Launch a Food Truck — Teacher Guide

Financial Algebra · Unit 12: Linear Models & Rates

3 class periods | Small groups (3–4) | Skills: Skill 1, Skill 2, Skill 3, Skill 4

Overview

Your team is launching Taco Town, a fictional food truck. You will model its costs and revenue, find how many plates it must sell to break even, choose a price using a demand table, and pick a payment-processing plan.

Skills covered

- Interpret rate of change in context (linear-skill-01)
- Write linear cost and earnings models (linear-skill-02)
- Compare plans and find break-even points (linear-skill-03)
- Model tiered and piecewise pricing (linear-skill-04)

Required materials

- Student packet
- Graph paper or Desmos
- Spreadsheet (optional)

Suggested pacing

Session	Focus
Day 1	Tasks 1–2
Day 2	Tasks 3–4
Day 3	Pitches

Implementation guidance

- Profit uses the demand at each price, not the break-even quantity.
- Processor costs: SwipeEasy 0.30s + 0.029(10s) = 0.59s; FlatPay 49 + 0.10s + 0.025(10s) = 49 + 0.35s.

Worked calculations

Task 1

1. $C(q) = 3.6q + 2400$; $R(q) = 9q$; $P(q) = 5.4q - 2400$.

Task 2

1. \$8: $\frac{2400}{(8 - 3.6)} \approx 545.45 \rightarrow 546$ plates.
2. \$9: $\frac{2400}{(9 - 3.6)} \approx 444.44 \rightarrow 445$ plates.
3. \$10: $\frac{2400}{(10 - 3.6)} \approx 375 \rightarrow 375$ plates.
4. \$11: $\frac{2400}{(11 - 3.6)} \approx 324.32 \rightarrow 325$ plates.

Task 3

1. \$8: $(8 - 3.6) \times 620 - 2400 = \$328.00$.
2. \$9: $(9 - 3.6) \times 540 - 2400 = \$516.00$.
3. \$10: $(10 - 3.6) \times 460 - 2400 = \$544.00$.
4. \$11: $(11 - 3.6) \times 380 - 2400 = \$412.00$.

Task 4

1. $0.59s = 49 + 0.35s \rightarrow s \approx 204$ card sales. Above about 204 sales a month, FlatPay is cheaper.

Sample student responses

> "At \$9 a plate we break even at 445 plates and expect 540 sales, for a profit of about \$516.00 a month. \$10 earns \$544.00, so we chose \$10."

Common misconceptions

- Dividing fixed costs by the price instead of price − cost per plate.
- Assuming sales stay the same when the price changes.

Differentiation

Support

- Give the model frames and a table template.

Extend

- Fit a linear demand model to the table and find the profit-maximizing price.

Extension opportunities

- Interview a local food truck or café owner about their fixed costs.

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)	Models, break-even quantities and profits correct; rounding up for whole plates.	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)

Estimated monthly demand (fictional survey)

Price per plate	Plates sold per month
$8	620
$9	540
$10	460
$11	380

Card processors

Processor	Monthly fee	Fee per sale
SwipeEasy	$0	$0.30 + 2.9% of the sale
FlatPay	$49	$0.10 + 2.5% of the sale