



5TH GRADE DATA CHALLENGE

Food Truck Tycoon

Teacher Facilitation Guide

Duration: ~1 Week (5–6 Class Periods)



CHALLENGE OVERVIEW

Students take on the role of food truck entrepreneurs. Working in teams, they collect and visualize class survey data, use those findings to decide what their food truck will sell, explore the basics of cost and profit, and build a brand identity with a food truck name and logo. The unit culminates in a class Food Truck Expo — a gallery walk where teams share their concepts and receive feedback from classmates.

The Data Challenge sets up the Systems Challenge (flowcharts) and the Design Challenge (physical food truck model). Each challenge can also stand alone.

BY THE END OF THIS CHALLENGE, STUDENTS WILL BE ABLE TO:

- Collect, visualize, and interpret survey data to inform a real-world decision.
- Use both quantitative and qualitative data to support a recommendation.
- Understand the basic relationship between cost, selling price, and profit.
- Apply the Identify and Understand stages of the Engineering Design Process.
- Create a visual brand (logo and name) that communicates what their food truck sells.
- Communicate a data-backed concept to peers through a gallery walk Expo display.

MODULE STRUCTURE

- Activity 1 — What is Data? (Day 1)
- Activity 2 — Introducing the Food Truck Challenge (Day 2)
- Activity 3 — Class Data Visualization (Day 3)
- Activity 4 — Working as Engineers (woven into Days 2 and 4)
- Activity 5 — What Does It Cost? Building Your Menu (Day 4)
- Activity 6 — Logo + Food Truck Expo (Day 5)

MATERIALS

- “Who Are You?” survey (printed or digital).
- Predictions chart and sticky notes.
- Food Item Cards, sorting zones, and Food Truck Menu Planner.
- Art supplies or digital design tools for the food truck logo.
- [Handout 1 — Who Are You? Survey](#)
- [Handout 2 — Food Truck Challenge Brief](#)
- [Handout 3 — Food Item Cards](#)
- [Handout 4 — Food Truck Menu Planner](#)
- [Handout 5 — Food Truck Expo Display Checklist](#)

STANDARDS ALIGNMENT

NGSS Engineering Design & Science and Engineering Practices

- **3-5-ETS1-1** — Activities 2 and 4: Students define the food truck problem, extract requirements from the challenge brief, and identify success criteria for their concept.
- **SEP-4: Analyzing and Interpreting Data** — Activities 1, 3, and 5: Students collect class survey data, build visualizations, and interpret both numerical and descriptive data to make food truck decisions.
- **SEP-5: Using Mathematics and Computational Thinking** — Activity 5: Students calculate cost-to-make, selling price, and profit-per-item for their menu items and estimate daily profit.
- **SEP-8: Obtaining, Evaluating, and Communicating Information** — Activity 6: Students communicate their food truck concept through a logo, Expo display, and data-backed justification for their menu choices.

Common Core Math Practice

- **5.NBT.B.7** — Activity 5: Students subtract and multiply decimals to calculate profit per item and estimate daily profit (selling price – cost to make, then × daily sales).
- **MP.1 Make sense of problems** — The challenge is open-ended. Students return to the same problem across sessions, refining their understanding as more data becomes available.
- **MP.3 Construct viable arguments** — Activities 5 and 6: Students defend menu choices and Expo displays using data, and respond to classmates’ questions with evidence.

KEY VOCABULARY

Cost to make	The amount of money it costs you to make one serving (ingredients, packaging). This is money you spend.
Selling price	The amount of money a customer pays you for one item. This is money you receive.
Profit per item	Selling price minus cost to make. This is money you keep. If it is negative, you are losing money on that item.

ACTIVITY 1

What is Data?

Essential Question: How can data help us make better decisions?

TIME
~60 min

Students are introduced to the concept of data. They warm up with a physical Data Lineup, complete the Who Are You? class survey, and discuss how data comes in many forms. The survey doubles as market research used throughout the challenge.

SETUP & MATERIALS

- Print the [“Who Are You?” Survey](#) or prepare to share the digital link (Google Form).
- Clear space along one wall for the Data Lineup warm-up.
- Optional: prepare 2-3 warm-up questions on a slide (see Part 1 below).

Part 1 — Data Lineup Warm-Up: 10–15 min

Have students stand and form a line along one wall, ordering themselves silently by their answer to a question. Run two or three quick rounds:

- How many siblings do you have? (fewest to most)
- How often does your family eat from a food truck or food stand? (never to often)
- How much would you pay for one item at a food truck? (least to most)

After each round, ask students at both ends to share their answer. Point out that the line IS a data display — they just made a histogram with their bodies.

DISCUSSION QUESTION— WHAT IS DATA?

- *What did the lineup show us? Is this a useful piece of information?*
- *Can words be used as data? Can pictures? Are numbers the only kind of data?*
- *Who might want to collect data like this in the real world?*

Part 2 — Who Are You? Survey: 20 min

Each student completes the “Who Are You?” survey. The survey mixes general background questions with food-preference questions that serve as market research. See Handout 1 for suggested questions. Allow a few minutes for students to share a surprising answer with a partner.

Part 3 — What is Data? Discussion: 20 min

Bring the class together. Goal: surface the idea that data can be qualitative (words, descriptions, categories) or quantitative (numbers), and that both types are useful for making decisions.

Key ideas to land:

- Data is information we collect to answer a question or make a decision.
- Quantitative data uses numbers. Qualitative data uses words or categories. Both matter.
- The challenge is not just collecting data — it is interpreting it in a meaningful way.

DISCUSSION QUESTIONS — AFTER THE SURVEY

- *Which survey answers are numbers? Which are words or categories?*
- *If you were opening a food truck, which survey questions would be most useful? Why?*
- *Is it possible to collect data that is not useful? (Not all data helps every question.)*

Part 4 — Reflection: 5–10 min

- What is data, in your own words?
- What is one piece of data from today that surprised you?
- How could a food truck owner use data to make better decisions?

ACTIVITY 2

Introducing the Food Truck Challenge

Essential Question: How can engineers use data to help a business succeed?

TIME
~50 min

Students form teams, read the challenge brief, and make predictions about what will sell well before looking at any data. Teams write a first-draft problem statement that they will revise in Activity 4.

SETUP & MATERIALS

- Print one copy of the [Food Truck Challenge Brief](#) per group or project it.
- Prepare a “Predictions” chart with two columns: “Top Sellers” and “Probably Won’t Sell.”
- Sticky notes in one color per group.
- Decide how to group students (2-3 per team recommended).
- Engineering Notebooks for problem statement drafts.

Part 1 — The Challenge Brief: 20 min

Divide the class into teams and read the brief together.

FOOD TRUCK TYCOON — CHALLENGE BRIEF

You and your team are going to open a food truck. Like any smart business owner, you will not just guess what to sell — you will use real data. The class survey you completed is your market research. Your job is to:

- Use the class data to decide what your food truck will sell.
- Build a simple business case: does your menu make financial sense?
- Create a brand identity: a name and logo for your food truck.
- Share your concept at the class Food Truck Expo.

After reading, walk students through requirements and constraints:

- **Requirements (what your concept must include):** data-backed menu, cost and profit check, food truck name and logo, Expo display.
- **Constraints (limits you must work within):** must use class survey data; display fits on one table; 5-6 sessions total.

Part 2 — Predictions Wall: 20 min

Before any analysis, each group makes predictions about what will sell best using only their instincts. Give each group sticky notes. Ask groups to write 3 predicted top sellers and 1-2 predicted poor sellers, then place them on the chart. The class returns to this wall in Activity 5 to compare with the data.

DISCUSSION QUESTIONS — INTRODUCING THE CHALLENGE

- *In your own words, what problem are you trying to solve?*
- *What information do you already have? What do you still need?*
- *Why is it important to use data instead of just going with your gut feeling?*

Part 3 — Reflection: 10 min

Have each team write a one-sentence problem statement:

“Our food truck needs to ____ because ____.” They will revise this in Activity 4.

ACTIVITY 3

Class Data Visualization

Essential Question: How does the way we display data change what we can learn from it?

TIME
~50 min

Students explore how data can be organized and displayed. They build a class dot-plot, then examine bar graphs of the food preference data. By the end, each group identifies the survey findings most relevant to their food truck concept.

SETUP & MATERIALS

- Compile the class survey responses before this session.
- Prepare a blank two-axis sibling chart (laminated wall poster or whiteboard): x-axis = number of sisters, y-axis = number of brothers.
- Create bar graphs from the food preference questions (Google Sheets or Excel). Print or project — include favorite food type, beverage, and dessert.
- Dry-erase markers if using a laminated poster.

Part 1 — Sibling Chart Warm-Up: 15 min

Each student places a dot in the cell matching their family (brothers and sisters, not counting themselves or parents). The goal is to build comfort with reading and interpreting a scatter-style chart — the same skill used when reading the food preference data.

DISCUSSION QUESTIONS — READING THE CHART

- *How many students are only children? How many have only brothers? Only sisters?*
- *What does this chart tell us quickly that a list of numbers would not?*
- *Remember: data can be qualitative (words) or quantitative (numbers). Both are useful.*

Part 2 — Food Preference Data: 25 min

Display the bar graphs from the food preference questions. Walk through each chart with the class, then give groups 10-12 minutes to review the data and discuss which points matter most for their concept.

- Which type of food was most popular in our class?
- What does the beverage data tell us about what to offer?
- If three groups all want to sell pizza, what happens to competition?

Part 3 — Which Data Matters for Your Truck?: 10 min

Lead a discussion about which data will actually help students make decisions. Capture responses on the board for groups to reference throughout the unit. Remind students to keep a shared Google Doc with notes, data highlights, and ideas.

DISCUSSION QUESTIONS — WHICH DATA MATTERS?

- *Which survey questions tell us what kids actually want from a food truck?*
- *Which questions tell us what people are willing to pay?*
- *Are there any questions that do not help? (Not all data is useful for every problem.)*
- *What words or descriptions in the survey could help you make better decisions?*

ACTIVITY 4

Working as Engineers

Essential Question: How do engineers use a process to break apart a complicated problem?

TIME
~50 min, split
across
Days 2 and 4

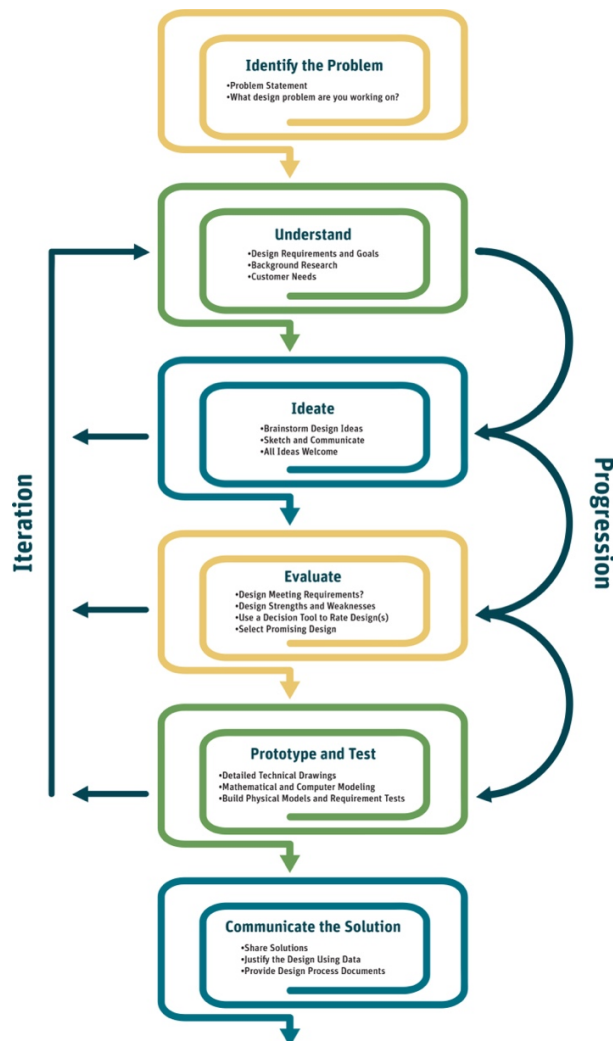
Students are introduced to the Engineering Design Process and use it as a framework for the food truck challenge. Part 1 can be taught at the end of Day 2 after the challenge brief. Part 2 is taught at the start of Day 4 to set up the cost and menu work in Activity 5.

SETUP & MATERIALS

- Engineering Design Process (EDP) poster or projection.
- [Food Truck Challenge Brief](#) from Activity 2.
- Engineering Notebooks.

Part 1 — Introducing the EDP: 25 min

Guide students through the EDP using the poster. Emphasize that the process is not always linear — engineers often loop back through stages as they learn more.



Part 2 — Anchoring the Food Truck Challenge in the EDP: 25 min

Groups apply the EDP to their food truck challenge, focusing on Identify the Problem and Understand — the early stages that set up the cost and menu work.

- **Identify the Problem:** Each group revises the problem statement from Activity 2, naming who has the problem, what the challenge is, and what data we have.
- **Understand — Requirements:** List every requirement from the brief: must use class survey data, must include a cost and profit check, must create a logo and display, must share at the Expo.
- **Understand — Constraints:** List the constraints: must use data the class collected; display fits on one table; must finish within the challenge timeline.
- **Where are we now?** Point to the EDP poster. Ideate (choosing what to sell) comes next, in Activity 5.

ACTIVITY 5

What Does It Cost? Building Your Menu

Essential Question: How do cost and data together help us make smart business decisions?

TIME
~65 min

Students combine class survey insights with a simplified look at food costs to build their food truck menu. After a hands-on Price Tier Sort that introduces cost, selling price, and profit, groups select 3-4 menu items that match the survey data AND make financial sense. The session closes with a simple daily profit estimate and a return to the Predictions Wall.

SETUP & MATERIALS

- Print and cut one set of [Food Item Cards](#) per group.
- Three labeled sorting zones per group: Low-Cost / Medium-Cost / High-Cost.
- One [Food Truck Menu Planner](#) per group
- Class data charts from Activity 3 posted or projected for reference.

Part 1 — Price Tier Sort + Vocabulary: 15 min

Open with a hands-on sort that makes cost, price, and profit concrete before any math. Give each group a set of Food Item Cards. Students sort the cards into three piles based on the cost-to-make column:

- **Low-Cost:** under \$0.75 per serving
- **Medium-Cost:** \$0.75–\$1.25 per serving
- **High-Cost:** over \$1.25 per serving

After sorting, quick share-out: which items surprised you? Are higher-cost items always better sellers?

DISCUSSION QUESTIONS — PRICE TIER SORT

- *Which cards were easy to sort? Which were tricky?*
- *Does a higher cost to make always mean a higher selling price?*
- *If you sold a hot dog for \$3.00 and it cost \$0.75 to make, what is your profit per hot dog?*
- *What would happen if you sold something for less than it costs to make?*

Part 2 — Walking Through One Example Together: 15 min

Walk through one item as a class before releasing groups to work independently.

SCAFFOLDED CLASS QUESTIONS — LEMONADE

“Your food truck sells lemonade. It costs \$0.25 to make one cup. You sell it for \$2.00.”

- **Q1 (selling price):** What does the customer pay? \$2.00 per cup.
- **Q2 (cost to make):** What do you spend? \$0.25.
- **Q3 (profit per cup):** What do you keep? $\$2.00 - \$0.25 = \$1.75$ profit per cup.
- **Q4 (daily profit):** If you sell 30 cups: $30 \times \$1.75 = \52.50 in profit for lemonade alone.

Big idea: selling price is what the customer pays. Cost is what you spend. Profit is what you keep. Choose items with positive profit that match what customers want.

Part 3 — Building Your Menu: 25 min

Groups use the Food Item Cards AND the class data charts from Activity 3 to choose 3-4 items that match what the survey says people want and make financial sense. Groups complete the Food Truck Menu Planner (Handout 4):

- Choose 3-4 items from the Food Item Cards.
- Calculate profit per item for each choice.
- Estimate daily profit: how many of each item might you sell in a day?
- Identify at least two survey data points supporting your menu choices.

TEACHER TIP

Students may want items not on the Food Item Cards based on their specific concept (e.g., birria tacos, smoothie bowls). Encourage this — have them estimate a realistic cost-to-make and selling price. The goal is the thinking process, not the specific item.

Part 4 — Return to the Predictions Wall + Reflection: 10 min

Walk to the Predictions Wall from Activity 2 and compare predictions to the data.

- Which predictions were right? Which were surprising?
- Did any group change their concept based on cost data? Why?
- What is more important: selling something people want, or something that makes a profit? How do you balance them?

ACTIVITY 6

Logo + Food Truck Expo

Essential Question: How can a name, logo, and data display communicate your concept persuasively?

TIME
~60 min (or
split across
two days if
needed)

Students create their food truck brand identity and prepare their Expo display. The session ends with the Food Truck Expo — a gallery walk where teams share their concepts, ask questions, and leave feedback.

SETUP & MATERIALS

- Art supplies: markers, colored pencils, poster paper.
- Optional digital tools: Google Drawings, Canva (free — food truck templates available).
- Food Truck Expo Checklist per group (Handout 5).
- Sticky notes for gallery walk feedback.
- Set up tables or display areas around the room for Expo stations.

Part 1 — Creating Your Food Truck Logo: 25 min

Students need a strong brand: a name and logo that communicates what they sell and makes their truck memorable.

LOGO REQUIREMENTS

- Must include the food truck's name.
- Should make it clear what type of food is being sold.
- Should have an appealing color scheme.
- Should be readable from 10 feet away.
- Cannot be larger than a standard piece of poster paper.

Before students begin, briefly discuss what makes a good logo:

- What logos do you recognize immediately? What makes them memorable?
- What feelings should your logo communicate to someone walking by?

DISCUSSION QUESTIONS — LOGO FEEDBACK (AFTER CREATION)

- *Is the name clear and easy to read from a distance?*
- *Can you tell what they sell just by looking at the logo?*
- *What is one thing that would make this logo even stronger?*

Part 2 — Expo Preparation: 10–15 min

Each display must include:

- Food truck name and logo.
- **Menu concept:** what they sell and at what price.
- **Data support:** at least two class survey findings backing their menu choices.
- **Simple profit check:** estimated profit per item and estimated daily profit.
- **Target customer:** brief description of who their food truck is designed for.

Part 3 — Food Truck Expo Gallery Walk: 20 min

Run the gallery walk in rotations — 3-4 minutes at each display. Visitors should read the display, ask at least one question, and leave a sticky note with feedback.

TEACHER TIP

Consider making this a festive event — invite another class as investors or play background music. As an optional, family-coordinated activity, groups could bring a small taste of the food they plan to sell. Be mindful of food allergies and school policies.

Part 4 — Reflection: 5–10 min

- Which food truck concept would you most want to visit, and why?
- What data did you find most convincing in another group's display?
- What is one decision you made differently because of data?
- How well did your group work together? What would you do differently next time?

LOOKING AHEAD — THE SYSTEMS CHALLENGE

You have decided what your food truck will sell — but how does it all work? In the next unit, you will use flowcharts to map the systems and processes that keep your food truck running: how a customer places an order, how your team prepares and serves it, and how everything flows smoothly on the big day.

Companion Handouts

Handout 1 — Who Are You? Survey

Adapt as needed. General questions give students varied data to visualize; food preference questions serve as market research.

General Section

- How many siblings do you have? (0, 1, 2, 3, 4, 5+)
- What is your favorite weekend activity? (sports, video games, hanging out with friends, reading, watching TV/movies, outdoor activities, art/music, other)
- What is your favorite kind of snack? (sweet, salty, sour, spicy, no preference)

Food Truck Section

- What is your favorite type of food? (Mexican/Tex-Mex, Italian/Pizza, American, Asian, Mediterranean, Other)
- What is your favorite snack food?
- What is your favorite beverage? (Water, Juice, Soda, Milk, Lemonade, Other)
- What is your favorite dessert?
- How often does your family eat from a food truck? (Never, 1-2 times/year, Monthly, Weekly+)
- What matters most when choosing what to eat? (Taste, Price, Healthy options, Portion size, Variety)
- What is one thing that would make you want to buy from a food truck? (open-ended)

Handout 2 — Food Truck Challenge Brief

Print one per group or share digitally.

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You and your team are going to open a food truck. Like any smart business owner, you will not just guess what to sell — you will use real data. The class survey you completed is your market research. Your job is to:

- Use the class data to decide what your food truck will sell.
- Build a simple business case: does your menu make financial sense?
- Create a brand identity: a name and logo for your food truck.
- Share your concept at the class Food Truck Expo.

Handout 3 — Food Item Cards

Print on cardstock and cut apart. One set per group for the Activity 5 Price Tier Sort. Suggested selling prices reflect typical food truck pricing.

Menu Item	Cost to Make (per serving)	Suggested Selling Price	Profit per Item (Price – Cost)
Lemonade (16 oz)	\$0.25	\$2.00	_____
Mini Donuts (3-pack)	\$0.40	\$2.00	_____
Hot Dog + Bun	\$0.75	\$3.00	_____
Chips + Salsa	\$0.50	\$2.50	_____
Pretzel	\$0.60	\$2.50	_____
Grilled Cheese	\$0.80	\$3.50	_____
Waffle Cone Ice Cream	\$0.75	\$3.00	_____
Taco (beef or chicken)	\$1.00	\$4.00	_____
Nachos	\$1.00	\$4.00	_____
Smoothie (16 oz)	\$1.25	\$4.50	_____
Loaded Fries	\$1.00	\$4.50	_____
Pizza Slice	\$1.50	\$5.00	_____

TEACHER TIP

Students may propose items not on this list. Have them estimate a realistic cost and selling price and proceed with the same calculation. The goal is the thinking process.

Handout 4 — Food Truck Menu Planner

One per group. Students complete this in Activity 5, Part 3.

Menu Item	Cost to Make	Selling Price	Profit per Item	Est. Daily Sales × Profit

Survey evidence supporting our menu choices:

1. _____

2. _____

Total estimated daily profit: \$_____

Handout 5 — Food Truck Expo Display Checklist

One per group. Students use this to prepare their Expo display in Activity 6.

- ☐ Food truck name and logo (clear name, shows what you sell, readable from 10 feet)
- ☐ Menu concept: 3-4 items with selling prices
- ☐ At least 2 class survey data points supporting your menu choices
- ☐ Profit per item calculated for each menu item
- ☐ Estimated daily profit
- ☐ Brief description of your target customer
- ☐ We are ready to explain our choices and answer visitor questions

This STEM Innovation and Design module was produced by Georgia Institute of Technology's Center for Education Integrating Science, Mathematics, and Computing with support from National Science Foundation Award #2101441.