

Sequence of activities to develop reasoning about data.

<i>Milestones: Ideas and Concepts</i>	<i>Suggested Activities</i>
FORMAL IDEAS OF DATA	
<ul style="list-style-type: none"> Data are values of a variable. 	<ul style="list-style-type: none"> Meet and Greet Activity (Lesson 1: “Data and Variability”)
<ul style="list-style-type: none"> Measurements produce data. 	<ul style="list-style-type: none"> Meet and Greet Activity (Lesson 1)
<ul style="list-style-type: none"> Data show variability. 	<ul style="list-style-type: none"> Meet and Greet Activity (Lesson 1)
<ul style="list-style-type: none"> Data are numbers with context. 	<ul style="list-style-type: none"> Variables on Back Activity (Lesson 1)
<ul style="list-style-type: none"> There are different kinds of data. 	<ul style="list-style-type: none"> Meet and Greet Activity (Lesson 1)
<ul style="list-style-type: none"> Some variability in data is due to measurement process. 	<ul style="list-style-type: none"> Meet and Greet, Variables on Back, and Developing a Class Survey Activities (Lesson 1)
<ul style="list-style-type: none"> Importance of taking good measurements by asking clear questions. 	<ul style="list-style-type: none"> Developing a Class Survey Activity (Lesson 1)
<ul style="list-style-type: none"> It is important to look at multiple variables (Multivariate data) to better understand and describe a group. 	<ul style="list-style-type: none"> Developing a Class Survey Activity (Lesson 1)
<ul style="list-style-type: none"> Sources of bias in questions. 	<ul style="list-style-type: none"> How you Ask a Question Activity (Lesson 2: “Avoiding Bias”)
<ul style="list-style-type: none"> Importance of asking clear, unambiguous questions in collection survey data. 	<ul style="list-style-type: none"> Critiquing the Student Survey Activity (Lesson 2)
<ul style="list-style-type: none"> Idea, purpose and importance of random sampling. 	<ul style="list-style-type: none"> The <i>Gettysburg Address</i> Activity (Lesson 3: “Random Sampling”)
<ul style="list-style-type: none"> Different methods and reasons to take samples. 	<ul style="list-style-type: none"> Student Survey Sampling Activity (Lesson 3)
<ul style="list-style-type: none"> Purpose of experiments to produce data to determine cause and effect. 	<ul style="list-style-type: none"> Taste Test Activity (Lesson 4: “Randomized Experiments”)
<ul style="list-style-type: none"> Purpose of randomization in an experiment. 	<ul style="list-style-type: none"> Taste Test Activity (Lesson 4)
<ul style="list-style-type: none"> Idea of making an inference based on a result of an experiment (using simulation). 	<ul style="list-style-type: none"> Taste Test Activity (Lesson 4)
<ul style="list-style-type: none"> Importance of randomization in drawing inferences about results of an experiment. 	<ul style="list-style-type: none"> ❖ Activity involving random assignment, with introduction to permutation test to informally test if results of the experiment are surprising or due to chance. (The symbol ❖ indicates that this activity is not included in these lessons.)
<ul style="list-style-type: none"> Importance of knowing sources of data: data coming from samples or from experiments. 	<ul style="list-style-type: none"> ❖ Activity where students identify whether the research is a survey (observational data) or an experiment.

<ul style="list-style-type: none"> • Good data vs. bad data. 	<ul style="list-style-type: none"> ❖ Activity where students identify potential sources of bias or confounding.
<ul style="list-style-type: none"> • What type of conclusions can be drawn based on the type of data. 	<ul style="list-style-type: none"> ❖ Activity identifying the type of conclusion given a study description.
<ul style="list-style-type: none"> • What kinds of questions to ask about where data come from. 	<ul style="list-style-type: none"> ❖ Activity where students ask appropriate questions for given sets of data.
BUILDING ON FORMAL IDEAS OF DATA IN SUBSEQUENT TOPICS	
<ul style="list-style-type: none"> • Two sources of variation in measurement data. 	<ul style="list-style-type: none"> • How Big is Your Head Activity (Lesson 1 in the Variability Unit)
<ul style="list-style-type: none"> • Reducing variability in measurement data. 	<ul style="list-style-type: none"> • Gummy Bears Activity (Lesson 2 in the Comparing Groups Unit)
<ul style="list-style-type: none"> • Determining cause and effect from an experiment. 	<ul style="list-style-type: none"> • Gummy Bears Revisited Activity (Lesson 4 in the Statistical Inference Unit)
<ul style="list-style-type: none"> • Correlation does not imply causation. 	<ul style="list-style-type: none"> • Credit Questions Activity (Lesson 1 in the Covariation Unit)