

Unit 02: Collecting Data

Content Area:

Course(s):

Time Period: **Year**

Length: **180**

Status: **Published**

Unit 2

Unit Title:	Collecting Data
Suggested Duration:	Two weeks

Interdisciplinary Connections

Interdisciplinary Connections
<p>Reading and Writing Companion Standards for History, Social Studies, Science and Technical Subjects</p> <ul style="list-style-type: none">▪ Grades 9-10▪ Grades 11-12 <p>Math Practices: https://www.nj.gov/education/standards/math/Index.shtml</p> <p>Science Practices: https://www.nj.gov/education/standards/science/Index.shtml</p> <p>Find and paste appropriate <u>Companion Standards or Practices</u> here.</p>

Real world Data will be used as part of each of the Learning Activities. Once the basic concepts and skills are Mastered, each activity and problem will use this knowledge and these skills to connect Mathematics to another discipline.

Technology Integration

Technology Integration
Northern supports the integration of the SAMR Model : a framework which extends learning through the use of technology. The installation of interactive boards, the purchase of softwares and subscriptions, and the investment in 1:1 laptops and various other instructional technologies are examples of Northern's commitment to enhancing students' learning and preparing the 21st century learner for college and careers.

Extensive use of TI-84, Stapplet, Google Classroom, AP Classroom, Desmos, and Khan Academy.

Standard(s) Addressed

Statistical Practices:

1. Formulate Questions: Determine an investigative question for a statistical study.
2. Collect Data: Identify and justify methods for collecting data and conducting statistical inference.
3. Analyze Data: Construct representations of data and calculate numerical statistical outputs.
4. Interpret Results: Interpret results and justify conclusions and methods.

Course Topics:

- 1.11 Random Sampling
- 1.12 Potential Problems with Sampling
- 1.13 Experimental Design

STAGE I Desired Results

STAGE I Desired Results
<i>Objective (Transfer)</i>
<i>Students will be able to independently use their learning to...</i>
<i>Depending on how data are collected, we may or may not be able to generalize findings or establish evidence of causal relationships. For example, if random selection is not used to obtain a sample from a population, bias may result and statistics from the sample cannot be assumed to generalize to the population. For data collected using well-designed experiments, statistically significant differences between or among experimental treatment groups are evidence that the treatments caused the effect. Students learn important principles of sampling and experimental design in this unit; they will learn about statistical inference in Units 6–9.</i>
<i>Mastery</i>

Big Ideas/Understandings

Students will understand that...

BIG IDEA 1: VARIATION AND DISTRIBUTION (VAR)

The distribution of measures for individuals within a sample or population describes variation. The value of a statistic varies from sample to sample. How can we determine whether differences between measures represent random variation or meaningful distinctions? Statistical methods based on probabilistic reasoning provide the basis for shared understandings about variation and about the likelihood that variation between and among measures, samples, and populations is random or meaningful.

BIG IDEA 3: DATA-BASED PREDICTIONS, DECISIONS, AND CONCLUSIONS (DAT)

Data-based regression models describe relationships between variables and are a tool for making predictions for values of a response variable. Collecting data using random sampling or randomized experimental design means that findings may be generalized to the part of the population from which the selection was made. Statistical inference allows us to make data-based decisions.

Essential Questions

§ What do our data tell us?

§ Why might the data we collected not be valid for drawing conclusions about an entire population?

Acquisition

Students will know . . .

[See “essential knowledge” in each topic of College Board CED for Unit 3](#)

Students will be skilled at . . .

Statisticians must be adept at determining “What is this question asking?” Students should get into the habit of identifying the task in the given prompt before they

begin, then checking that their response addresses that task. For example, when asked if it would be appropriate to generalize the results of a given experiment, students need to provide a clear “yes” or “no” decision in their response, along with an explanation that supports their decision. Although students may recognize that they need to justify their reasoning, they often struggle to include explicit evidence supporting their claims. For instance, claims about non-response bias should be supported with evidence indicating whether the sample result is likely to be too high or too low compared to the population value that is being estimated. As another example, students need to clearly explain why a particular variable might lead to confounding in a given setting.

STAGE II Assessment Evidence

STAGE II Assessment Evidence	
Evaluation	Assessments
<p>Chapter evaluations in the format of AP exam (free responses and multiple choice based on chapter alignment of The Practice of Statistics</p> <p>Chapter 4: Collecting Data</p>	<p>Formative assessments will be based on FRQs from previous AP exams on topics at regular intervals in the chapter/unit.</p>
Modifications	
<p>How are the evaluations/assessments modified/accelerated? (i.e.: alternate assessment). All courses follow a balanced assessment system with Practice, Assessments, Evaluations.</p>	

Modifications on 504 plans may be submitted at ([SSD](#)), prior to testing. Both exclusion **statements** and **extensions** exist for each standard to accommodate different paces.

STAGE III Learning Plan

STAGE III Learning Plan
Organize plan by weeks
Day 1: Lesson 4.1 - Sampling Methods Day 2: Lesson 4.1 - More Sampling Methods Day 3: Lesson 4.1 - Problems with Sample Surveys Day 4: Quiz 4.1 Day 5: Lesson 4.2 - Observational Studies vs. Experiments Day 6: Lesson 4.2 - Designing Experiments Day 7: Lesson 4.2 - Randomized Block Design Day 8: Quiz 4.2
Day 9: Lesson 4.3 - Inference for Sampling & Experiments Day 10: Lesson 4.3 - Scope of Inference Day 11: Quiz 4.3 Day 12: Chapter 4 Review Day 13: Chapter 4 Test
Modifications
How are the activities modified/differentiated? (i.e.: abridged text)

Modifications on 504 plans may be submitted at ([SSD](#)), prior to testing. Both exclusion **statements** and **extensions** exist for each standard to accommodate different paces.

Specific Resources for Unit

Specific Resources for Unit
Attached Affirmative Action Compliance Checklist

[LP: AP Chapter 4 | StatsMedic](#)
[Study design | AP® Statistics | Math](#)
AP Classroom

Diversity, Equity, & Inclusion

Diversity, Equity & Inclusion

Provide a brief description of how this unit addresses DE&I.

Career Readiness (9.2), Life Literacies and Key Skills (9.4) Standards

WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
WRK.K-12.P.2	Attend to financial well-being.
WRK.K-12.P.3	Consider the environmental, social and economic impacts of decisions.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.6	Model integrity, ethical leadership and effective management.
WRK.K-12.P.7	Plan education and career paths aligned to personal goals.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

Climate Change Education

ClimateChange Education

Enduring Understandings/Core Ideas

Performance Expectations

Math and ELA- Provide a brief description of a lesson or activity that relates to Climate Change. All other Content Team copy and paste the Core Idea and Performance Expectation from NJDOE link above.