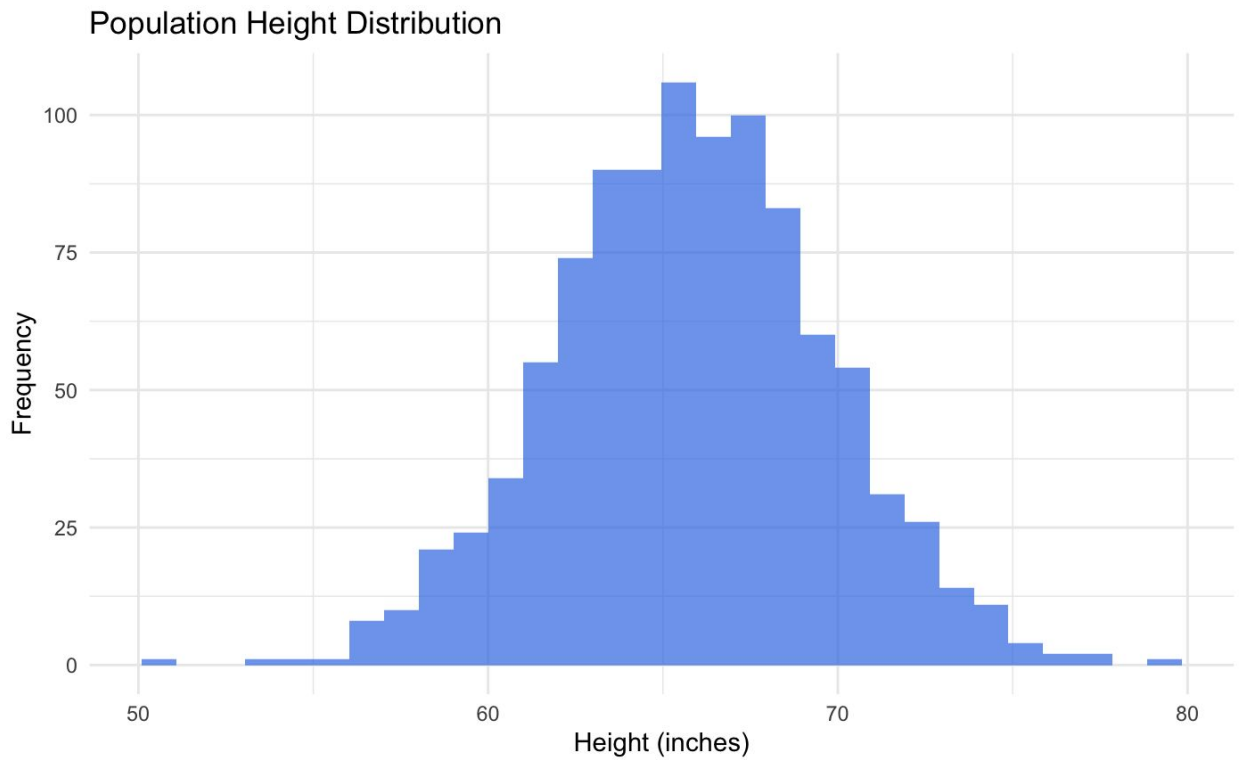
If we measure the average height of different samples of students from the same school, are we creating a population distribution or a sampling distribution?

Example

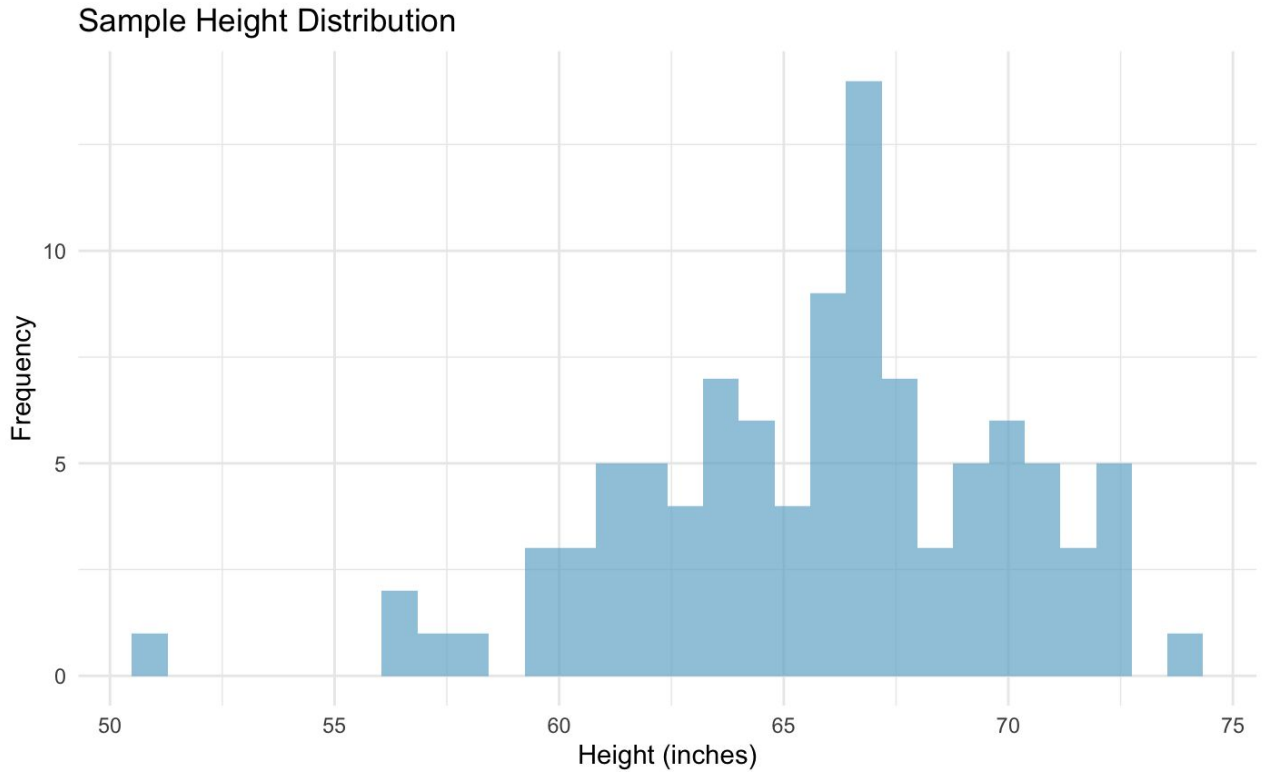
Let's analyze a small data set about the heights of students in a school.

Imagine we have a population of 1000 students with a range of heights.
We take a sample of 100 students to analyze.

Distribution of Heights in the Entire

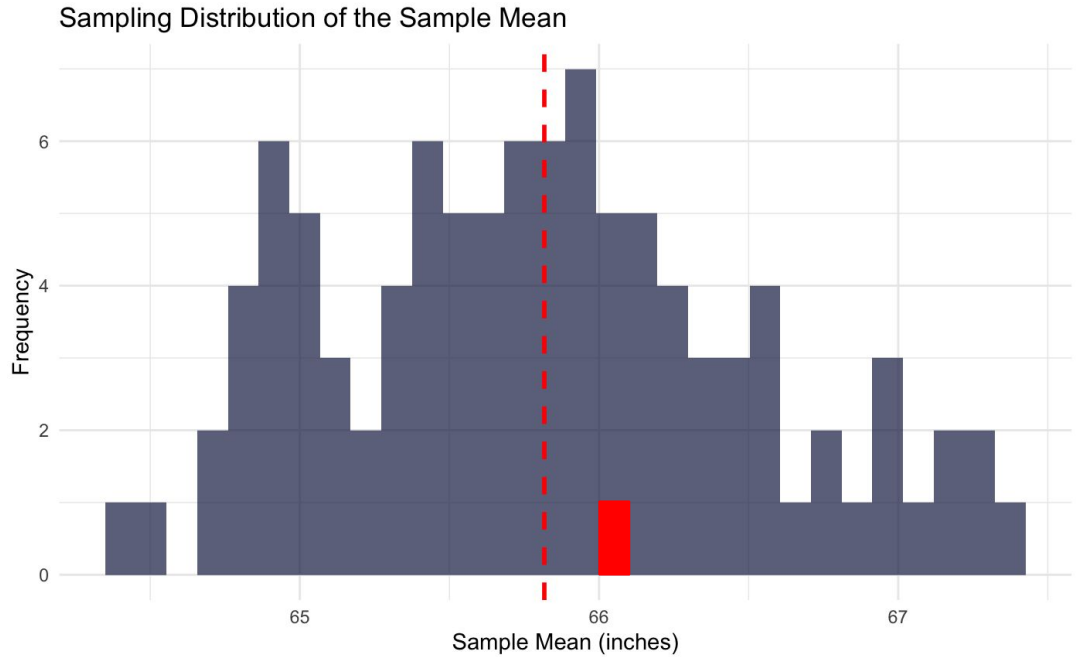


Distribution in a Sample



Sampling Distribution of the Sample Means

with a red dashed line indicating the true population mean



Summary of Concepts

Population Distribution

The spread of a variable across the entire population

Sample Distribution

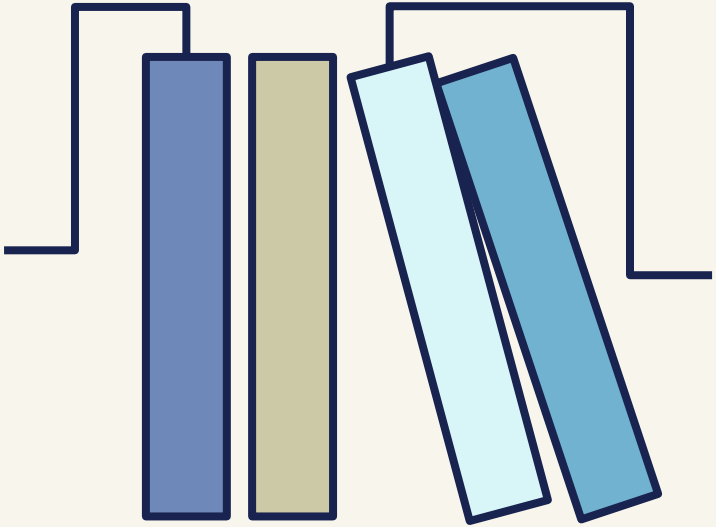
The spread of a variable within a selected sample

Sampling Distribution

The distribution of a statistic over different samples

Key Takeaways

Role in Understanding Data



Importance in Predictions

Thanks!

Do you have any questions?