

Disappearing Cookies

Kathy had fun baking lots of cookies. She left them on a plate to cool while she went shopping with her dad. Her brother saw the cookies and took $\frac{1}{2}$ of them to his Scout meeting. Her sister took $\frac{2}{3}$ of the remaining cookies to share with her friends. Finally, her mom took $\frac{1}{2}$ of the remaining cookies to her Book Club meeting. When Kathy and her dad got home, there were only 5 cookies left on the plate.

How many cookies had Kathy baked?

Exemplars

Disappearing Cookies

Suggested Grade Span

3-5

Task

Kathy had fun baking lots of cookies. She left them on a plate to cool while she went shopping with her dad. Her brother saw the cookies and took $\frac{1}{2}$ of them to his Scout meeting. Her sister took $\frac{2}{3}$ of the remaining cookies to share with her friends. Finally, her mom took $\frac{1}{2}$ of the remaining cookies to her Book Club meeting. When Kathy and her dad got home, there were only 5 cookies left on the plate.

How many cookies had Kathy baked?

Alternate Versions of Task

More Accessible Version:

Kathy had fun baking lots of cookies. She made 24 of them, leaving them on a plate to cool while she went shopping with her dad. Her brother saw the cookies and took $\frac{1}{2}$ of them to his Scout meeting. Her sister took $\frac{1}{4}$ of the remaining cookies to share with her friends. Finally, her mom took $\frac{1}{3}$ of the remaining cookies to her Book Club meeting. When Kathy and her dad got home, how many cookies were left on the plate?

More Challenging Version:

Go to the library and sign out a cookbook that has a recipe for chocolate chip cookies. Use the recipe to determine the exact amount of each ingredient Kathy used to make the cookies.

Context

This task was piloted in a fourth-grade classroom.

What This Task Accomplishes

This task allows the teacher to assess students' understanding of fractions and the problem-solving strategy of working backwards to solve a problem.

Time Required for Task

45 minutes

Exemplars

Interdisciplinary Links

This task could link to a unit on cooking.

Teaching Tips

To make the task more complicated, you can change the fractions presented in the task.

Suggested Materials

Manipulatives (students can use to represent cookies)

Possible Solutions

There were 60 cookies to begin with.

More Accessible Version Solution:

$$24 \times \frac{1}{2} = 12 \text{ left}$$

$$12 \times \frac{3}{4} = 9 \text{ left}$$

$$9 \times \frac{2}{3} = 6 \text{ left on the plate}$$

More Challenging Version Solution:

The solution will depend of the recipe the student finds. To determine accuracy, divide the number of cookies the recipe makes by the number of cookies Kathy makes. Multiply each ingredient in the recipe by this amount.

Task Specific Assessment Notes

Novice

The student is unable to proceed toward a solution. Little or no math language is used. Representations may be attempted.

Apprentice

Little math language is used. A partial solution is achieved, but all parts of the task are not attempted or are attempted unsuccessfully. Representations are used to organize the solution.

Practitioner

The student has an approach that works and achieves a correct solution. Representations are used to organize the solution. Work is shown and labeled. Math language is used to communicate.

Disappearing Cookies

Exemplars

Expert

The student has an approach that works and achieves a correct solution. Sophisticated math language is used to communicate. Representations are used to organize the solution. The student demonstrates solid understanding of fractions.

Exemplars

Novice

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person	COOKY
Dad	10
Mom	10
sister	10
brother	5

Little math reasoning is evident.

No approach is evident – merely answers.

Few or no parts are correct.

35 COOKIES

Exemplars

Apprentice

Disappearing Cookies

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Dad + Kathy Mom her sister Brother

Some reasoning and parts are correct.

There is an attempt to organize and label work.

Some math language is used.

An incorrect answer is achieved.

70 baked

Exemplars

Practitioner

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I will make a chart and work backwards to see how many cookies Kathy cooked

The approach is explained.

Kathy's cookies

Kathy/Dad	oooo	5
Mom	oooo	5
Sister	oooooooooooooooooooo	20
Brother	oooooooooooooooooooo oooo ooooo	30
	oooooooooooooooooooo oooo ooooo	60
thirds	oooo ooooo / ooooo ooooo o	
half	oooo ooooo	

Work is labeled and organized.

All parts are correct.

Exemplars

Expert

Disappearing Cookies

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You have to work backwards to solve this task

The chart is labeled, accurate and appropriate.

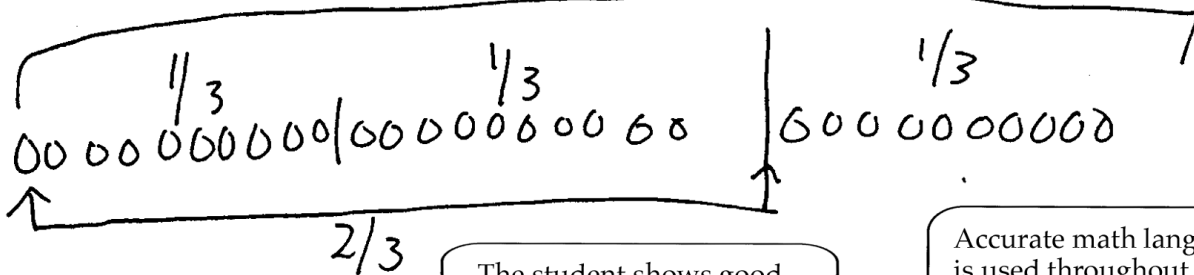
The approach used is identified.

Disappearing Cookies

cookies	who has them
5	Dad + Cathy
5	mom
20	Sister
30	brother
60	baked by Cathy

$5 + 5 = 10$
 10 left
 $10 + 10 + 10 = 30$
 half of 60 = 30

my reasons
 other $\frac{1}{2}$
 $\frac{1}{2}$ of 20 = 10
 $\frac{2}{3}$ of 30 = 20
 $\frac{1}{2}$ of 60 = 30
 60 cookies to start



All work is shown.

The student shows good understanding of fractions.

Accurate math language is used throughout to communicate.