Marietta City Schools

2024–2025 District Unit Planner

Statistical Reasoning

Unit title	Unit 3: Collecting/Considering Data and Types of Studies (including non-traditional data)	**Unit duration (hours)**	*22.5 - 25 hours*

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): ***What will students learn?***

GA DoE Standards

Standards

SR.DSR.3 Collect data by designing and implementing a plan to address the formulated statistical investigative question.

SR.DSR.3.1 Apply an appropriate data-collection plan when collecting primary or secondary data for the statistical investigative question of interest.

Fundamentals

• Students will use appropriate sampling techniques, critique a poorly constructed survey, and make suggestions for good questions.

Terminology

• Primary data is collected through first-hand sources such as surveys, experiments, and other studies.

• Secondary data is obtained from previously conducted studies or research.

Examples

• Students should consider features such as whether the population is well defined, whether the sampling procedure is random or non-random, and whether the objectivity or bias of questions will result in valid/invalid answers

SR.DSR.3.2 Distinguish between surveys, observational studies, and experiments.

Terminology

• Surveys involve the collection of data from a pre-defined group to gain insight and information about the statistical investigative question.

• Observational studies measure a sample as it is without attempting to influence the results.

• Experiments involve the use of a treatment to explore the effects of the treatment on a sample.

Fundamentals

• Students should understand the advantages and disadvantages of each data collection method for specific statistical questions.

SR.DSR.3.3 Design sample surveys, experiments, and observational studies using accepted practices.

Fundamentals

• Students are able to identify, discuss, and explain the aspects of best statistical practice for designing an experimental study, including: the clear identification of the statistical question to be investigated; the variables under investigation; and the random selection of experimental units and/or the random assignment of treatments to the experimental units.

SR.DSR.3.4 Distinguish between random selection and random assignment and identify their impact on conclusions.

Fundamentals

• Students should be able to design and conduct comparative experiments using random assignment and demonstrate correct methods for planning data collection for comparison of treatments.

• Students should be able to randomly assign treatments to experimental units.

SR.DSR.3.5 Describe potential sources and effects of bias and confounding variables

Fundamentals

• Students should be able to design and conduct surveys from both non-random and randomly selected participants.

• Students should be able to explain why random samples can provide more unbiased information about a population than other types of samples, such as convenience samples or self-selected samples

Examples

• Types of bias include wording bias, under coverage, non-response bias, selection bias,

SR.DSR.3.6 Describe and adhere to the ethical use of data (e.g., sensitive information, privacy, and living subjects).

Relevance and Application

• Practices for handling data that enhance reproducibility and ensure ethical use include providing descriptions of alterations to collected data, proper treatment of sensitive information, maintaining the confidentiality of data and experimental units, and using Institutional Review Boards to review study designs.

Fundamentals

• Students should be able to describe the ethical consequences of their experiments and analyses.

SR.DSR.3.7 Identify when data can be generalized to a target population.

Relevance and Application

• Samples must be randomly selected from the appropriate population to allow for generalizations that extend beyond the sample from which the data were collected.

• Sampling procedures that are not random do not allow for generalizations to the sampled population because they may be biased.

SR.MM.1 Apply mathematics to real-life situations; model real-life phenomena using mathematics.

Concepts/Skills to support mastery of standards

- Students will use appropriate sampling techniques, critique a poorly constructed survey, and make suggestions for good questions.
- Surveys involve the collection of data from a pre-defined group to gain insight and information about the statistical investigative question.
- Observational studies measure a sample as it is without attempting to influence the results.
- Experiments involve the use of a treatment to explore the effects of the treatment on a sample.
- Primary data is collected through first-hand sources such as surveys, experiments, and other studies. • Secondary data is obtained from previously conducted studies or research.

Vocabulary

Analysis	Categorical Variable	Census	Collection of Data	Distribution	Interpretation
Interrogative Question	Mode (modal category)	Observational Units	Population	Quantitative Variable	Sample
Statistical Graphical Display	Statistical Investigative Question	Statistical Problem-Solving Process	Survey Question	Variable	

Notation

Essential Questions

1. How can I identify the statistical question?
2. How can I identify and explain the variables under investigation?
3. Why are random samples able to provide unbiased information compared to other types of samples?
4. What are best practice for handling data that ensure ethical use for collected data, treatment of sensitive information, and confidentiality in experiments?
5. How can I select a sample randomly from an appropriate population, and how will this allow for me to make generalizations to the entire population from the sample?

Assessment Tasks

List of common formative and summative assessments.

Formative Assessment(s): Skills checks, tickets out the door, classwork/HW, quiz

Summative Assessment(s): Unit 3 test

Learning Experiences

Objective or Content	Learning Experiences	Personalized Learning and Differentiation

SR.DSR.3 • SR.DSR.3.1 • SR.DSR.3.2 • SR.DSR.3.3 • SR.DSR.3.4 • SR.DSR.3.5 • SR.DSR.3.6 • SR.DSR.3.7 SR.MM.1 • SR.MM.1.1 • SR.MM.1.2 • SR.MM.1.3 • SR.MM.1.4 Apply an appropriate data-collection plan when collecting primary or secondary data for the statistical question of interest. -Distinguish between surveys, observational studies, and experiments. -Design sample surveys, experiments, and observational studies using accepted practices. -Distinguish between random selection and random assignment; identify their impact on conclusions. -Describe potential sources of bias and confounding variables. -Describe and adhere to the ethical use of data. -Identify when data can be generalized to a target population.	● I can describe how convenience sampling leads to bias. ● I can describe how voluntary response sampling can lead to bias. ● I can explain how random sampling can help to avoid bias. SR-U2-T1-Questioning-Through-the-Investigative-Process-TG (gadoe.org) Gettysburg address Learning Task adapted/edited as necessary for a Big Ideas Review.	Students will be able to work at their own pace in collaborative groups where additional scaffolding is available as needed. Graphic organizers and visual supports are provided in Schoology Unit Resources.

Content Resources

Principles to Actions: Ensuring Mathematical Success for All. (2014). Reston, VA: NCTM, National Council of Teachers of Mathematics.

Adapted from *StatsMedic.com*, 180 Days of Intro Stats, Chapter 3, Lesson 3.2 Retrieved from https://www.statsmedic.com/intro-chapter3-day3

Random Integer Generator, Random.org, Retrieved from: https://www.random.org/integers/

Library of Congress, Audio Recording of Lincoln's Gettysburg Address, Retrieved from: https://www.loc.gov/item/jukebox-262416/

Stats Medic

Teacher Created Resources