# Design a Retirement Strategy — Teacher Guide

Financial Algebra · Unit 10: Retirement & Inflation

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

## Overview

Retirement feels far away, which is exactly why decisions made at 24 matter so much. You will design a retirement strategy for Andre, measure it in today's dollars, and stress-test it against inflation and return assumptions.

## Skills covered

- Model inflation (retirement-skill-01)
- Estimate retirement savings (retirement-skill-02)
- Compare account contributions (retirement-skill-03)
- Analyze purchasing power (retirement-skill-04)

## Required materials

- Student packet
- Spreadsheet
- Decision Lab "Retirement & Inflation Explorer"

## Suggested pacing

| Session | Focus |
|---|---|
| **Day 1** | Tasks 1–2 |
| **Day 2** | Tasks 3–5 |

## Implementation guidance

- Use the lab to verify scenario values.
- Remind students that returns and inflation are assumptions.

## Worked calculations

### Task 1

1. 55,000 × 1.025^43 ≈ $159,033.60.
2. $\frac{1{,}000{,}000}{1.025}$ ^43 ≈ $345,838.86.

### Task 2

1. 3%: employee $137.50 + match $68.75; balance $499,643.57; today's $ $172,796.16.
2. 6%: employee $275.00 + match $137.50; balance $999,287.14; today's $ $345,592.32.
3. 10%: employee $458.33 + match $137.50; balance $1,443,414.76; today's $ $499,188.91.

### Task 3

1. Need = $\frac{(0.75 \times 55{,}000 - 21{,}000)}{0.04}$ = $506,250.00.
2. Gaps: 3% $333,453.84; 6% $160,657.68; 10% $7,061.09 (negative = surplus).

## Sample student responses

> "Andre should contribute at least 6% to capture the full match and increase 1% per year to 10%. In today's dollars the 6% plan falls short of the goal, but the 10% plan comes close. I chose Roth because Andre is in a low tax bracket now."

## Common misconceptions

- Judging balances in future dollars.
- Skipping the match.
- Treating the 4% guideline as a guarantee.

## Differentiation

### Support

- Provide a spreadsheet template.

### Extend

- Add 2% real salary growth.

## Extension opportunities

- Look up current 401(k) and IRA contribution limits on irs.gov.

## 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)** | Inflation, projections, and gap calculations correct. | 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)

## Plan details (fictional employer)

| Feature | Detail |
|---|---|
| **Employer match** | 50% of contributions up to 6% of salary |
| **Vesting** | 25% per year; fully vested after 4 years |
| **Account types** | Traditional or Roth 401(k) |
| **Fund options** | Target-date fund (0.12%), stock index (0.04%), bond index (0.05%), stable value (0.30%) |

## Assumptions (adjust in Task 4)

| Assumption | Base case |
|---|---|
| **Average return (hypothetical)** | 6% per year |
| **Inflation** | 2.5% per year |
| **Withdrawal guideline** | 4% |
| **Years to retirement** | 43 |