Grade 8 Math · Lesson 11 — The Market Research Memo

Data Analysis & Scatter Plots · ages 12 to 15 · 45 minutes · the workbook, one screen, this page, a pencil and paper

At a Glance

- **The book:** 8th Grade Math Workbook: Real-World Problem Solving, Chapter 11 (The Market Researcher), by Dr. Gene A Constant.
- **Free tool:** Statistics Skeptic (how numbers can mislead, as a game), free, no login, plays in the browser: globalsovereignuniversity.org/statistics-skeptic.
- **Free class:** Lesson 11 of the free Grade 8 Mathematics class: globalsovereignuniversity.org/grade-8-math-class#lesson-11.
- **Ages and time:** Grade 8 · ages 12 to 15 · 45 minutes.
- **Prep (5 min):** read the Teaching Creed and have the workbook open to Chapter 11. Ask five people for their height and shoe size, or use the family, and have graph paper ready.

Why this lesson

Market researchers, doctors and voters all read scatter plots and trend lines. A child who can describe a correlation, make a fair prediction and say why correlation is not cause is harder to fool for life.

What the learner will be able to do

- Construct and interpret scatter plots.
- Identify correlation (positive, negative, none).
- Draw and use lines of best fit.
- Use two-way tables to analyze categorical data.

The 45-Minute Climb

How to read this: the gold box in each step is your lesson, word for word. Run it as written. The notes beneath are optional support. "The group" means your family; "host" means you.

1 · The Hook (5 min)

"Do taller people have bigger shoe sizes? Ask five people for both and plot the pairs. What do you see?"

Say it like this: let your child do it with real objects if you can, then ask how they know their answer is right before you check it.

2 · Work It Together (15 min)

Open the workbook to the worked example Hours of practice vs free throws made: (1, 4), (2, 6), (3, 7), (4, 9) (Section 11.1) together: Look at the x-values: they increase from 1 to 4 Look at the y-values: they increase too, from 4 to 9 As x goes up, y tends to go up: POSITIVE correlation. Then read Data suggests trend line y = 2x + 1. Predict y when x = 10. (Section 11.2) together: Substitute x = 10 into equation: y = 2(10) + 1 Calculate: y = 21.

Read each step aloud and let your child say the next step before you read it. Then play one round of Statistics Skeptic.

3 · The Talk (8 min)

1. What does a positive correlation look like? 2. Why is it risky to predict far outside the data? 3. Why is correlation not cause?

You are not fishing for one right answer. You are listening for understanding:

- Q1: The points rise from left to right: as one quantity grows, the other tends to grow.
- Q2: The trend may not continue there; the line only describes the data you have.
- Q3: A third thing can drive both, such as summer heat raising both ice cream sales and sunburns.

4 · Solo Climb (12 min)

Five problems on your own, with your work shown.
1. Temperature vs ice cream sales: Positive, negative, or no correlation?
2. Shoe size vs IQ: Positive, negative, or no correlation?
3. Data points: (2, 9), (4, 15), (6, 21), (8, 27). Find a line of best fit.
4. Using your line from the previous problem, predict y when x = 12.
5. A savings jar holds S = 200 - 5w dollars after w weeks. Starting amount? Rate of change? Amount after 10 weeks?

Why solo: a test, a job and real life ask you to work alone. Five problems rehearse exactly that. The answers are at the end of this plan.

Keep It Fresh (5 min, the next day)

Two review problems from the book's Extra Practice.
1. Line of best fit: y = 2.5x + 8. Predict y when x = 12.
2. Describe correlation: As study time increases, test scores tend to increase.

Ready to move on? Four of the five Solo Climb problems right, with work shown, means this skill is solid. If not, reread the worked examples together and try two more problems from the chapter before the next lesson. Short review of old skills keeps them from fading.

5 · The Takeaway (5 min)

A scatter plot shows a trend; a line of best fit predicts. Slope is the change per unit, and correlation is not cause. · Homework: Collect ten pairs of numbers you care about, such as hours of sleep and mood, plot them and describe the trend.

The badge moment: finishing all five steps earns the Bronze ring of this lesson's badge, The Honest Analyst. Mark it on the Climber's Passport now; the homework is how Silver and Gold are earned during the week.

Common Mistakes to Watch For

- Reading correlation as cause.
- Predicting far outside the data the line was built from.
- Mixing up the percent of a row with the percent of a column in a two-way table.

The Teaching Creed

You are not the expert; the book and the method are. Your job is to ask "how do you know?" one more time than feels natural, and to celebrate wrong answers out loud. In here, a wrong answer is where the lesson lives.

GENO, GSU's free tutor, can explain any step a second way, any hour, in 83 languages, with no login: globalsovereignuniversity.org/free-tutor. A prompt for the host: Ask GENO: "Help me tell whether a news claim confuses correlation with causation."

Adapt It and Measure It

Differentiation

- Struggling: plot each point with a finger on the grid before marking it.
- Ahead: find a news claim that confuses correlation with cause and explain the flaw.
- Large co-op: each team surveys a different question and plots the results.
- Reluctant: plot data the child cares about, such as game scores and practice time.

Evidence of learning (no exam)

Look for three things. Tried: finished all five Solo Climb problems with work shown. Noticed: can name the mistake in Common Mistakes that they almost made. Changed: the next day, solves one new problem from the same chapter without help. Those three words are the whole rubric, and they match the badge tiers below.

Gamify It — The Campus Climb

Every GSU lesson is one badge on the Climber's Passport, earned at four depths: Bronze, Silver, Gold and Platinum.

LESSON 11 BADGE — The Honest Analyst · Bronze — The Climb: finished the 45-minute lesson, all five steps. · Silver — The Try: did the homework and explained it to the host. · Gold — The Proof: completed the chapter's Action Report in the workbook with every answer checked against the Answer Key. · Platinum — The Teacher: ran this lesson as host for someone else. The harvest of a teacher is teachers.

Answers for the Host

1. Positive
2. No correlation
3. y = 3x + 3 (the points lie exactly on it)
4. 39
5. $200 to start; it drops $5 per week; $150 after 10 weeks

Keep It Fresh: 1. 38 · 2. Positive

Every answer above comes from the workbook's own Answer Key. The book behind this lesson: 8th Grade Math Workbook: Real-World Problem Solving, Chapter 11 (The Market Researcher).

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