Sequence of activities to develop reasoning about distribution.

Milestones: Ideas and Concepts	*Suggested Activities*
INFORMAL IDEAS PRIOR TO FORMAL STUDY OF DISTRIBUTION	
• Understand that variables have values that vary and can be represented with graphs of data.	• Variables on Back Activity (Lesson 1, Data unit)
• Understand simple graphs of data where each case is represented with a bar (e.g., case-value graphs).	❖ An activity where students summarize and interpret data sets that are of interest to them, such as class survey data given in case-value plots. Have students arrange the points on the horizontal scale in different orders. (The symbol ❖ indicates that this activity is not included in these lessons.)
• A distribution is a way to collect and examine statistics from samples.	• Gettysburg Address Activity (Lesson 3, Data unit)
• A distribution can be generated by simulating data.	• Taste Test Activity (Lesson 4, Data unit)
• Understanding a dotplot.	❖ An activity where students see how the data can be represented in a dotplot, and how this plot gives a different picture than a case value plot.
FORMAL IDEAS OF DISTRIBUTION	
• Characteristics of shape, center and spread for a distribution.	• Distinguishing Distributions Activity (Lesson 1: "Distributions")
• Features of graphs, clustering, gaps and outliers of data.	• Distinguishing Distributions Activity (Lesson 1)
• A continuous curve as representing a distribution of a large population of data.	• Growing a Distribution Activity (Lesson 1)
• An understanding of histogram by changing one data set from a dotplot to a histogram, by forming equal intervals of data. Recognizing the difference between these two types of graphs.	• What is a Histogram Activity (Lesson 2: "Reasoning about Histograms")
• The abstract idea of shape of histogram and recognition of some typical shapes.	• Sorting Histograms Activity (Lesson 2)
• Understand that histograms may be manipulated to reveal different aspects of a data set.	• Stretching Histograms Activity (Lesson 2)
• Recognize where majority of data are, and middle half of data.	❖ An activity where students describe graphs in terms of middle half of data

	and overall spread.
• Recognize the difference between bar graphs of categorical data, case value graphs, and histograms of quantitative data.	❖ An activity where students examine and compare these three types of graphs that all use bars in different ways.
• Only certain types of graphs (e.g., dotplots and histograms) reveal the shape of a distribution.	• Exploring Different Representations of the Same Data Activity (Lesson 2)
• Reason about what a histogram/dotplot would look like for a variable (integrate ideas of shape, center and spread) given a verbal description or sample statistics.	• Matching Histograms to Variable Descriptions Activity (Lesson 2)
BUILDING ON FORMAL IDEAS OF DISTRIBUTION IN SUBSEQUENT TOPICS	
• Idea of center of a distribution and how appropriate measures of center depend on characteristics of the distribution.	• Activities in Lessons 2 (Center Unit)
• Idea of variability of a distribution and how appropriate measures of variability depend on characteristics of the distribution.	• Activities in Lessons 1 and 2 (Variability Unit)
• How a boxplot provides a graphical representation of a distribution.	• Activities in Lessons 1, 2, 3 and 4 (Comparing Groups unit)
• How boxplots and histograms reveal different aspects of the same distribution.	• Matching Histograms to Boxplots Activity (lesson 3, Comparing Groups Unit)
• Probability distribution as a distribution of a random variable that has characteristics of shape, center and spread.	• Coins, Cards, and Dice Activity (Lesson 2, Modeling Unit)
• The normal distribution as a model of univariate data that has specific characteristics of shape, center and spread.	• Activities in Lesson 3, The Normal Distribution as Model (Models Unit)
• The idea of sampling distribution as distributions of sample statistics that can be described in terms of shape, center and spread.	• Activities in Lessons 1, 2, and 3 (Samples and Sampling Unit)
• How statistical inferences may involve comparing an observed sample statistic to a sampling distribution.	• Activities in Lessons 1 and 2, (Inference Unit)
• Bivariate distribution as represented in a scatterplot.	• Activities in Lesson 1 (Covariation Unit)

• Characteristics of a bivariate distribution such as linearity, clusters, and outliers.	• Activities in Lesson 1 (Covariation Unit)