

Unit 1: Data in Learners' Lives

Unit 1 Project

In this Project, students practice applying many of the concepts they've learned over the course of Unit 1, including the design and analysis of surveys, concerns about the appropriate use of data and representation, evaluation of a data source, and identification of various types of data.

Duration: 1 or 2 class periods, depending on student readiness and pace

Objective: By the end of this project, students will know how to apply their knowledge about data to real-world scenarios.

CSTA Standards in this Lesson

Concept	Standard Identifiers
Data & Analysis	3A-DA-09, 3A-DA-10, 3A-DA-11, 3A-DA-12, 3B-DA-06
Impacts of Computing	3A-IC-24, 3A-IC-25, 3A-IC-29, 3A-IC-30
Algorithms & Programming	3A-AP-13, 3A-AP-21

Lesson activities

Part 1: Market Research Study Evaluation

- Students examine the [plan for data collection](#) from a fictional neighborhood. They respond to the following prompts:
 - Who is included in the data collection design? **[students may notice that only houses fairly close to the site will be sampled; also, the sampling times are mostly when people might be at work, so this will only include folks who are here at these times]**
 - Who might go underrepresented? **[folks who work between 9 and 5 are unlikely to be able to participate, and anyone not home on the Sunday]**
 - Why might the underrepresentation you identified be a problem? **[this may disproportionately sample people who work unusual hours or don't work; as such, we may underestimate household income, how much people are willing to spend at a grocery store, etc.]**
- Students review the survey used to collect data from residents. They list and categorize each variable to be collected. These are:
 - race/ethnicity [qualitative - categorical]
 - household income [quantitative - continuous]

- c. grocery spending [quantitative - continuous]
 - d. rent spending [quantitative - continuous]
 - e. utility spending [quantitative - continuous]
 - f. subscription spending [quantitative - continuous]
 - g. clothing spending [quantitative - continuous]
 - h. transportation spending [quantitative - continuous]
 - i. travel & vacations spending [quantitative - continuous]
 - j. adult residents [quantitative - discrete]
 - k. children residents [quantitative - discrete]
 - l. predicted grocery store use Y/N [qualitative - categorical]
 - m. likeliness of use at different frequencies [qualitative - ordinal]
3. Students evaluate the study based on appropriateness of data use and overall, responding to the following questions:
- a. Do you think the data collected is being used appropriately? If not, how would you describe the potential misuse of data? **[because the data may be sold to other organizations afterwards, students may say this is inappropriate use of data]**
 - b. Do residents know how their data is being used? Is there anything about the study that residents might not realize when they complete the survey? **[residents probably do not know that the grocery store is only aimed at higher-income residents; they also do not know that their data will be sold to other organizations]**
 - c. Evaluate this study overall, considering anything you've learned in Unit 1. **[students may have a wide range of answers here, but should include some mention of the data collection plan excluding working people and that the data to be collected will be used in ways that residents probably do not expect]**

Part 2: Survey Design

Students design their own survey to collect data on an area of interest.

1. Data types - students respond to the following questions.
 - a. What topic would you like to investigate?
 - b. What types of quantitative/qualitative data do you plan to collect? List the variables you think are important to collect and categorize each. **[consider checking student categorization of data, as they often struggle to differentiate some of the categories; this might be an opportune moment to make rounds through the classroom and check in with students]**
 - c. Create your survey with the appropriate questions to collect these variables.
2. Privacy/data use & representation - students respond to the following questions.
 - a. Is the data sensitive/unique enough to cause privacy concerns? **[ask students to consider if they were filling out their own survey: is there any data here they would consider sensitive and wouldn't want being made public?]**
 - b. Give one example of how this data could be misused, and what problems it would cause.



- c. Is the data you collect likely to be biased in any particular way? **[ask students to consider a collection scheme at this time; who will they send their survey to? how will they ensure good representation of their population of interest?]**
3. DIKW Model - students respond to the following questions. **[these are mostly project-specific; students haven't learned much about graphs yet, too, so answers may vary. some helpful questions to guide them: are they looking at a single variable, or a relationship between multiple variables? are there sub-populations of interest?]**
 - a. What data would be MOST important to show your audience?
What kind of **graph/visualization** would be most convincing, and why?
 - b. What **additional** knowledge would help you interpret/make sense of the data you collected?
 - c. What **wisdom/advice** would be supported by the data you collected?
4. Comparing & Evaluating Sources of Data
 - a. Since you designed this survey, it's an example of primary data...
What is the BEST secondary data source can you find?
Evaluate this data source according to the 5Vs for K-12 Framework.
Which data source would be better for answering your topic, and why?
[students often find some questionable data sources! this may be a good time to go around and double-check that their source is reputable, recently updated, large enough, etc.; a very common problem is that students will find a "source" that is just a blog somewhere online]
 - b. Sharing your survey: Go to the "Settings" page in your survey. Open the "Responses" section. If the box below for "Restrict to users in _____ and its trusted organizations" is checked (purple), un-check it until it matches the appearance below. Then, use the arrow at the top right to "send" your form. Go to the Link option and copy this link, then paste it into the final response on the worksheet.

Assessment:

Assess student understanding through participation in class discussions and class activities.

