






Focus
Standards
and Claim

Claim 3
4.NF.4c

Stimulus

Clay Pottery

Lizzie and Zela are interested in making pottery. The following chart shows how much clay is needed to make different projects.

Project	Pounds of Clay Needed
 Small Plate	$2\frac{1}{2}$
 Small Bowl	$1\frac{1}{2}$
 Large Bowl	$3\frac{1}{4}$
 Dinner Plate	$4\frac{1}{2}$
 Mug	$\frac{3}{4}$

Item Prompt

Lizzie has 12 pounds of clay and wants to use all of it. She does not need to make all of the projects, and may make more than one of any project.

Describe a plan for Lizzie to use 12 pounds of clay making projects from the chart.

Show how you know she will use **exactly** 12 pounds of clay with this plan.

Scoring Guide

SCORE	2 POINTS	1 POINT	0 POINTS
	Student describes a plan by which Lizzie uses all 12 pounds of clay making projects from the chart. A valid explanation is one that connects to the context. Numeric computations with no explanation are not considered valid.	Student provides either a correct explanation with incorrect calculations or has incorrect calculations that total 12, but has a valid explanation.	All other responses.

Sample Responses

Student Sample A



$$2 \frac{1}{2} + 2 \frac{1}{2} = 5 \text{ pounds}$$

$$1 \frac{1}{2} + 1 \frac{1}{2} = 3 \text{ pounds}$$

$$5 + 3 = 8 \text{ lb}$$

$$8 \text{ lb} + 3 \frac{1}{4} = 11 \frac{1}{4} + \frac{3}{4} = 12 \text{ lb}$$

Lizzie would need to make two small plates, two small bowls, one large bowl, and one mug to use exactly 12 pounds of clay.

SCORE RATIONALE

The student's response identifies a series of items that, when added together, would use exactly 12 pounds of clay. The equations model the student's thinking process and support the student's plan, expressed in words. The explanation connects the mathematics to the context. The response earns full credit of 2 points.

Student Sample B



She can 8 small bowls to exactly use 12 pound of clay because each bowl you use $1\frac{1}{2}$ pound so if you do two of them that will equal 3 and since I know that $3 \times 4 = 12$ so thats 12 pound, so I do $4 \times 2 = 8$ so I did the small bowl.

SCORE RATIONALE

This response, though a little hard to follow, connects all of the essential points of a valid explanation that relates to the context. The plan is to make 8 small bowls. The explanation begins with a statement about the amount of clay used for each bowl ($1\frac{1}{2}$ pounds) and the amount of clay used for 2 bowls (3 pounds). The student then provided calculations showing that the second value, 3, must be multiplied by 4 to get 12, so to use 12 pounds, 2 bowls would also be multiplied by 4. In other words, 8 bowls would use ($1\frac{1}{2}$ pounds per bowl) (4×2 bowls), which equals exactly 12 pounds of clay. The response earns full credit of 2 points.

Student Sample C



$$2\frac{1}{2} + 2\frac{1}{2} + 2\frac{1}{2} = 7\frac{1}{2}$$

$$7\frac{1}{2} + 1\frac{1}{2} + 1\frac{1}{2} = 9\frac{1}{2}$$

$$9\frac{1}{2} + 2\frac{1}{2} = 12 \text{ pounds}$$

I know that she will get exactly 12 pounds if she makes 4 small plates and 2 small bowls.

SCORE RATIONALE

The student's calculations represent an attempted plan to use exactly 12 pounds of clay. The student's equations outline the thinking process used to correctly determine first that 3 small plates would use $7\frac{1}{2}$ pounds. The student then attempted to add $7\frac{1}{2}$ to the amount of clay needed for 2 small bowls, and indicated an incorrect sum of $9\frac{1}{2}$ pounds. Using this incorrect sum, the student then added the amount of clay needed for a 4th small bowl and found a total sum of 12 pounds. Although the student's reasoning is clearly expressed and the explanation clearly connects the mathematics to the context, the stated plan does not fit the requirements due to the incorrect calculation. The response earns 1 point.

Student Sample D



1 Dinner plate: $4 \frac{1}{2}$

Small plate: $2 \frac{1}{2}$

Small bowl: $1 \frac{1}{2}$

Small bowl: $1 \frac{1}{2}$

Mug: $\frac{3}{4}$

Mug: $\frac{3}{4}$

$$4 \frac{1}{2} + 2 \frac{1}{2} = 7 \text{ pounds}$$

$$2 \frac{1}{2} + 1 \frac{1}{2} = 3 \text{ pounds}$$

$$\frac{3}{4} + \frac{3}{4} = 2 \frac{1}{4} \text{ pounds}$$

$$7 + 3 = 10 \text{ pounds}$$

$$10 + 2 \frac{1}{4} = 12 \frac{1}{4} \text{ pounds}$$

SCORE RATIONALE

This response includes a set of values and calculations that are both contextually sensible and accurate, except for one: $\frac{3}{4} + \frac{3}{4} = 2 \frac{1}{4}$. The provided total sum of $12 \frac{1}{4}$ pounds suggests that the plan does not fit the given requirements of the problem. Moreover, even if all calculations had been correct, the total sum would not be 12 pounds. The student provided the amounts of clay needed for each project taken directly from the provided table, which does indicate a connection between the values in the calculations and the context. However, there is no stated plan to make an explicit connection between the values, the projects to be made, and how many of each are to be made. The response earns partial credit of 1 point.

Student Sample E



Small bowl + large bowl + large bowl + dinner plate + small bowl

$$1 \frac{1}{2} + 3 \frac{1}{4} + 3 \frac{1}{4} + 4 \frac{1}{2} + 1 \frac{1}{2}$$

$$1 \frac{1}{2} + 3 \frac{1}{4} + 3 \frac{1}{4} = 7 \frac{3}{10} + 4 \frac{1}{2} + 1 \frac{1}{2} = 12 \frac{5}{14}$$

If she needs dishes she can make a small bowl, 2x large bowl, dinner plate, small bowl because she said she doesn't want to waste anything.

SCORE RATIONALE

The student's response explicitly presents a plan that exceeds the amount of 12 pounds required in the problem, as well as incorrect calculations. Though the conclusion connects well to the context of the problem, the excess clay needed for this plan suggests a reasoning error in relation to the given constraints. The response earns 1 point.

Student Sample F

$$4 \frac{1}{2} + 2 \frac{1}{2} = 7 + 3 \frac{1}{4} = 10 \frac{1}{4} + 3/4 = 11$$

She can get the small bowl, dinner plate, large bowl, and a mug.

SCORE RATIONALE

The student provided contextually sensible and correct calculations that yield a sum of 11 pounds of clay, rather than 12 pounds of clay, so the plan does not meet the requirements given in the problem. The student clearly stated what projects are represented in the calculations, connecting the mathematics to the context. The shortcoming in the stated plan appears to be a reasoning error, and not due to a calculation error. The response earns partial credit of 1 point.

Student Sample G

Lizzie needs to make 1 dinner plate, 1 small bowl, 1 large bowl, 1 small plate, and 2 mugs to make 12 pounds.

SCORE RATIONALE

The student's plan exceeds 12 pounds of clay, and there are no calculations provided to support the plan. The response earns 0 points.

Student Sample H

Lizzie will use 12 pounds with 2 dinner plates because $4 \frac{1}{2}$ can be 12 pounds to use all of her clay.

SCORE RATIONALE

The student's plan to make two dinner plates will not use 12 pounds of clay, and there are no calculations to support the student's reasoning. The response earns 0 points.