Data Detective: Does More Training Pay? — Teacher Guide

Financial Algebra · Unit 14: Data & Regression

2–3 class periods | Pairs | Skills: Skill 1, Skill 2, Skill 3, Skill 4

Overview

A guidance office poster claims: “Every extra year of training adds $10,000 to your pay.” Your team will test the claim with data on 14 careers: summarize the data, draw a scatterplot, fit a line, study the residuals, and design an honest graph for the poster.

Skills covered

- Summarize data with center and spread (data-skill-01)
- Interpret scatterplots and correlation (data-skill-02)
- Use lines of best fit to predict (data-skill-03)
- Analyze residuals and misleading graphs (data-skill-04)

Required materials

- Student packet
- Graphing calculator, Desmos or a spreadsheet

Suggested pacing

Session	Focus
Day 1	Tasks 1–2
Day 2	Tasks 3–4
Day 3 (optional)	Posters and gallery walk

Implementation guidance

- Emphasize correlation vs. causation in the reflection.
- Values are illustrative; invite students to look up current figures for careers they like.

Worked calculations

Task 1

1. Mean ≈ 78.14 thousand; median 71.5 thousand.

Task 3

1. $\hat{y} \approx 11.83x + 37.15$ (thousands of dollars); $r \approx 0.86$.
2. Slope: each extra year of training predicts about $11,830 more pay — more than the poster's $10,000.

Task 4

1. Retail associate: -4.15
2. Barista: -6.15
3. Truck driver: +10.94
4. Medical assistant: -6.98
5. Electrician: -21.47
6. Dental hygienist: +14.36
7. Welder: +2.02
8. Registered nurse: +1.53
9. Accountant: -5.47
10. Teacher: -32.3
11. Software developer: +39.53
12. Physical therapist: -20.96
13. Pharmacist: +4.21
14. Lawyer: +25.04

Sample student responses

> "The relationship is positive and fairly strong ($r \approx 0.86$). The line predicts about $11,830 more per year of training, but software developers earn far more than predicted and teachers less, so training is not the only factor."

Common misconceptions

- Concluding that training causes higher pay from correlation alone.
- Computing residuals as predicted − actual.

Differentiation

Support

- Give the line and r; students focus on interpretation and residuals.

Extend

- Remove the two largest residuals and refit. How does the slope change?

Extension opportunities

- Use the Bureau of Labor Statistics Occupational Outlook Handbook to update the data.

100-point rubric

Category (points)	Exemplary (100%)	Proficient (~80%)	Developing (~60%)	Beginning (~30%)
Financial understanding (20)	Uses vocabulary precisely and explains every financial concept involved, including assumptions.	Mostly accurate explanations with minor vocabulary gaps.	Partial understanding; some concepts misapplied.	Little evidence of understanding.
Mathematical accuracy (25)	Statistics, line, r and residuals correct and interpreted in context.	1–2 minor errors that do not change conclusions.	Several errors or missing work.	Calculations largely missing or incorrect.
Analysis & comparison (20)	Compares every option on the same basis and tests at least one changed assumption.	Compares options with small gaps.	Comparison superficial or uneven.	Little analysis.
Justification (15)	Recommendation is supported by specific numbers and weighs non-financial factors and risks.	Mostly supported.	Mostly opinion.	No justification.
Communication & presentation (10)	Clear, organized, well-labeled tables, charts, and writing.	Minor clarity issues.	Hard to follow in places.	Disorganized.
Completion (10)	Every checklist item complete.	One item missing.	Two or three items missing.	Most items missing.

Total: 100 points. Alternative recommendations earn full credit when supported by accurate evidence.

Student documents (reference)

Training and pay (illustrative)

Career	Years of training	Typical pay ($ thousands)
Retail associate	0	33
Barista	0	31
Truck driver	0.5	54
Medical assistant	1	42
Electrician	4	63
Dental hygienist	3	87
Welder	1	51
Registered nurse	4	86
Accountant	4	79
Teacher	5	64
Software developer	4	124
Physical therapist	7	99
Pharmacist	8	136
Lawyer	7	145