

Instructor's Guide: A SNAP take on Height and Weight

Before you begin...

1. Identify which grade band your class belongs in:
 - *Grade Band I:* Grades 3 – 5 (elementary school)
 - *Grade Band II:* Grades 6 – 8 (middle school)
 - *Grade Band III:* Grades 9 – 12 (high school)
2. There are five subsections:
 - Data Question
 - Data Collection
 - Data Analysis
 - Data Visualization
 - Data Equity, Ethics, and Privacy

Select one or two subsections as your *Learning Goal(s)* for your lesson. Each subsection has a *Learning Goal* and *Alternative Lesson*, where the "answer" is given in the latter. *We recommend that if you pick Data Question or Data Collection, you should pick both.*

In this document, *Learning Goal(s)* are in the highlighted rows in the table below, whereas *Alternative Lesson(s)* are in the unhighlighted rows. The [Google Slides](#) have the *Learning Goal* slides with orange titles and subtitle marks on the bottom, whereas the other slides will be for the *Alternative Lesson* unless indicated or instructed otherwise in the **Instructor Notes** in the table below.

3. Read and follow the guide based on whether you picked a *Learning Goal* or not for each subsection. Within each subsection are further instructions for each Grand Band.

Slide Content	Instructor Notes
<p>Introduction</p> <p>People come in all shapes and sizes. Think about how tall you are and how tall you are relative to your family, friends, and teachers. Using data collected from people across the country, we can look at how tall people are and how much they weigh. We're going to look at the height and weight of people in every state of the country.</p> <hr/> <p>Grade Band I</p>	<p>Introduction (no learning goal for this subsection) Read over the introduction paragraph provided on the slide.</p> <p><i>Grade Band I:</i> People come in all shapes and sizes. Think about how tall you are and how tall you are relative to your family, friends, and teachers. Using data collected from people across the country, we can look at how tall people are and how much they weigh. We're going to look at the height and weight of people in every state of the country.</p>
<p>Introduction</p> <p>Across the United States, millions of families and children who do not have enough to eat. Using data from different sources, we can look at how many people receive benefits from two major government programs: the Supplemental Nutrition Assistance Program and the National School Lunch Program. We can also look at how many people receive benefits from those programs compares with rates of poverty and obesity, as well as characteristics of each state like age and race.</p> <hr/> <p>Grade Bands II and III</p>	<p><i>Grade Bands II and III:</i> Across the United States, millions of families and children who do not have enough to eat. Using data from different sources, we can look at how many people receive benefits from two major government programs: the Supplemental Nutrition Assistance Program and the National School Lunch Program. We can also look at how many people receive benefits from those programs compared with rates of poverty and obesity, as well as characteristics of each state like age and race.</p>
<p>Time to look at the data!</p>	<p>Time to look at the data!</p> <p>Show the class the data and give about 5 minutes for them to observe the data before moving onto the first subsection.</p> <p>Download the excel sheets here.</p> <p><u>Note:</u> The Google Sheets does not render the data visualizations correctly (e.g., rescales axes), so download the sheets to see the correct visualizations.</p>

Data Question - Notice

What do you notice about the data? Start by saying, "I notice that..."

- To be filled

Learning Goal: For all Grade Bands

Data Question - Wonder

What do you wonder about the data? Start by saying, "I wonder if...", "I wonder why...", or "I wonder how..."

- To be filled

Learning Goal: For all Grade Bands

Data Question – What do we notice and wonder about the data?

Students should formulate broad and general questions about a topic of interest (preferably from among those provided within the Data Story).

For all Grade Bands (I, II, III): Ask your students:

- What do you notice about the data?
Have them answer the question by saying,
 - "I notice that..."
- What do you wonder about the data?
Have them answer the question by saying,
 - "I wonder if..."
 - "I wonder why..."
 - "I wonder how..."

As you ask your students to answer questions, fill in the slide with their responses (i.e., type in the responses in the "To Be Filled" parts).

On the slides, select one of the questions and remove the rest.

Data Question

Data questions for each grade band are provided. Select one to try and answer. The text in the brackets and in blue are the answers to the questions.

Grade Band I:

Data Question

- Which state has the most people?
- Which state has the tallest people?
- Which state has the shortest people?
- In which state do people weigh the most?
- Which state has an average weight of 178 pounds?
- Is the average height in your state higher than the nation as a whole?

Grade Band I

Grade Band I:

- Which state has the most people?
[California 39,512,223]
- Which state has the tallest people?
[Iowa, Montana, and Utah, 66"]
- Which state has the shortest people?
[Hawaii 64.6"]
- In which state do people weigh the most?
[Iowa 189.4 lbs]
- Which state has an average weight of 178 pounds?
[Maine]
- Is the average height in your state higher than the nation as a whole?
[Depends on the state; nationwide average height is 65.5 inches.]

Grade Band II:

Grade Band II:

Data Question

- Which state has the most people receiving benefits from SNAP?
- Which state has the fewest number of people receiving benefits from SNAP?
- Which states are the tallest and shortest, on average?
- How many states have poverty rates that are at or below 10%?
- What is the average number of kids participating in the National School Lunch Program in Northeastern states?

Grade Band II

- Which state has the most people receiving benefits from SNAP?
[California 4,312,002]
- Which state has the fewest number of people receiving benefits from SNAP?
[Wyoming 26,928]
- Which states are the tallest and shortest, on average?
[Iowa, Montana, and Utah (66") and Hawaii (64.6")]
- How many states have poverty rates that are at or below 10%
[26 states]
- What is the average number of kids participating in the National School Lunch Program in Northeastern states?
[379,792]

Grade Band III:

Data Question

- Are average height and weight correlated?
- Are the number of people participating in SNAP and NSLP correlated?
- Why might this relationship be weak or strong?
- Is the total number of SNAP participants completely representative of a state.

Grade Band III

Grade Band III:

- Are average height and weight correlated?
[Yes—see data visualization below.]
- Are the number of people participating in SNAP and the NSLP correlated?
[Yes—see data visualization below.]
- Is the unemployment rate and the poverty rate correlated?
[Yes—see data visualization below.]
- Why might this relationship be weak or strong?
[There are lots of reasons why the poverty rate and the unemployment rate are not strongly correlated, including how jobs differ across the country; access to education; access to food; and globalization, among other reasons.]
- Is the total number of SNAP participants completely representative of a state?
[No, because it reflects population; per capita numbers (participation divided by population) would be better.]

Data Collection

Which notice and wonder statements can we answer?

- Insert your notice and wonder statements

Learning Goal: For all Grade Bands

Data Collection – What goes into gathering and selecting data?

Students should identify the kinds of questions they can answer with the data at hand. Going further, they should identify the kinds of data they could collect or find to answer those questions.

For all Grade Bands (I, II, III): Have the students label which **notice** and **wonder** statements that they came up in the previous subsection and be answered or not answered.

<hr/> <p>Data Collection</p> <p>Which notice and wonder statements can we not answer?</p> <ul style="list-style-type: none"> • Insert your notice and wonder statements <hr/> <p>Learning Goal: For all Grade Bands</p>	<p>For the statements that they cannot answer, ask them what additional information or data they need to answer those statements.</p>
	<p>Data Collection</p> <p>A list of questions for each grade band are provided that can and cannot be answered by the data.</p>
<p><i>Grade Band I:</i></p> <hr/> <p>Data Collection</p> <p>What we can answer:</p> <ul style="list-style-type: none"> • Do you think you could tell someone your exact height? • Do you think you could tell someone your exact weight? <hr/> <p>Grade Band I</p> <hr/> <p>Data Collection</p> <p>What we cannot answer:</p> <ul style="list-style-type: none"> • Can we find the exact tallest and shortest person in each state? • Can we find the exact heaviest and lightest person in each state? <hr/> <p>Grade Band I</p>	<p><i>Grade Band I:</i></p> <p>What we can answer:</p> <ul style="list-style-type: none"> • Do you think you could tell someone your exact height? • Do you think you could tell someone your exact weight? <p>What we cannot answer:</p> <ul style="list-style-type: none"> • Can we find the <i>exact</i> tallest and shortest person in each state? • Can we find the <i>exact</i> heaviest and lightest person in each state?
<p><i>Grade Band II:</i></p>	<p><i>Grade Band II:</i></p> <p>What we can answer:</p> <ul style="list-style-type: none"> • Do you think it's easier to count the <i>number of children</i> receiving lunches in the NSLP program or the <i>number of lunches</i>?

Data Collection

What we can answer:

- Do you think it's easier to count the number of children receiving lunches in the NSLP program or the number of lunches?
- Do you think people are more or less likely to answer some of the questions in the data more accurately?

Grade Band II

Data Collection

What we cannot answer:

- How might self-reported height, weight, and obesity data be inaccurate?
- Who might not be counted in the total population?

Grade Band II

- Do you think people are more or less likely to answer some of the questions in the data more accurately?

What we cannot answer:

- How might self-reported height, weight, and obesity data be inaccurate?
- Who might not be counted in the total population?

Grade Band III:

Data Collection

What we can answer:

- Why is the poverty rate an imperfect measure of poverty?
- What are some things to consider with the data about race?

Grade Band III

Data Collection

What we cannot answer:

- Do you think people consistently characterize their race in the data?
- The unemployment rate only captures people who are not working and are looking for work; it does not include people who have decided not to look for work at all. How might this affect your interpretation of unemployment rate data?

Grade Band III

Grade Band III:

What we can answer:

- Why is the poverty rate an imperfect measure of poverty?
- What are some things to consider with the data about race?

What we cannot answer:

- Do you think people consistently characterize their race in the data?
- The unemployment rate only captures people who are not working and are *looking* for work; it does not include people who have decided not to look for work at all. How might this affect your interpretation of unemployment rate data?

Data Analysis

Data are often “messy,” such as missing values and in the wrong units (e.g., feet vs. inches).

Time to look at a “messy” version of the data and identify what parts of the data are messy!

Learning Goal: For all Grade Bands

Data Analysis – What goes into preparing or “wrangling” data?

Students should learn that unstructured or incomplete data cannot be analyzed. Use the “messy” data version and see notes on how the data are messy.

Note: Make sure to isolate the parts of the data that matches the cleaned data for your specific *Grade Band*.

Insert the selected visualization on the blank slide.

Data Analysis

Insert the selected visualization.

Grade Bands I and II

Data Analysis

Alternative I: Recommended for Grade Bands I and II

Use the “clean” data that are prepared for visualization. Data are filtered and aggregated into separate tabs with the visualization for your use.

Select one of the tabs and visualizations. Show the student the specific tab and have them answer how they would analyze that data before showing them the visualization.

Data Analysis

Time to analyze the data! Follow these steps:

1. Sort, filter, and aggregate the data.
2. Report how you altered the data.
3. Compare states above and below the national average.

Grade Band III

Alternative II: Recommended for Grade Band III

Students should learn to aggregate the data to better visualize the data. Use the “clean” data that are not prepared for visualization.

- Ask the students to sort, filter, and aggregate the data. See if they can aggregate from the state-level data to regions.
- See what other aggregations the students can come up with—examples might be top 10, bottom 10, states that neighbor yours.
- Have the students compare states above and below the national average.

All data visualizations are on the slides.

Data Visualization – Which data visualization is best to tell the story?

Students should learn how to read and interpret roughly 3 to 5 graphs and charts (i.e., read, create, and share data visualizations).

Grade Band I: Bars Charts

- Total Population in the Southern states

Figure 1. Population in Southern States

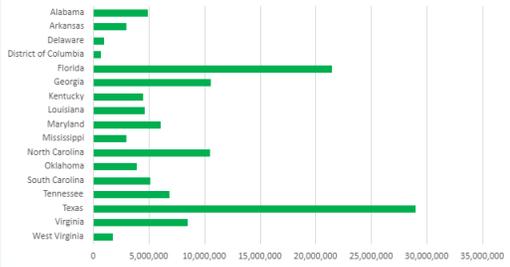


Figure 2. Total SNAP Participants in Northeastern States

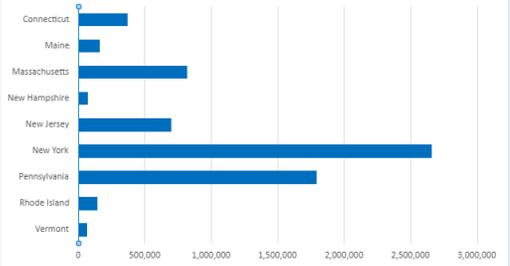


Figure 3. Population

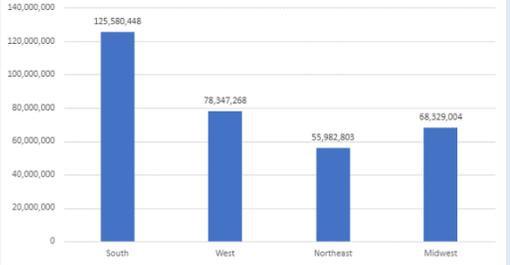


Figure 4. Population as share of total

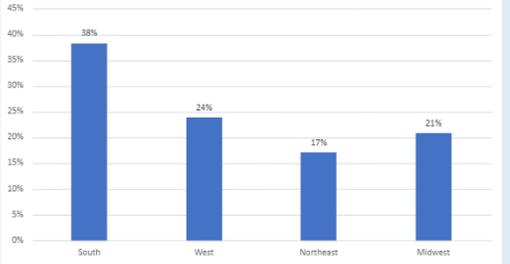
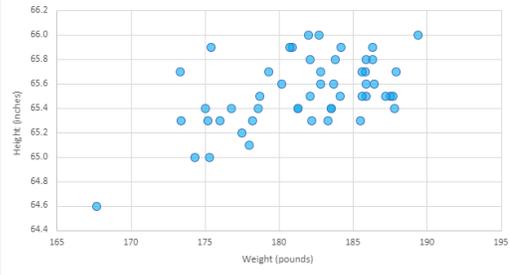


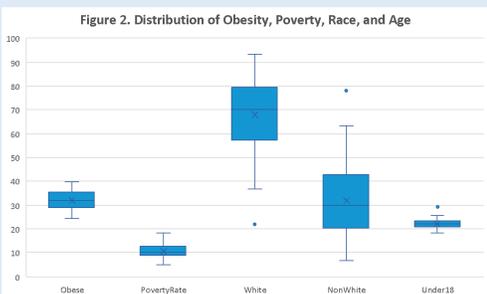
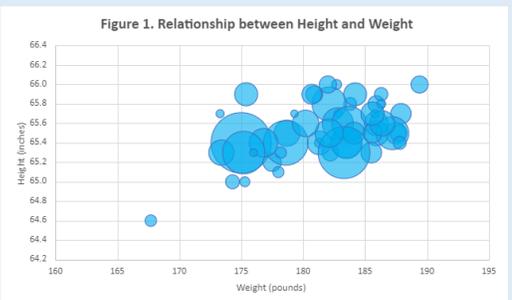
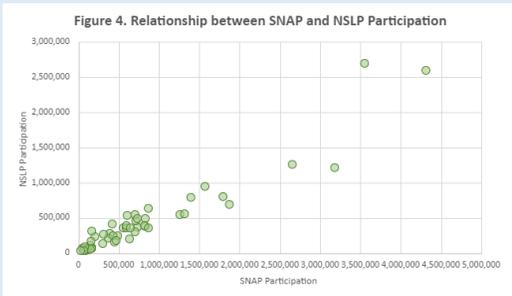
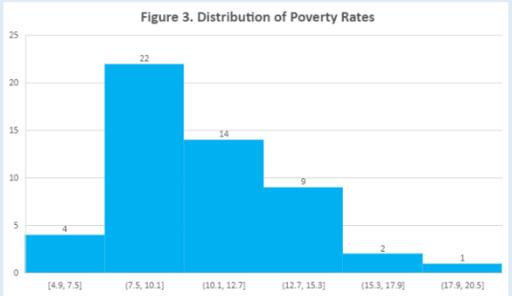
Figure 1. Relationship between Height and Weight



- Total SNAP Participants in Northeastern states
- Total Population in Each Region
- Total Population as Share of Total Population

Grade Band II: Histograms and Scatterplots

- Relationship between Height and Weight
- Relationship between SNAP and NSLP Participation
- Distribution of Obesity Rates
- Distribution of Poverty Rates

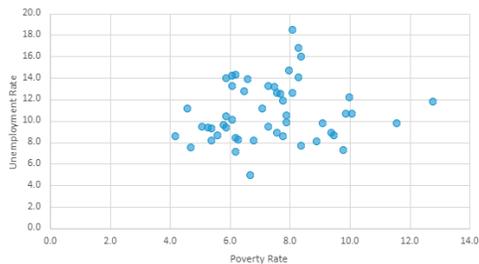


Grade Band III: Bubble Plots and Box-and-Whisker Charts

- Relationship between Height and Weight (bubbles sized by population)
- Distribution of Obesity Rates, Poverty Rates, Race, and Age

Note: The use of the terms “white” and “non-white” provide you with an opportunity to discuss racial equity in data and data visualization; see below.

Figure 3. Relationship between the Unemployment Rate and the Poverty Rate



See slides in previous row.

Data Visualization

A set of visualizations are prepared for you to select. Please review the interpretation of each one described in the *Learning Goal* section and select one that best matches the Data Question your class picked.

Data Equity, Ethics, and Privacy

For this subsection, there is no specific *Learning Goal*. Instead, select “Data Equity,” “Data Ethics,” or “Data Privacy” to wrap up this data story.

Data Equity - Who is represented in the data?

- Are you represented in the data?
- Are you family members represented in the data?
- Are your friends represented in the data?
- Are people in your community represented in the data?
- Do the data reflect your experiences?

For all Grade Bands

Data Equity – Who is represented in the data?

For all Grade Bands (I, II, III): Ask your students the following questions:

- Are you represented in the data?
- Are you family members represented in the data?
- Are your friends represented in the data?
- Are people in your community represented in the data?
- Do the data reflect your experiences?

Students should learn that failing to account for representation, such as having race and ethnicity breakdown, in the data could result in an inaccurate story and cause further inequalities.

Data Ethics - How should we report the data?

Suppose we published our data analysis and data visualization.

- What would the title be?
- What information, key concepts, and takeaways would be included in the article?

For all Grade Bands

Data Ethics – How should we report the data?

For all Grade Bands (I, II, III): Prompt your students that suppose they decided to publish their data analysis and data visualization as a news article. Ask your students the following questions:

- What would the title be?
- What information, key concepts, and takeaways would be included in the article?

Next, have the students evaluate their answers with the following questions:

Data Ethics - How should we report the data?

Now, to evaluate our answers from the previous questions.

- What conclusions would someone make from the title alone?
- Does the content of the article match the title?
- Does the article credit who collected, analyzed, and/or visualized the data?
- Would it be important to know the answer to the previous question? Why or why not?

For all Grade Bands

- What conclusions would someone make from the title alone?
- Does the content of the article match the title?
- Does the article credit who collected, analyzed, and/or visualized the data?
- Would it be important to know the answer to the previous question? Why or why not?

Students should learn how they report the data story could cause unintended ethical issues, such as misleading titles, and how important it is to report the sources of the data collection, analysis, and visualization.

Data Privacy - Are we telling the right data story?

- Suppose the data were collected at the state region level (Northwest, West, Southwest, Mid-West, Southeast, Mid-Atlantic, and Northeast). Would the answer to the data question change? Why or why not?
- Suppose the data were reported at the city level. Would the answer to the data question change? Why or why not?

For all Grade Bands

Data Privacy - Are we telling the right data story?

- If your information was part of the data, would you be more comfortable with the data being reported at the state region level or city level? Why or why not?
- At what geographic level would answer the data question while protecting your personal information?

For all Grade Bands

Data Privacy – Are we telling the right data story?

For all Grade Bands (I, II, III): Ask your students the following questions:

- Suppose the data were collected at the state region level (Northwest, West, Southwest, Mid-West, Southeast, Mid-Atlantic, and Northeast). Would the answer to the data question change? Why or why not?
- Suppose the data were reported at the city level. Would the answer to the data question change? Why or why not?
- If your information was part of the data, would you be more comfortable with the data being reported at the state region level or city level? Why or why not?

(Note: Students should realize that smaller geographies make it easier to find someone.)

- At what geographic level would answer the data question while protecting your personal information?

Students should learn the data story could change and be potentially inaccurate depending on how the data are reported due to data privacy concerns.