LESSON 6

Food Data

Making meaning from numbers.

GRADE	TIME	FINAL PRODUCT
Grades 4–5	**Three class periods, plus a data-collection week**	**Data graph + a short written "data story"**

BIG IDEA

Data tells a story about our community's relationship to food: patterns we can see, understand, and act on.

ESSENTIAL QUESTION

How can we use data and numbers to better understand our community's food system?

ACTIVITY OVERVIEW

Ask, collect, analyze.

In this interdisciplinary lesson, students use data to explore how their community connects to the larger food system.

The arc spans three days plus a week of fieldwork: Day 1 opens with a Nourish film hook on food research and data (*Food and Family* by Dr. Nadine Burke), introduces survey question types, and ends with each student writing a research question proposal. Day 2 models data collection, gives students a practice round with classmates, and finalizes their data collection plan.

Out of class, students survey 50 community members over one week. Day 3 brings the data back into the classroom: students organize, graph, and interpret what their numbers reveal.

STANDARDS ALIGNMENT

Four subjects, one lesson.

SCIENCE (NGSS)

What students do

Plan and carry out investigations to collect and analyze food-related data; identify patterns and possible solutions.

Three-dimensional emphasis. SEP: Analyzing and Interpreting Data; Planning and Carrying Out Investigations. CCC: Patterns; Cause and Effect.

5-ESS3-1 3-5-ETS1-3

ELA (CCSS)

What students do

Conduct short research projects using multiple sources. Write informative texts that explain findings using clear ideas, facts, and domain vocabulary. Present findings clearly using appropriate speaking skills and visual supports.

W.5.7 W.5.2 SL.5.4

SOCIAL STUDIES (C3)

What students do

Analyze how individual and community actions influence resource use within the food system. Explain how data can help communities understand food-related challenges. Identify ways individuals and groups work together to solve community problems.

D2.Geo.4.3-5 D2.Civ.12.3-5 D2.Civ.14.3-5

MATH (CCSS)

What students do

Choose a display that fits the question: a scaled bar graph to compare categories, a line plot to show the spread of numerical answers, a pie chart for parts of a whole. Build it with a clear title, labeled axes, and a consistent scale, then read back what it says about the community.

Practice emphasis: MP.4 Model with mathematics; MP.2 Reason abstractly and quantitatively; MP.5 Use appropriate tools strategically; MP.6 Attend to precision

MP.4 MP.2 MP.5 MP.6 3.MD.B.3

BACKGROUND FOR TEACHERS

What to know before you teach.

Collecting and analyzing data helps us understand how the food system works in everyday life. By collecting and visualizing numerical data, we can reveal patterns and relationships: overconsumption of processed food, strong community support for farmers' markets, gaps in food access. Recognizing these patterns helps students (and communities) make informed choices that promote a healthy, fair, and regenerative food system.

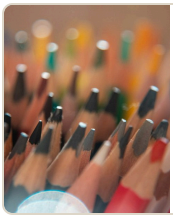
VOCABULARY

Words to grow on.

Front-load these four terms at the start of Day 1.



food system
All the people, places, and steps involved in bringing food to our community.



survey question
A question used to collect information or opinions from a group of people.



data
Facts or numbers collected to help us understand something.



graph
A visual display of data, like a bar graph, line graph, or pie chart.

MATERIALS & PREPARATION

What you'll print and cue up.

MATERIALS

- ☐ **Nourish short film**: *Food and Family* (Dr. Nadine Burke, 1 min): Dr. Burke cites research data to show the value of families eating together.
- ☐ **Two Graphs, Two Stories slides**: two sample graphs as Day 1 hook for the inquiry pattern.
- ☐ **Survey Question Types slides**: defines the three question types students can choose from.

PREPARATION

- ☐ Cue up the Nourish short film *Food and Family* (Burke) for Day 1, Step 1. Captions on.
- ☐ Locate and cue the three slide decks: Two Graphs Two Stories, Survey Question Types, Graph and Chart Examples.
- ☐ Print the Data Collection Planning sheet (1 per student) and Data Record Sheet (1 per student, with extra blanks for any who lose theirs during the fieldwork week).

- [ ] **Graph and Chart Examples slides**: used in Day 3 to review graph type choices.
- [ ] **Data Collection Planning student page**: printable PDF, 1 per student; Day 2.
- [ ] **Data Record Sheet**: printable PDF, 1 per student; used during the fieldwork week and into Day 3.
- [ ] Clipboards and pencils, or devices for fieldwork.
- [ ] **Graph paper OR digital graphing tools**: Google Sheets, Excel, or similar for Day 3.
- [ ] Whiteboard / chart paper labeled “Our Food System Questions” for the Day 1 group brainstorm.
- [ ] Set up a wall-sized chart paper or whiteboard area labeled “Our Food System Questions” for Day 1 brainstorm.
- [ ] Plan the fieldwork timing: Days 1–2 in one week, then one week of out-of-class collection, then Day 3 in the following week.

DAY 1

Asking good questions.

50 minutes

1 Watch: *Food and Family*

6 MIN

TEACHER

- Pre-frame: introduce *Food and Family* (Burke). Ask students to listen for research and numbers Dr. Burke cites.
- Play *Food and Family* (~1 min). Captions on.
- Pair share + capture: what does the research say about eating together as a family? Invite 2–3 students to share.
- Bridge: today we'll look at our community's relationship to food using data we collect ourselves.

STUDENTS

Watch *Food and Family* and share with a partner.

2 Vocabulary + the Two Graphs

7 MIN

TEACHER

- Quickly introduce the four core vocabulary terms: food system, survey question, data, graph.
- Project the Two Graphs, Two Stories slides. Use **"Think About It"** prompts: notice, wonder, story each graph tells, who the people and places behind the numbers are.
- Frame the lesson: scientists ask survey questions to collect and visualize data. Today students will write their own survey question about food in the community.

STUDENTS

Look at the two graphs. Notice patterns. Wonder what story each tells.

3 Survey Question Types

6 MIN

TEACHER

- Project the Survey Question Types slides. Walk through the three types with concrete examples:
  - Number of Times / Percentage Questions: **"How many times per week do you cook dinner?"** (0–7), or **"What percentage of the food you eat is grown locally?"** (0–100%).
  - Personal Preference Questions: **"How important is it to buy organic food?"** (0–5 scale), or **"How much do you like carrots?"** (0–10).
  - Test-Your-Knowledge Questions: **"About what percentage of food is never eaten?"** (answer: 30%) or **"About how many workers in the world have food or farming jobs?"** (1 in 3).
- Brief discussion: which type would collect data fastest? Which would tell the most surprising story?

STUDENTS

Notice the difference: number vs. preference vs. knowledge questions. Think about which type interests you most.

4 What makes a good research question?

4 MIN

TEACHER

- Frame: good research starts with good questions.
- Define two criteria. A strong question is BOTH:
  - Measurable: it can be answered with numbers.
  - Meaningful: it connects to a real food system issue (health, farming, access, waste).

STUDENTS

Begin thinking about your own food system question.

5 Group brainstorm + write your research question

14 MIN

TEACHER

- Invite the class to brainstorm measurable, meaningful questions. Post on the **"Our Food System Questions"** chart.
- Discuss as a class: which questions are both measurable AND meaningful? Which could improve? Mark the strongest with stars.
- Distribute the Data Collection Planning student page. Have each student complete Part 1: My Research Question: their question, why it matters, and their response scale.

STUDENTS

Contribute 1–2 ideas to the class brainstorm.

Star the questions you like best.

Complete Part 1: My Research Question on the Data Collection Planning student page.

6 Draft your data collection plan

6 MIN

TEACHER

- Direct students to Part 2: My Data Collection Plan on the same page.
- Have students draft WHO, WHERE, WHEN, and HOW MANY; keep it as a first draft they will refine on Day 2 with a partner.
- Circulate. Coach for variety in ages and parts of the community.
- Collect student pages at the end of the day. Quick review before Day 2; flag any questions that need revision.

STUDENTS

Complete Part 2: My Data Collection Plan: a first draft you can refine tomorrow.

Aim for a sample with variety: different ages, different places.

7 Wrap and preview Day 2

3 MIN

TEACHER

- Brief whole-class wrap: preview Day 2: refine plans with a partner, practice on classmates, then survey 50 people.

STUDENTS

Hand in your Data Collection Planning student page.

DAY 2

Preparing to collect data.

45 minutes

1 Modeling a data table + graph

10 MIN

TEACHER

- Return approved question proposals.
- Project a sample data table (e.g., **"How many times a week do you cook dinner?"** with 10 fictional responses) and demonstrate plotting it as a bar graph or line plot. Review scaling axes, labeling.
- Show how the same data can be displayed as a bar, line, or dot plot.

STUDENTS

Notice that different graph types tell slightly different stories.

2 Partner review of your plan

7 MIN

TEACHER

- Return Data Collection Planning student pages with brief feedback.
- Pairs review each other's plan; each partner offers one specific suggestion.

STUDENTS

Review your Data Collection Planning student page with a partner.

Revise your question or plan if needed.

3 Distribute the Data Record Sheet

3 MIN

TEACHER

- Distribute the Data Record Sheet. Show how to write the research question and scale at the top, then record one response per row.
- Goal: 50 community members over one week, with variety in ages and places.

STUDENTS

Pick up your Data Record Sheet and fill in your research question and scale at the top.

4 Practice round with classmates

15 MIN

TEACHER

- Students survey 5 classmates as a warm-up, swapping roles (surveyor / respondent).
- Flag any questions that aren't working yet: too vague, scale unclear, hard to answer.

STUDENTS

Practice your survey on 5 classmates.

Notice what's working and what isn't.

5 Reflect + finalize

5 MIN

TEACHER

- Pair-share: what worked in the practice round? What needs revising?
- Each student's question + plan gets a quick teacher check before they go into the field.

STUDENTS

Revise your question or plan if needed.

Get final teacher approval.

6 Preview Day 3

2 MIN

TEACHER

- Set expectations: over the next week, students survey 50 people and bring their Record Sheet back on [date]. Variety in ages and places matters more than hitting exactly 50.

STUDENTS

Plan when you'll do your fieldwork.

A WEEK OF FIELDWORK

Between the classroom days.

Between Day 2 and Day 3, students survey 50 members of their community on their own time.

Respondents may include classmates, family members, neighbors, teachers, faith community members, friends of family. Variety matters more than hitting exactly 50.

Teacher check-ins: brief 30-second touchpoints Mon/Wed help maintain momentum.

DAY 3

Analyzing the results.

50 minutes

1 Review and organize data

10 MIN

TEACHER

- Welcome students back. Quick energy check: who got to 50? What surprised you?
- Students organize their responses into a clean table (paper or spreadsheet). Coach for accuracy and consistency.
- Brief class discussion: early observations, surprises, patterns?

STUDENTS

Organize your data into a clean table.

Note one surprise or pattern.

2 Graphing the data

25 MIN

TEACHER

- Project the Graph and Chart Examples slides. Review when to use each type:
  - Bar graph: comparing categories (e.g., responses to a multi-choice question).
  - Line plot or dot plot: showing distribution of numerical answers (e.g., 0–7 times cooking dinner).
  - Pie chart: showing proportions of a whole (e.g., percent who shop at a farmers market vs. supermarket).
- Students choose the best graph type for their question, then graph (paper or digital).
- Remind students of the four essentials:
  - A clear title.
  - Labeled axes (with units or categories).
  - A consistent scale.
  - Color or shading for clarity.
- Circulate and coach: what's the headline? Can a stranger read it?

STUDENTS

Choose the right graph type and create your graph (paper or digital).

Step back: does it tell a clear story?

3 Write your data story

8 MIN

TEACHER

- Project the data story prompts:
  - What story is your graph telling?
  - What patterns do you notice? What might explain them?
  - What new questions do you have?
- Students write a 1-paragraph data story. Remind them: the numbers represent real people in their community.

STUDENTS

Write your 1-paragraph data story using the prompts.

End with one new question your data raised.

4 Closing discussion

7 MIN

TEACHER

- Invite 4–6 students to share their graphs + 1–2 sentences of their data story.
- After each, ask: what surprised you? What new question does this raise for the class?
- Frame: students are now data storytellers who can use data to understand and improve the food system.

STUDENTS

Share your graph and data story (if invited).

Notice patterns across the class's data.

ASSESSMENT

What understanding looks like.

Students demonstrate understanding by:

- Designing a research question that is BOTH measurable (answerable with numbers) AND meaningful (connected to the food system).
- Collecting data accurately and consistently, aiming for 50 responses, with variety in ages and places.
- Organizing data into a clean table and creating a correctly constructed graph with title, labeled axes, scale, and visual clarity.
- Identifying at least one pattern or insight from their data.
- Writing a coherent data story that connects findings to the food system.
- Communicating findings clearly when sharing with the class.

Look-fors: students may show understanding through paper graphs, digital graphs, oral explanation, or written interpretation. All four are valid.

DIFFERENTIATION & SCAFFOLDING

Build access in.

FOR STUDENTS WHO NEED MORE SUPPORT WITH GRAPHING

- Pre-printed graph templates (axes drawn, title and labels needed) reduce the cognitive load of constructing a graph from scratch.
- Pair students for graphing: one student does the math, one does the drawing; then both review.
- Use the Graph and Chart Examples slides as a visual reference students can keep on their desks.

FOR MULTILINGUAL LEARNERS

- Survey questions can be conducted in students' home languages with their family and community.
- Data stories can be written in a student's home language and translated; the analytical work is the same.
- Use sentence stems for the data story: **"My data shows that ___. This matters because ___. One pattern I noticed is ___. I now wonder ___."**

FOR STUDENTS WITH READING OR WRITING IEPS

- Audio recording of survey responses is allowed (with respondent permission). Students can transcribe later.
- Data stories can be delivered orally and recorded rather than written.

IF 50 RESPONDENTS ISN'T FEASIBLE

- A sample of 25–30 still works; the analysis is the same.
- Pairs or small teams can pool their data to reach a larger combined sample.
- Within a class of 24, total responses easily exceed 1,000, a powerful aggregate finding.

CONTEXT FOR TEACHERS

This lesson connects naturally with math curriculum on data, measurement, and graphing. If your school has a dedicated math block, consider running Day 3 during math time; the graphing work doubles as math practice with real student-collected data.

EXTENSIONS

Five ways to go further.

EXTENSION 01

Food Data Infographic

Students use a digital tool (Canva, Google Slides, or similar) to create a polished infographic summarizing their key findings: graph, headline, 2–3 supporting facts, and one call to action. The infographic shareable format makes the data story portable to families and community members.

EXTENSION 02

Enlarging Our Food Data Story

Combine data from multiple student projects into a single class display, slideshow, or short presentation. Students collaborate on a meta-analysis: what story does our combined data tell about our class's relationship to the food system? Builds collaborative analysis and synthesis skills.

EXTENSION 03

Data Interviews: Behind the Numbers

Students conduct short follow-up interviews with 2–3 of their survey respondents to learn the WHY behind their numerical answers. They present how qualitative stories help explain the quantitative patterns. Builds mixed-methods research thinking and personal connection to data.

EXTENSION 04

From Data to Action

Students turn their data into a civic action artifact (a poster, letter to the school board, a parent newsletter article, or a short slide presentation) that communicates findings and proposes one community-level action.

EXTENSION 05

Future Data Forecast

Students imagine how their data might change in 10 years if people made healthier or more sustainable food choices. They create a second graph showing their forecast (same axes, hypothetical numbers) and explain what actions could lead to that change. Builds forward-looking thinking and connects data to decision-making.