Sequence of activities to develop reasoning about statistical inference.

Milestones: Ideas and Concepts	*Suggested Activities*
INFORMAL IDEAS PRIOR TO FORMAL STUDY OF STATISTICAL INFERENCE	
• Making inferences and generalizations from a sample of simulated data.	• One Son Activity, (Lesson 1, Statistical Models and Modeling Unit)
• Statistical inference as an argument.	❖ An informal discussion early in a course about the nature of statistical inference, and comparing this to making an argument and providing evidence to support your claim. (The symbol ❖ indicates that this activity is not included in these lessons.)
• Random sample and how it is representative of a population.	• The Gettysburg Address Activity (Lesson 3, Data Unit)
• Results being due to chance or due to design (some other factor).	• Taste Test Activity (Lesson 4, Data Unit)
• As a sample grows the characteristics become more stable, that with more data you can better generalize to a population.	• Growing a Distribution Activity (Lesson 1, Distribution Unit)
• Two samples of data may or may not represent true differences in the population.	• Activities in Lessons 1, 2, 3 and 4, Comparing Groups Unit)
• When comparing groups, you must take into account the variability between groups relative to the variability with each group.	• Gummy Bears Activity, Lesson 2, Comparing Groups Unit)
• If the normal distribution provides a good model for a data set we may make inferences based on the Empirical Rule.	• Normal Distribution Applications Activity, (Lesson 3, Statistical Models and Modeling Unit)
• We can make inferences by comparing a sample statistic to a distribution of samples based on a particular hypothesis.	• Activities in Lessons 1 and 2, Samples and Sampling Unit
FORMAL IDEAS OF STATISTICAL INFERENCE	
• Hypothesis test as making an argument.	• Modeling Coin Tosses Activity (Lesson 1: "Testing Statistical Hypotheses")
• Hypothesis test, null and alternative hypothesis	• Balancing Coins Activity (Lesson 1)
• The idea of a *P*-value.	• *P*-values Activity (Lesson 2)
• Types of errors and correct decisions.	• Types of Errors Activity (Lesson 2)
• What is needed to test a hypothesis?	• Types of Errors and *P*-values

	Activities, (Lesson 2)
• Confidence interval as an estimate of parameter, with margin of error.	• Introduction to Confidence Intervals (Lesson 2)
• Understanding how confidence intervals may be presented in different ways.	• Introduction to Confidence Intervals (Lesson 2)
• Understanding what the 95 percent refers to in a confidence interval.	• Estimating with Confidence, Estimating Word Lengths, and What Does the 95% Mean Activities (Lesson 3: "Reasoning about Confidence Intervals")
• A statistically significant difference between two groups where randomization of conditions has taken place	• Gummy Bears Revisited Activity (lesson 4: "Using Inference in an Experiment")
BUILDING ON FORMAL IDEAS OF STATISTICAL INFERENCE IN SUBSEQUENT TOPICS	
• Statistically significant correlation coefficient.	• Activities in Lesson 3, Covariation Unit
• Statistically significant regression slope.	• Activities in Lesson 3, Covariation Unit
• There are many types of statistical inferences, and software may be used by correctly choosing the commands.	• Research Questions Involving Statistical Methods Activity (Lesson 5: "Applying Methods of Statistical Inference")
• Understanding that the interpretation of *P*-values and confidence depends on assumptions being met.	• Research Questions Involving Statistical Methods Activity, (Lesson 5)