

Student investigation: does the recipe stay the same?

Name: _____ | Compare cocoa (tablespoons) with milk (cups).

Table A: Milk 2, 4, 6 | Cocoa 3, 6, 9

Table B: Milk 2, 4, 6 | Cocoa 3, 5, 7

Table C: Milk 1, 3, 5 | Cocoa 2, 6, 10

Table D: Milk 1, 2, 4 | Cocoa 2, 4, 7

For each table, calculate cocoa divided by milk for all three pairs. Decide whether each table keeps one constant recipe. Record your calculations, not just yes or no.

A: _____

B: _____

C: _____

D: _____

Which TWO tables each show a constant recipe? Do those two tables have the SAME recipe? Explain the difference.

Predict the cocoa needed for 8 cups of milk using Table A: _____

Explain why “both columns increase” is not enough evidence: _____

New context: A truck travels 90 miles on 4 gallons and 135 miles on 6 gallons. Under a constant-rate model, how far would it travel on 10 gallons?

Exit ticket: A job pays \$12 for 1 hour, \$36 for 3 hours and \$65 for 5 hours. Is the pay proportional to the hours? Support your answer with a calculation.

Teacher key: what to listen for

Use this sheet during Explore in the ratios example. It supplies the four tables mentioned in the article. Students need division or fraction comparison; allow a calculator when arithmetic would hide the reasoning.

A: $3/2 = 6/4 = 9/6 = 1.5$ tablespoons per cup. Constant.

B: $3/2 = 1.5$; $5/4 = 1.25$; $7/6$ is about 1.167. Not constant.

C: $2/1 = 6/3 = 10/5 = 2$. Constant.

D: $2/1 = 4/2 = 2$, but $7/4 = 1.75$. Not constant.

A and C are each proportional, but they are different recipes: their constants are 1.5 and 2. Do not describe them as the same flavor as each other.

For A, 8 cups need 12 tablespoons: $8 \times 1.5 = 12$.

Increasing together is insufficient: B and D increase, but their ratios change.

Truck: $90/4 = 135/6 = 22.5$ miles per gallon; 10 gallons gives 225 miles within the stated model. This is a mathematical model, not a prediction of actual fuel consumption.

Exit: $12/1 = 36/3 = 12$, but $65/5 = 13$. The pay is not proportional across all three pairs. A constant \$12/hour model would give \$60 for 5 hours.

While circulating, ask “What stays the same?” before supplying the word proportional. During Explain, compare a correct ratio argument with the tempting constant-addition argument for Table B.

Sort exit responses: constant ratio identified and checked -> transfer task; correct verdict without calculations -> justify with two pairs; proportional because both increase -> compare A and B using double number lines.

Access: supply a two-column ratio table with one row started. Extension: construct a table that looks proportional for two pairs but fails at a third, then explain why.