



(<https://www.teach.lgbt/>)

MINING DATA

SUMMARY OVERVIEW LEARNING PLAN
LESSON RESOURCES STANDARDS

GRADE LEVEL: 6-12

APPROXIMATE LESSON DURATION: TWO 45 MINUTE PERIODS

UNIT/LESSON NEW JERSEY STUDENT LEARNING STANDARDS (NJSLs):

8th grade (Statistics & Probability)

- Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
- Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit (e.g. line of best fit) by judging the closeness of the data points to the line.
- Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.

HS (Statistics & Probability)

Interpreting Categorical and Quantitative Data

- Summarize, represent, and interpret data on a single count or measurement variable
- Summarize, represent, and interpret data on two categorical and quantitative variables
- Interpret linear models
- Making Inferences and Justifying Conclusions
- Understand and evaluate random processes underlying statistical experiments
- Make inferences and justify conclusions from sample surveys, experiments and observational studies
- Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
- Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.
- Evaluate reports based on data
- Understand independence and conditional probability and use them to interpret data
- Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
- Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are

independent.

- Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.
- Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.

BRIEF SUMMARY OF CULTURAL COMPETENCIES RELATED TO THE UNIT/LESSON:

What makes this lesson culturally relevant? This lesson examines data collected across several demographic indices by publicly available resources. Bivariate data analysis is used to examine the intersection of gender identity, race, class, age and other personal characteristics appear in data sets.

LESSON OVERVIEW:

Essential Question(s)

- How can climate data be used to make the concerns of LGBT youth visible?
- How can mathematical models be used to develop agency in a school community?

Enduring Understanding(s)

- Data quality can be determined based on the replicability of data/study questions.
- Data visualizations are models of numeric (quantitative information) that can be used to build understanding.

Potential Misconceptions

- All published data are true.
- Studies/surveys of interest to LGBT youth are limited/non-scientific (invalid) because of their emphasis on self-reports.

LEARNING PLAN, EXPERIENCES, INTSTRUCTION AND LEARNING ACTIVITIES:

W

Students will be able to:

What is Expected?

- List the intentional learning objectives on the board.
- Discuss additional ways to aggregate and disaggregate data
- Organize data in multiple ways and discuss/evaluate the merits of each
- Create a graphical representation of data

Today we will be working on...data analysis and representation. By representing data within the classroom environment, students will create a small case study based on questions available in large sample data sets (GLSEN, ACS).

H

What is expected?

How will we hook (Introduce this to) the students?

- Activate thinking
- Consider the language you will use to introduce the lesson (See example in the table)

Link to Engagement

Recently, we...surveyed members of the class to determine characteristics about our birth dates and dietary preferences.

Using different color post its, ask students to identify their birth quarter (Q1: January – March, Q2: April – June, Q3: July – September, Q4: October – December) and primary dietary preference by category (plant-based, meat-based)

Turn and talk to a partner about...what the word PRIMARY means in data collection; additional categories that could be used to get more insight into the members of the community. Examples include vegan, vegetarian, pescatarian, mainly poultry/fish, pork free, all meat; gender identity; age categories.

You are really beginning to understand BASIC STATISTICS. Today, we're going to dig deeper with a new focus. This focus is...DATA ANALYSIS and SAMPLING; MODELING AND STUDY REPLICATION.

E

What equipment, resources, or materials are needed?

GLSEN School Climate Survey 2017 Report

(<https://www.glsen.org/sites/default/files/GLSEN-2017-National-School-Climate-Survey-NSCS-Full-Report.pdf>)

- Table 2.4
- Figure 2.5
- Figure 2.13

Availability of LGBTQ Inclusive Resources (FIGURE)

(<https://www.glsen.org/sites/default/files/Availability-of-LGBTQ-inclusive-school-resources-GLSEN-NSCS-2017.png>)

American Community Survey (related to U.S. Census)

(<https://www.census.gov/programs-surveys/acs/>)

DATA sources (<https://www.census.gov/programs-surveys/acs/data.html>)

R

How will we rethink or revise our thinking throughout the lesson?

- What learning is confirmed?
- What misconceptions are uncovered?
- What is your new thinking?

Using the identified resources from the 2017 GLSEN School Climate Survey, reproduce data collection for the sample of students in the class. From the engagement activity (post-it poll), groups will have slightly different foci: the Q1 group will analyze Table 2.2; Q2 will analyze Table 2.4; Q3 will analyze Figure 2.5 and Q4 group will analyze Figure 2.13. In small groups, develop a poll question and reproduce the data for the class sample.

Discuss ways to expand the study while maintaining the integrity of the study process (anonymity)

Compare focal data to the Availability of LGBTQ Inclusive Resources graph. Discuss how these data are different/same.

In small groups or as individuals, review data that are available through the American Community Survey (ACS). Create a replicate based on ACS questioning and/or data representations.

E

How will students self-evaluate and reflect on their learning?

Students can evaluate how closely their data compare to larger data sets by examining trends. If their representations are significantly different, they can write about why or expand their data collection.

T

How will we tailor learning to

This lesson can be done as a paper-pencil or technology-supported lesson to meet the specific needs of students/teachers.

varied needs, interests, and learning styles?

Several teachers can work together to unpack the data from the suggested reports.

Students can prepare a presentation to share the GLSEN and ACS reports with teachers, counselors and advocate for specific programs based on school-based sampling.



How will we organize the sequence of learning during the lesson?

Scaffold the Instruction

- Model: Post-It Poll shows how to quickly organize data using simple variables.
- Guided Practice: Using available resources, students reproduce surveys without worrying about phrasing questions or introducing significant bias into data collection.
- Independent Practice: Students have opportunities to work in small and individual groups to practice data collection and analysis.

CHECK FOR UNDERSTANDING:

(Formative evidence such as conferencing, group Q/A, teacher observation, exit-slip, etc.)	Each group will have opportunities to check-in with teachers; production of a final graphical representation of the data will serve as an exit slip.
Quiz/Test (optional): (attach copy of assessment)	N/A
Performance Task/Project: (attach rubric)	<ol style="list-style-type: none">1. Each group will prepare a summary of their focal data set and class data representation2. Individual students will use the ACS to re-create

	<p>a single question poll patterned after small group activity</p> <p><u>Rubric for presentation available online here.</u> (https://www.state.nj.us/education/cccs/2009/8.pdf)</p>
Resources	N/A



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