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```
if (curious) {
  create();
  connect();
}
```

FREE SAMPLE LESSON · GRADES 6-8

# Fast Food Data Lab

## Nutrition, Spreadsheets and Smart Choices

Middle School Computer Science with Free Google Tools

3 sessions · Google Sheets · teacher plan, student pages, key

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Aligned to CSTA K-12 CS Standards · ISTE Standards for Students · Maryland K-12 Computer Science Standards

# Fast Food Nutrition Data Lab

Students love talking about fast food. This three-session lab turns that energy into real data science: they research official nutrition information from restaurants they actually visit, build a class database in Google Sheets, make the spreadsheet flag high-sodium and high-sugar items with formulas, then compete to design the best meal under a budget.

## At a Glance

| Session | Students will | Computer science skills |
|---|---|---|
| 1 Become Food Data Detectives | Research official nutrition pages and build a crowdsourced class data set | Collecting reliable data, sources, data validation |
| 2 Make the Spreadsheet Do the Thinking | Calculate % Daily Value, flag high sodium, compare protein per calorie | Absolute references, nested IF, ratios, conditional formatting |
| 3 Build a Better Meal Challenge | Design a meal that meets 5 goals for $10 or less and persuade others with a chart | Checkboxes, SUMIF, constraints, honest charts |

## Standards

**2-DA-08** (Data and Analysis) Collect data using computational tools and transform the data to make it more useful and reliable.
**2-DA-09** (Data and Analysis) Refine computational models based on the data they have generated.
**2-AP-11** (Algorithms and Programming) Create clearly named variables that represent different data types and perform operations on their values.
**2-AP-12** (Algorithms and Programming) Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.
**2-IC-20** (Impacts of Computing) Compare tradeoffs associated with computing technologies that affect people's everyday activities and career options.
**2-IC-22** (Impacts of Computing) Collaborate with many contributors through strategies such as crowdsourcing or surveys when creating a computational artifact.

**ISTE** 1.3 Knowledge Constructor, 1.5 Computational Thinker, 1.6 Creative Communicator
**Maryland** Algorithms and Programming, Data and Analysis, Impacts of Computing (MD K-12 CS Standards, grades 6-8)
**Cross-curricular** Health: analyzing nutrition information to make healthy choices. Math: percents and ratios (MD College and Career Ready Standards, Grade 7 Ratios and Proportional Relationships).

## Materials

- [ ] Fast Food Data Lab Google Sheet: Student version (practice data) and Teacher Key (all formulas, chart and meal builder). Upload to Drive, then File > Save as Google Sheets.
- [ ] Student pages in this packet (one set per student).
- [ ] Devices with internet access to official restaurant nutrition pages or apps.

**Teacher note.** Restaurant menus and nutrition numbers change often, so students always use the restaurant's official, current page and record the date. The Practice Food Court restaurants are fictional so the lesson works even without internet. Keep the focus on data and choices, not on judging anyone's food, family or body. Every food can fit; the goal is informed decisions.

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SAMPLE LESSON · FAST FOOD NUTRITION DATA LAB · 1 OF 3

# Session 1: Become Food Data Detectives

Google Sheets | 45-50 minutes | Grades 6-8

**LEARNING GOAL** I can collect nutrition data from reliable sources and organize it in a shared spreadsheet.

| | | | | |
|---|---|---|---|---|
| nutrition facts | serving size | sodium | % Daily Value | data source |

## Warm-Up 5 min

Put three mystery meals on the board: a large burger meal, a 6-inch veggie sub with water, and a burrito with chips. Ask: Rank these from healthiest to least healthy. Then ask: What information would you need to prove your ranking?

## Mini-Lesson: Teach and Model 10 min

1. Show a real Nutrition Facts label. Point out serving size, calories, sodium, sugars, protein, fiber and % Daily Value. Explain that 'Daily Value' is based on 2,000 calories, and teens' real needs vary.
2. Show that most chains (for example Subway, McDonald's, Chick-fil-A, Taco Bell and Wendy's) post official nutrition information on their websites or apps. Model finding one item and checking the serving size.
3. Connect to computer science: we are building a crowdsourced database. If one person types 1,290 as 129, every chart we make later is wrong, so we use data validation and record our sources.

## Student Work Time 25 min

1. Open the Fast Food Data Lab Sheet (your teacher's copy) and look at the Practice Food Court tab. Find the item with the most sodium.
2. With your team, pick one real restaurant. Find its official nutrition page or app.
3. Choose 5 menu items: a main, a side, a drink, a dessert and one 'healthier' choice. Enter them on the Real Restaurant Research tab.
4. Record the source URL and date checked for every item.
5. Swap with another team and spot-check two of their items against the source.

## Exit Ticket 5 min

Why is it important to record the source and date for nutrition data?

**Support (scaffold)**

Assign one restaurant per team and give a printed menu list so students only search for numbers.

**Extend (challenge)**

Turn data entry into a Google Form (dropdowns for restaurant and category, number validation for nutrients) and link it to the class Sheet.

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SAMPLE LESSON · FAST FOOD NUTRITION DATA LAB · 2 OF 3

# Session 2: Make the Spreadsheet Do the Thinking

Google Sheets | 45-50 minutes | Grades 6-8

**LEARNING GOAL** I can use formulas, absolute references, IF and conditional formatting to analyze nutrition data.

| formula | absolute reference ($) | IF function | conditional formatting | ratio |
|---|---|---|---|---|

## Warm-Up 5 min

Display: 'This sandwich has 2,400 mg of sodium.' Ask: Is that a lot? How could a spreadsheet tell us instantly for 100 items?

## Mini-Lesson: Teach and Model 10 min

1. Model % Daily Value: =G2/'Daily Values'!$B$6. Explain why the $ signs lock the Daily Value cell when you fill the formula down.
2. Model an IF alert: =IF(G2>=920,"HIGH",IF(G2<=115,"LOW","OK")). Explain the FDA's quick guide: 20% DV or more is high, 5% or less is low.
3. Model a ratio column: protein per 100 calories, =ROUND(I2/D2*100,1). Discuss why a ratio can be fairer than comparing totals.

## Student Work Time 25 min

1. On the Practice Food Court tab, fill in % DV Calories, % DV Sodium and % DV Sat Fat using absolute references.
2. Add the Sodium Alert column with a nested IF.
3. Add Protein per 100 Cal and sort to find the top 3 items.
4. Add a green-yellow-red color scale to % DV Sodium and highlight every HIGH alert.
5. Copy your formulas to the Real Restaurant Research tab and answer: Which real item surprised you most?

## Exit Ticket 5 min

Write the formula to find % Daily Value for calories in row 5, using the Daily Value in 'Daily Values'!B3.

**Support (scaffold)**

Give the first row of formulas already completed; students fill down and explain each one.

**Extend (challenge)**

Use =SORT(FILTER(...)) to list only items under 500 calories with LOW or OK sodium.

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SAMPLE LESSON · FAST FOOD NUTRITION DATA LAB · 3 OF 3

# Session 3: Build a Better Meal Challenge

Google Sheets | 45-50 minutes | Grades 6-8

**LEARNING GOAL** I can use data to design a meal that meets goals, chart my findings and persuade an audience.

| constraint | SUMIF | checkbox | chart | recommendation |
|---|---|---|---|---|

## Warm-Up 5 min

Ask: Can you get a filling fast food meal for $10 or less that is also healthy? What would 'healthy' mean in numbers?

## Mini-Lesson: Teach and Model 10 min

1. Introduce the challenge constraints on the My Meal Builder tab: 700 calories or less, 1,000 mg sodium or less, 25 g sugar or less, at least 20 g protein, $10 or less.
2. Model checkboxes (Insert > Checkbox) and SUMIF: =SUMIF(Q2:Q21,TRUE,D2:D21) adds only the checked items.
3. Model a clear chart: sodium by item, sorted, with a title, axis labels and a line or note at the 920 mg 'high' mark. Remind students that charts must be honest.

## Student Work Time 25 min

1. Check items to build a meal and watch the totals and 'Goal Met?' column update.
2. Find at least two different meals that meet every goal. Record them.
3. Build one honest chart that supports your best meal choice.
4. Create a one-slide 'Smart Order Guide' (Slides or Docs) with your meal, your chart and one surprising fact.
5. Share your guide in a 1-minute gallery walk.

## Exit Ticket 5 min

Which constraint was hardest to meet, and what trade-off did you make?

**Support (scaffold)**

Limit the challenge to calories and price first, then add one nutrient at a time.

**Extend (challenge)**

Survey the class with Google Forms about what they really order, then compare the class's favorite meal to the healthiest meal that meets the goals.

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# Answer Key and Rubric

Session 2: Most sodium = Footlong Meatball Melt (2,400 mg, 104% DV). Five items are HIGH in sodium (920 mg or more): Double Barn Burger, Footlong Meatball Melt, Loaded Burrito, Black Bean Bowl and Crispy Chicken Strips. Top protein per 100 calories: Grilled Chicken Sandwich 8.2, Crispy Chicken Strips 7.2, 6-inch Turkey Veggie Sub 6.4. Session 3 meals that meet all five goals: Grilled Chicken Sandwich + Bottled Water (390 cal, 770 mg sodium, 9 g sugar, 32 g protein, $7.98); Grilled Chicken Sandwich + Apple Slices + Bottled Water (405 cal, 770 mg, 12 g, 32 g, $9.27). Great discussion case: 6-inch Turkey Veggie Sub + Apple Slices + Water is low in everything (295 cal, 760 mg, 8 g sugar, $9.37) but has only 18 g protein, so it misses one goal. Is it still a smart choice? Why?

## Smart Order Guide Rubric

| Criteria | 4 Exceeds | 3 Meets | 2 Approaching | 1 Beginning |
|---|---|---|---|---|
| **Data Accuracy** | Nutrition data matches official sources, with URL and date recorded, with depth, creativity or polish beyond the requirements. | Nutrition data matches official sources, with URL and date recorded. | Partly meets this criterion; some parts are missing or unclear. | Little evidence yet; needs reteaching or support. |
| **Formulas and Logic** | % DV, IF alerts and SUMIF totals are correct and use absolute references, with depth, creativity or polish beyond the requirements. | % DV, IF alerts and SUMIF totals are correct and use absolute references. | Partly meets this criterion; some parts are missing or unclear. | Little evidence yet; needs reteaching or support. |
| **Meal Design** | Meal meets all five goals, and trade-offs are explained, with depth, creativity or polish beyond the requirements. | Meal meets all five goals, and trade-offs are explained. | Partly meets this criterion; some parts are missing or unclear. | Little evidence yet; needs reteaching or support. |
| **Communication** | Chart is honest and labeled; the guide persuades with evidence, with depth, creativity or polish beyond the requirements. | Chart is honest and labeled; the guide persuades with evidence. | Partly meets this criterion; some parts are missing or unclear. | Little evidence yet; needs reteaching or support. |

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Name _____ Class _____ Date _____

FAST FOOD NUTRITION DATA LAB · SESSION 1

# Become Food Data Detectives

**TODAY'S GOAL** I can collect nutrition data from reliable sources and organize it in a shared spreadsheet.

| nutrition facts | serving size | sodium | % Daily Value | data source |
|---|---|---|---|---|

## Activity

### Nutrition Label Decoder

Serving size: how much the numbers are for. Calories: energy. Sodium: salt (Daily Value 2,300 mg). Total Sugars. Protein (helps you stay full). Fiber.
% Daily Value: 5% or less is LOW, 20% or more is HIGH.

| Restaurant | Menu item | Calories | Sodium (mg) | Sugars (g) | Protein (g) | Source + date |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

## My Steps

- [ ] Open the Fast Food Data Lab Sheet (your teacher's copy) and look at the Practice Food Court tab. Find the item with the most sodium.
- [ ] With your team, pick one real restaurant. Find its official nutrition page or app.
- [ ] Choose 5 menu items: a main, a side, a drink, a dessert and one 'healthier' choice. Enter them on the Real Restaurant Research tab.
- [ ] Record the source URL and date checked for every item.
- [ ] Swap with another team and spot-check two of their items against the source.

## Exit Ticket

Why is it important to record the source and date for nutrition data?

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FAST FOOD NUTRITION DATA LAB · SESSION 2

# Make the Spreadsheet Do the Thinking

**TODAY'S GOAL** I can use formulas, absolute references, IF and conditional formatting to analyze nutrition data.

| formula | absolute reference ($) | IF function | conditional formatting | ratio |
|---|---|---|---|---|

## Activity

**Formula cheat sheet**

% DV Sodium: =G2/'Daily Values'!$B$6
Alert: =IF(G2>=920,"HIGH",IF(G2<=115,"LOW","OK"))
Protein per 100 Cal: =ROUND(I2/D2*100,1)

| Question | My answer |
|---|---|
| Item with the most sodium | |
| How many items are HIGH in sodium? | |
| Top 3 protein per 100 calories | |
| Most surprising real item | |

## My Steps

- [ ] On the Practice Food Court tab, fill in % DV Calories, % DV Sodium and % DV Sat Fat using absolute references.
- [ ] Add the Sodium Alert column with a nested IF.
- [ ] Add Protein per 100 Cal and sort to find the top 3 items.
- [ ] Add a green-yellow-red color scale to % DV Sodium and highlight every HIGH alert.
- [ ] Copy your formulas to the Real Restaurant Research tab and answer: Which real item surprised you most?

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## Exit Ticket

Write the formula to find % Daily Value for calories in row 5, using the Daily Value in 'Daily Values'!B3.

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Name _____ Class _____ Date _____

FAST FOOD NUTRITION DATA LAB · SESSION 3

# Build a Better Meal Challenge



**TODAY'S GOAL** I can use data to design a meal that meets goals, chart my findings and persuade an audience.

| constraint | SUMIF | checkbox | chart | recommendation |
|---|---|---|---|---|

## Activity

| Goal | Meal 1 | Meal 2 |
|---|---|---|
| Items | | |
| Calories (≤ 700) | | |
| Sodium (≤ 1,000 mg) | | |
| Sugars (≤ 25 g) | | |
| Protein (≥ 20 g) | | |
| Price (≤ $10) | | |

My Smart Order Guide headline:

## My Steps

- [ ] Check items to build a meal and watch the totals and 'Goal Met?' column update.
- [ ] Find at least two different meals that meet every goal. Record them.
- [ ] Build one honest chart that supports your best meal choice.
- [ ] Create a one-slide 'Smart Order Guide' (Slides or Docs) with your meal, your chart and one surprising fact.
- [ ] Share your guide in a 1-minute gallery walk.

## Exit Ticket

Which constraint was hardest to meet, and what trade-off did you make?

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