SECURE MATERIAL - Reader Name: _____

Tennessee Comprehensive Assessment Program

TCAP/CRA

2014

5

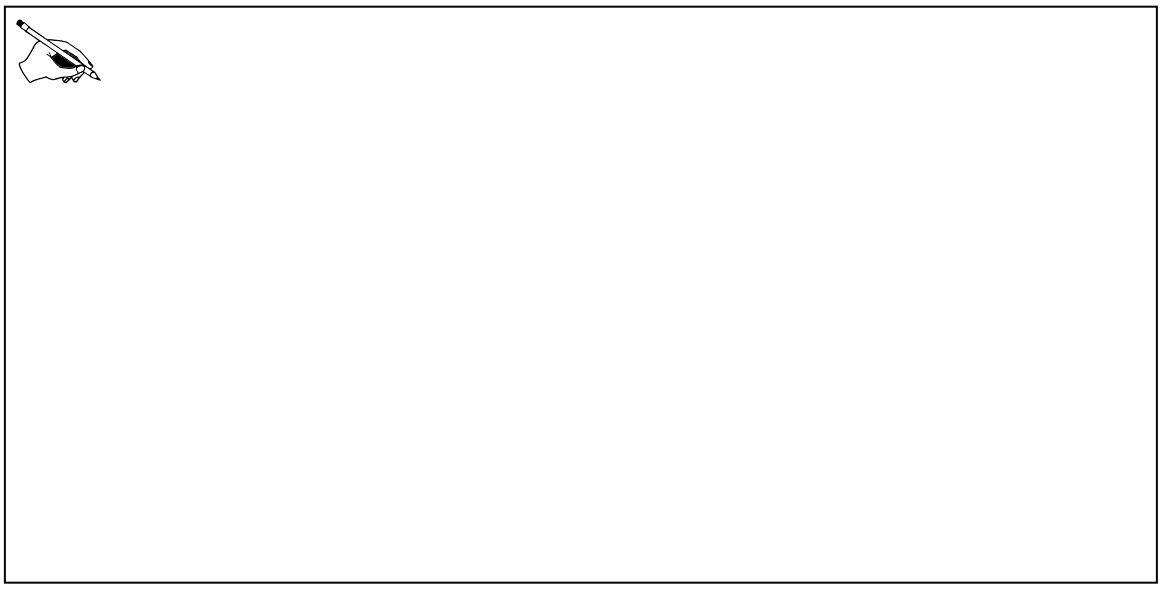
Phase III

Box of Crayons Task

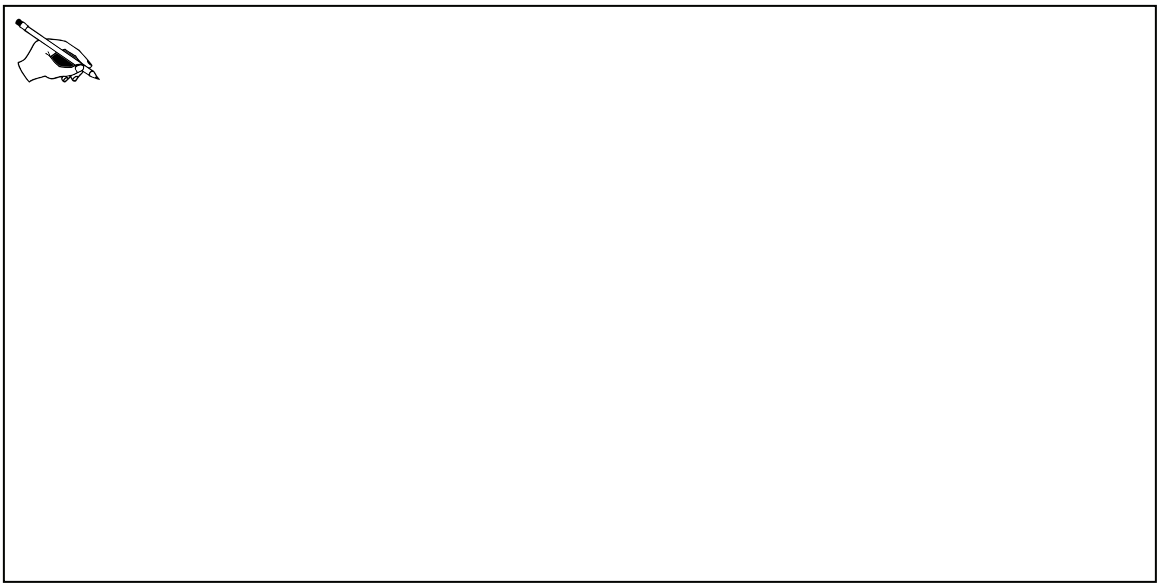
Anchor Set

Box of Crayons Task

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.



b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?



REVIEW YOUR WORK IF YOU HAVE TIME.

Scoring Guide

The CCSS for Mathematical Content (2 points)

5.NF.B.4(x) Multiplies $\frac{1}{4} \times \frac{2}{3}$ to get $\frac{2}{12}$. _____

(1 Point)

5.NF.B.4(z) Multiplies accurately $\frac{2}{12}$ or the fraction found in part a by 24. _____

(1 Point)

The CCSS for Mathematical Practice (2 points)

MP4 Writes a precise expression to represent $\frac{1}{4}$ of $\frac{2}{3}$. _____

(1 Point)
(MP4: Model with mathematics.)

MP7 Represents with a visual model the denominator of 12 when multiplying fourths times thirds or the denominator of 6 when multiplying halves times thirds (through the process of cross simplification). _____
(**1 Point)**
(MP7: Look for and make use of structure.)

TOTAL POINTS: 4

The CCSS for Mathematical Content Addressed In This Task

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	
5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

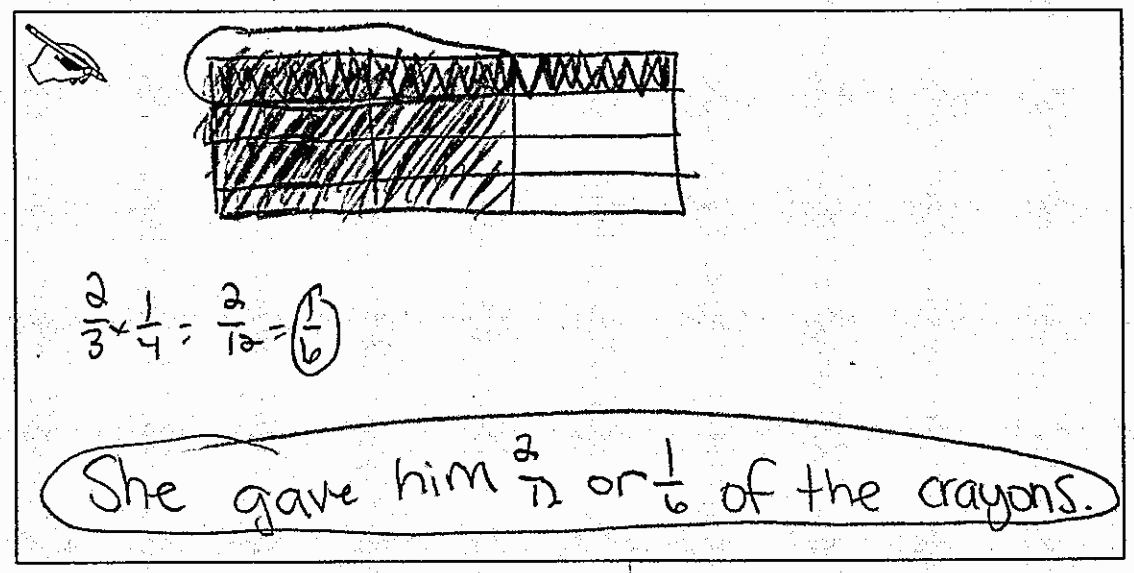
The CCSS for Mathematical Practice*

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

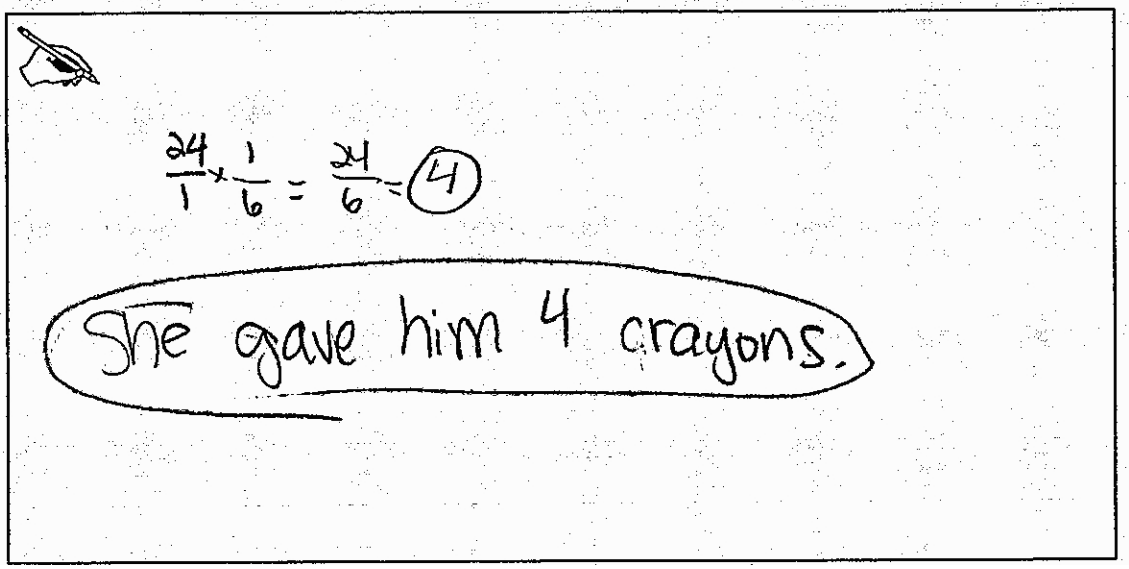
* Gray type indicates Mathematical Practices not addressed in this assessment.

Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.



b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?



Anchor 1 Litho 00365200183

Total Content Points: 2 (5.NF.B.4(x), 5.NF.B.4(z))

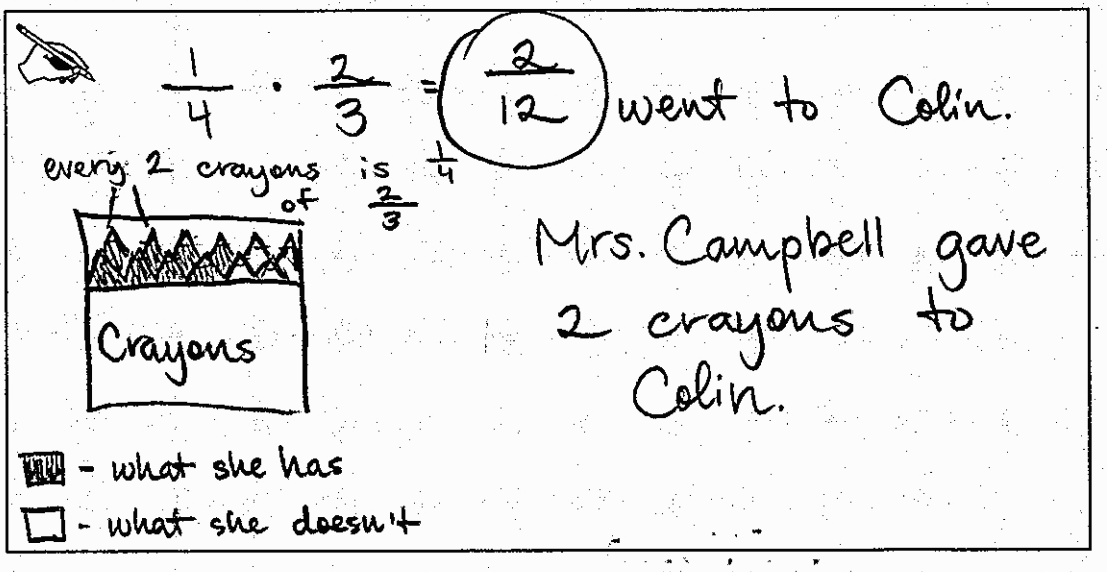
Total Practice Points: 2 (MP4, MP7)

In Part A, the student correctly solves the word problem and finds an answer of "$\frac{2}{12}$ or $\frac{1}{6}$ of the crayons." (5.NF.B.4(x)). In Part B, the student correctly determines that Mrs. Campbell gives Colin 4 crayons (5.NF.B.4(z)). In Part A, the student writes the expression $\frac{2}{3} \times \frac{1}{4}$ to represent $\frac{1}{4}$ of $\frac{2}{3}$ (MP4). The student's diagram in Part B reflects the answer $\frac{2}{12}$ by partitioning the whole into 12 boxes, which accurately represents the denominator of 12 (MP7).

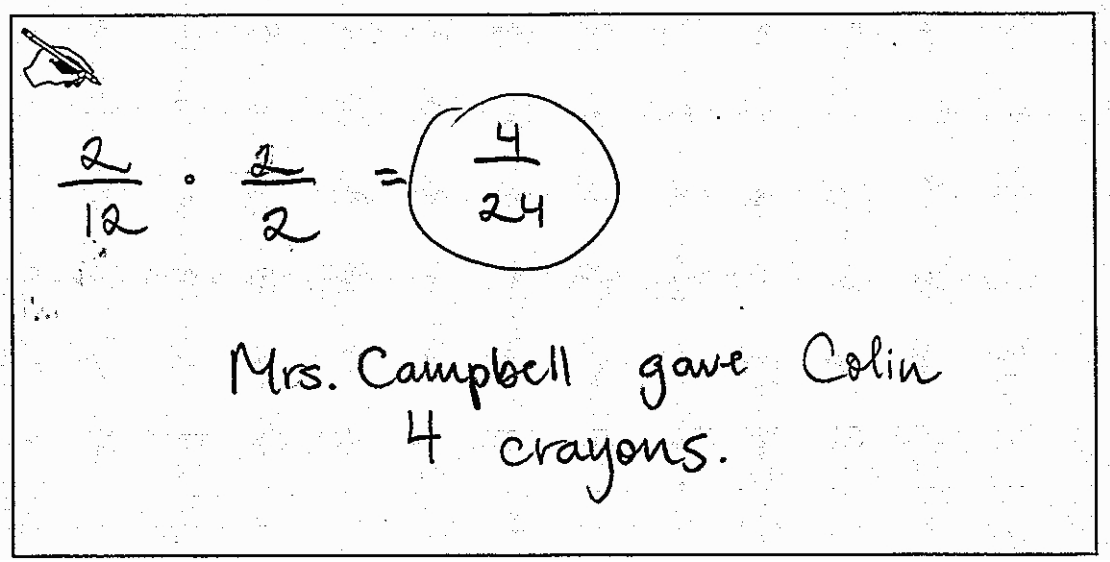
Total Awarded Points: 4 out of 4

Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.



b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?



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Total Content Points: 2 (5.NF.B.4(x), 5.NF.B.4(z))

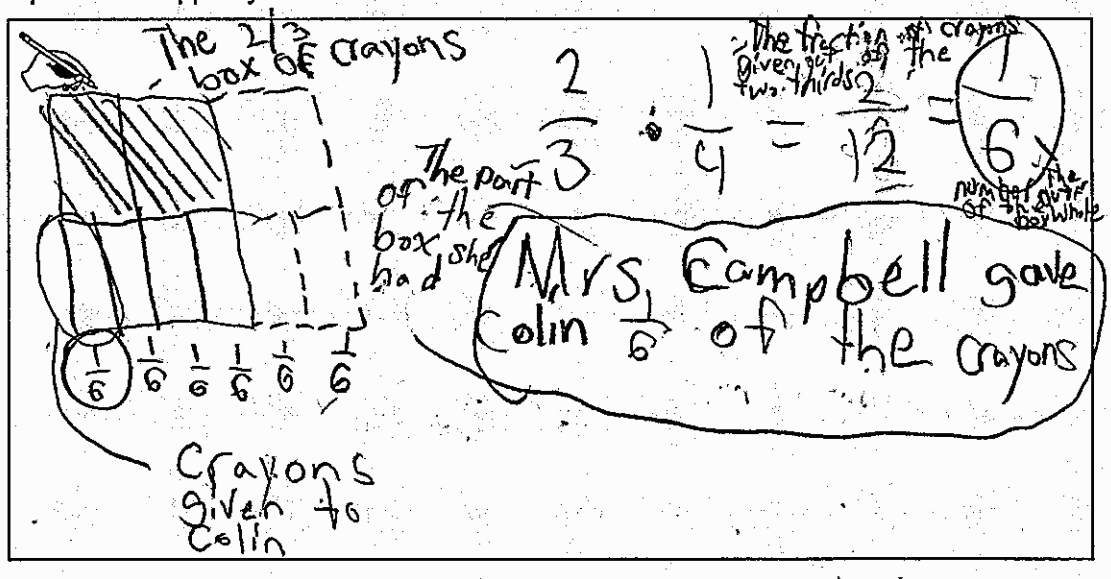
Total Practice Points: 2 (MP4, MP7)

In Part A, the student correctly solves the word problem and finds that "$\frac{2}{12}$ went to Colin." (5.NF.B.4(x)). In Part B, the student correctly determines that Mrs. Campbell gave Colin 4 crayons (5.NF.B.4(z)). In Part A, the student writes the expression $\frac{1}{4} \times \frac{2}{3}$ to represent $\frac{1}{4}$ of $\frac{2}{3}$ (MP4). The student's diagram in Part A reflects the situation by showing 12 crayons in the box, accurately representing the denominator of 12 (MP7).

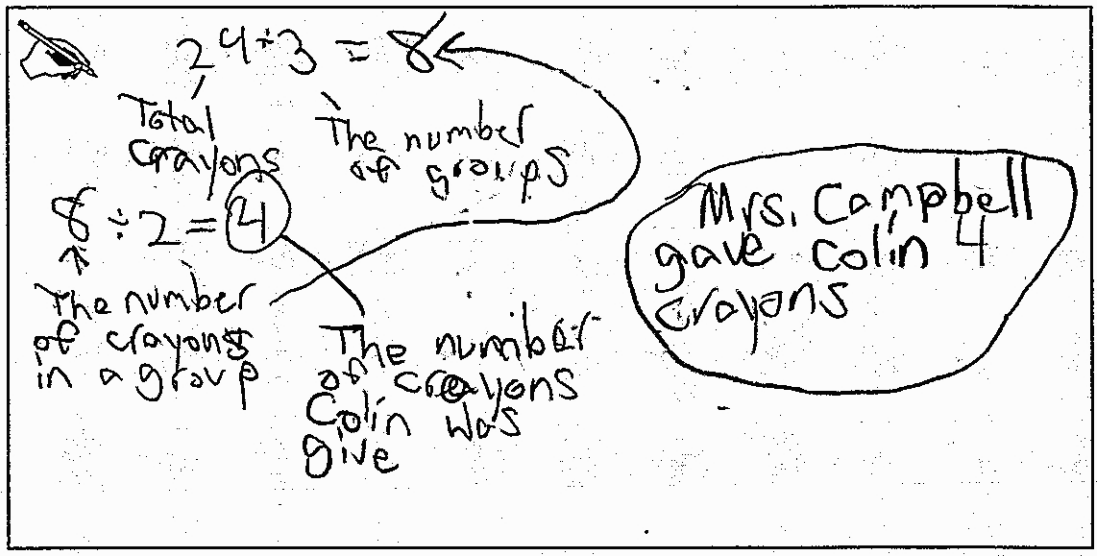
Total Awarded Points: 4 out of 4

Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.



b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?



Anchor 3 Litho 00015200178

Total Content Points: 2 (5.NF.B.4(x), 5.NF.B.4(z))

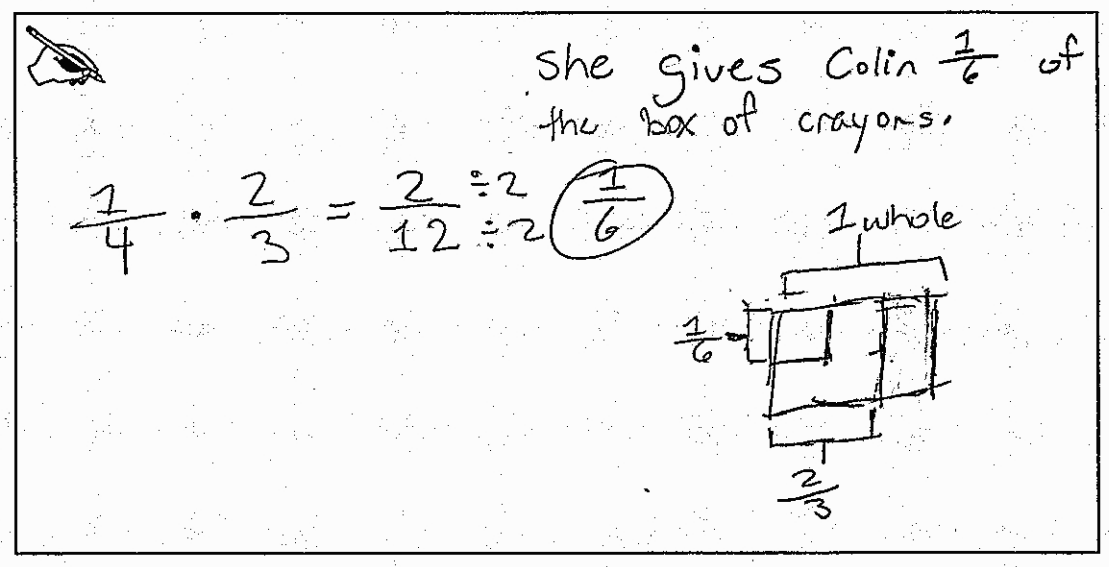
Total Practice Points: 2 (MP4, MP7)

In Part A, the student correctly solves the word problem and gets the answer $\frac{1}{6}$ (5.NF.B.4(x)). In Part B, the student correctly determines that "Mrs. Campbell gave Colin 4 crayons" (5.NF.B.4(z)). The student writes a precise expression $\left(\frac{2}{3} \times \frac{1}{4}\right)$ to represent $\frac{1}{4}$ of $\frac{2}{3}$ $\left(\frac{2}{3} \times \frac{1}{4}\right)$ (MP4). The student's visual model accurately represents the denominator of 6, found when finding $\frac{1}{4}$ of $\frac{2}{3}$ (MP7).

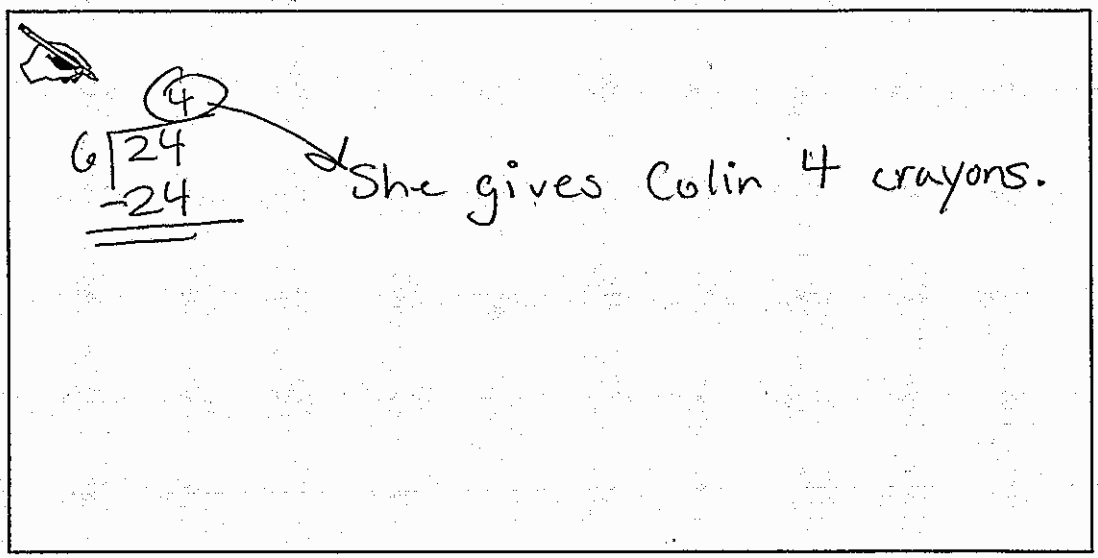
Total Awarded Points: 4 out of 4

Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.



b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?



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Total Content Points: 2 (5.NF.B.4(x), 5.NF.B.4(z))

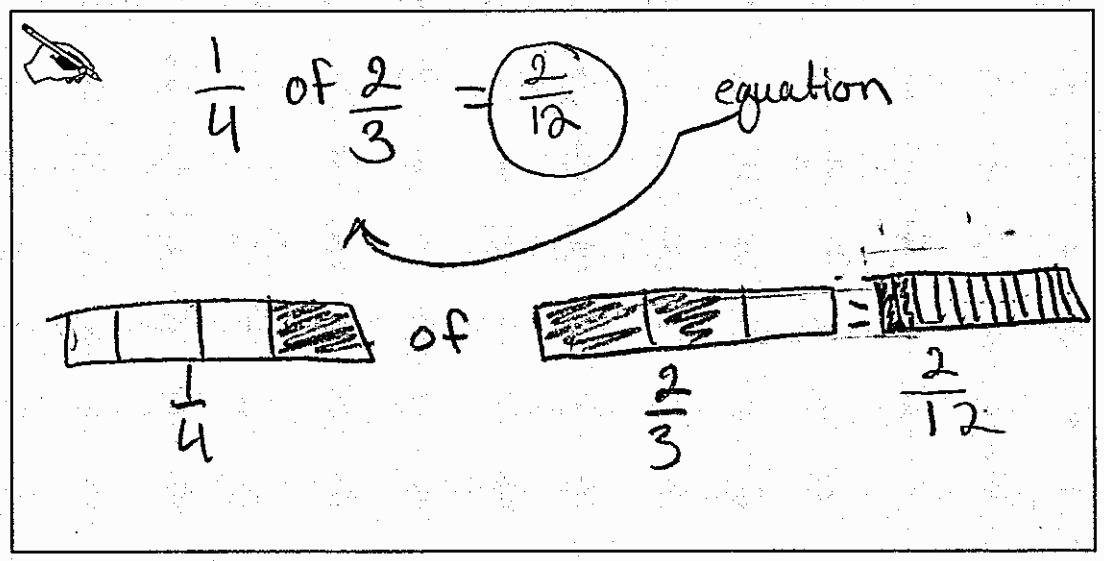
Total Practice Points: 1 (MP4)

In Part A, the student correctly solves the word problem and finds the answer $\frac{1}{6}$ (5.NF.B.4(x)). In Part B, the student correctly determines that Mrs. Campbell gives Colin 4 crayons (5.NF.B.4(z)). The student writes the precise expression $\frac{1}{4} \times \frac{2}{3}$ to represent $\frac{1}{4}$ of $\frac{2}{3}$ (MP4). As the student's diagram is not clearly divided into six equal parts, it does not show sufficient evidence of a denominator of 6 (no credit for MP7).

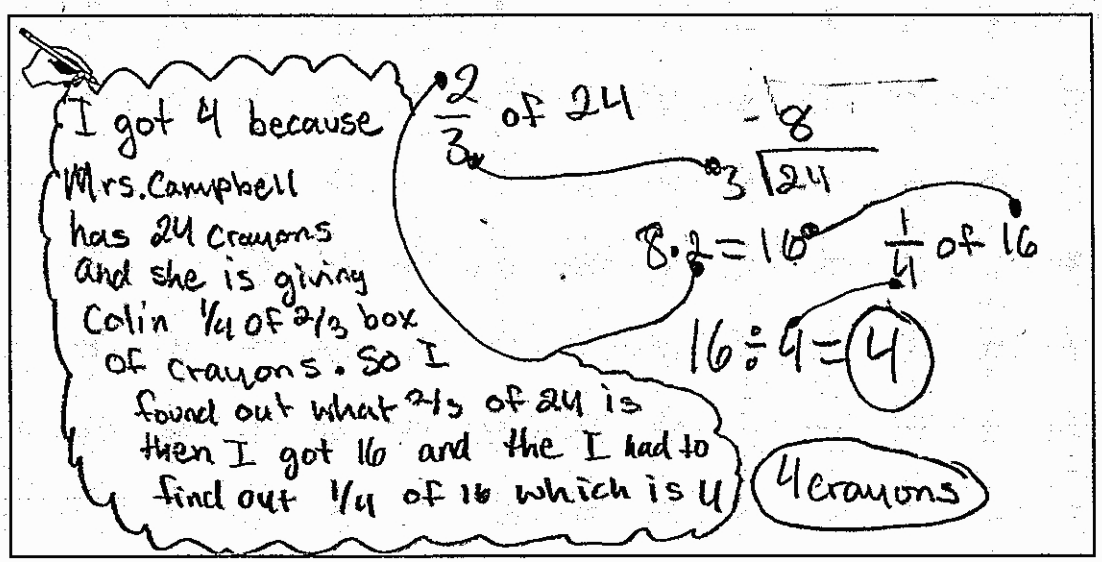
Total Awarded Points: 3 out of 4

Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.



b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?



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Total Content Points: 2 (5.NF.B.4(x), 5.NF.B.4(z))

Total Practice Points: 1 (MP7)

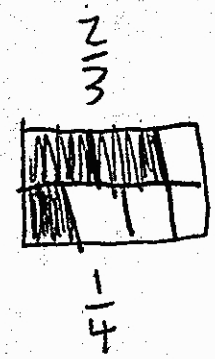
In Part A, the student finds the answer $\frac{2}{12}$ for the fraction of the crayons Mrs. Campbell gave Colin (5.NF.B.4(x)). In Part B, the student correctly determines that Mrs. Campbell gives Colin 4 crayons (5.NF.B.4(z)). The student does not write a precise mathematical expression to represent $\frac{1}{4}$ of $\frac{2}{3}$ (no credit for MP4). The student's final diagram indicates an understanding of structure by dividing the whole into 12 parts, which accurately represents the denominator of 12 (MP7).

Total Awarded Points: 3 out of 4

Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.

$\frac{2}{3} \cdot \frac{1}{4} = \frac{2}{12}$



b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?

$24 \div 4 = 6$

She gave Colin 6 crayons

Anchor 6 Litho 00175200178

Total Content Points: 1 (5.NF.B.4(x))

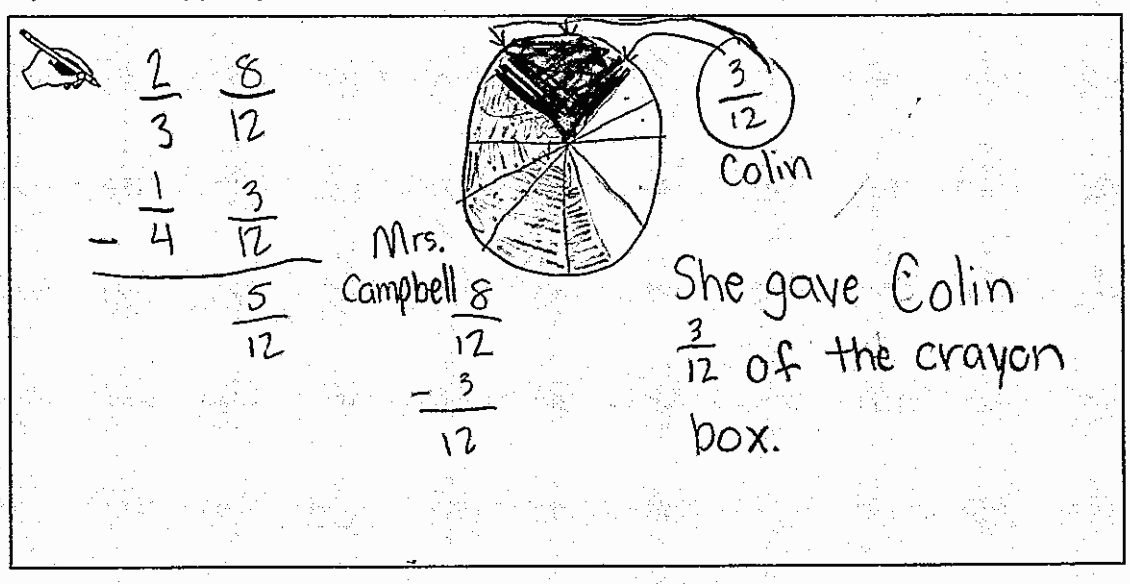
Total Practice Points: 1 (MP4)

In Part A, the student correctly solves the word problem, finding the correct answer of $\frac{2}{12}$ (5.NF.B.4(x)). In Part B, the student incorrectly determines that Mrs. Campbell gives Colin 6 crayons, instead of $\frac{1}{6}$ of the total number of crayons (no credit for 5.NF.B.4(z)). In Part A, the student writes a correct expression to represent $\frac{1}{4}$ of $\frac{2}{3}$ $\left(\frac{2}{3} \times \frac{1}{4}\right)$ (MP4). The diagram in Part A divides half of the whole into fourths and the other half into thirds. The diagram does not demonstrate an understanding of the structure of fractions, as the whole is not divided into either six or twelve equal parts (no credit for MP7).

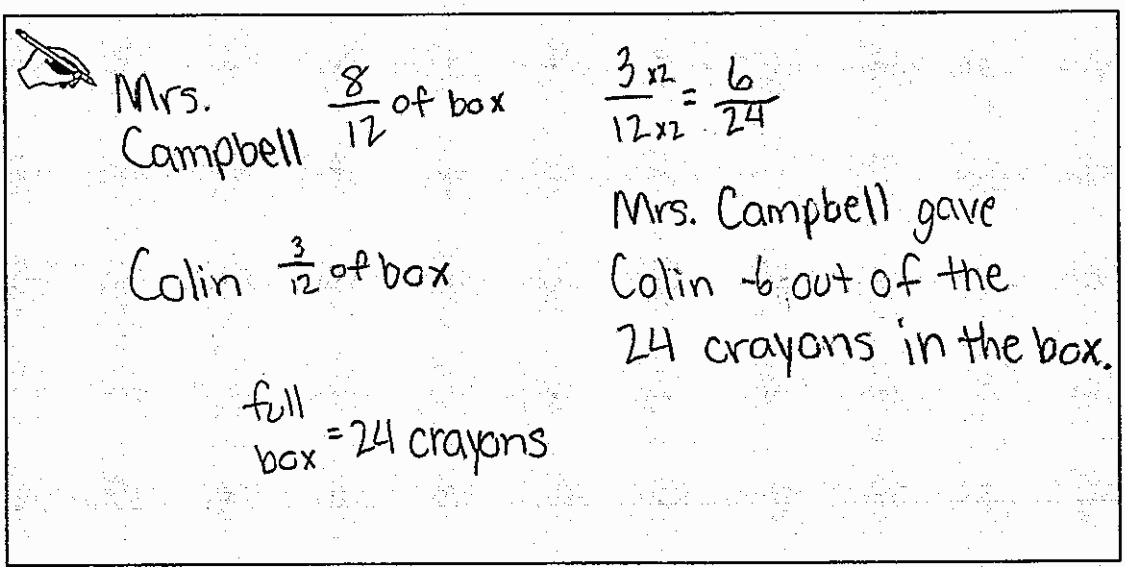
Total Awarded Points: 2 out of 4

Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.



b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?



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Total Content Points: 1 (5.NF.B.4(z))

Total Practice Points: 1 (MP7)

In Part A, the student gets an incorrect answer of $\frac{3}{12}$ (no credit for 5.NF.B.4(x)). In Part B, the student uses the incorrect fraction $\left(\frac{3}{12}\right)$ from Part A to determine the number of crayons that Mrs. Campbell gives to Colin (6), which is correct based on the incorrect fraction (5.NF.B.4(z)). The student writes an incorrect expression to represent $\frac{1}{4}$ of $\frac{2}{3}$ $\left(\frac{2}{3} - \frac{1}{4}\right)$ in Part A (no credit for MP4). However, the student's diagram in Part A accurately represents the denominator of 12, demonstrating some understanding of the structure of fractions (MP7).

Total Awarded Points: 2 out of 4

Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.

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

$\frac{2}{12} = 6$

Mrs Campbell gave Collin $\frac{2}{12}$ of the Box of Crayons.

b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?

Mrs Campbell gave Colin six crayons, because Denom times Denom. Nume. times Num.

$\frac{1}{4} \times \frac{2}{3} = \frac{2}{12}$ $2 \div 12 = 6$

Anchor 8 Litho 01805200183

Total Content Points: 1 (5.NF.B.4(x))

Total Practice Points: 0

In Part A, the student finds the correct answer to the word problem $\left(\frac{2}{12}\right)$ (5.NF.B.4(x)). In Part B, the student incorrectly determines that Mrs. Campbell gives Colin 6 crayons (no credit for 5.NF.B.4(z)). The student does not write an expression to represent $\frac{1}{4}$ of $\frac{2}{3}$ (no credit for MP4). The response does not contain a visual model representing the problem, and thus does not demonstrate an understanding of the structure of fractions (no credit for MP7).

Total Awarded Points: 1 out of 4

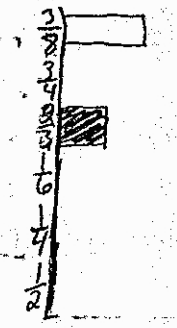
Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.

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

$\frac{1}{4} \times \frac{3}{2} = \boxed{\frac{3}{8}}$

$\frac{1}{4} \div \frac{2}{3} = \boxed{\frac{3}{8}}$



Key:
= Mrs. Campbell has
= Collin has

b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?

$\frac{3}{8_1} \times \frac{24^3}{1} = \frac{9}{1} = \boxed{9 \text{ crayons}}$

∴ She gave collin 9 crayons.

Anchor 9 Litho 02595200183

Total Content Points: 1 (5.NF.B.4(z))

Total Practice Points: 0

In Part A, the student incorrectly solves the word problem, finding an incorrect answer $\left(\frac{3}{8}\right)$

(no credit for 5.NF.B.4(x)). In Part B, the student uses the incorrect fraction from Part A and multiplies it by 24 to determine that Mrs. Campbell gives Colin 9 crayons, which is correct based on that incorrect fraction (5.NF.B.4(z)). The student writes an incorrect expression to represent $\frac{1}{4}$ of $\frac{2}{3}$ $\left(\frac{1}{4} \div \frac{2}{3}\right)$ (no credit for MP4) For several reasons, including not showing a denominator of 12 or 6, the diagram in Part A does not accurately represent the problem situation (no credit for MP7).

Total Awarded Points: 1 out of 4

Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.

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

$\frac{2}{3} \cdot \frac{4}{1} = \frac{8}{3} = 2\frac{2}{3}$

Mrs. Campbell gave Colin $2\frac{2}{3}$ of the box.

b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?

$\frac{24}{1} \div \frac{2}{3} = \frac{48}{3} = 16$

$\frac{16}{1} \div \frac{1}{4} = \frac{16}{4} = 4$

$16 \cdot \frac{1}{1} =$

Mrs. Campbell gave Colin 4 crayons.

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Total Content Points: 1 (5.NF.B.4(z))

Total Practice Points: 0

In Part A, the student finds an incorrect answer of $2\frac{2}{3}$ (no credit for 5.NF.B.4(x)). In Part B, the student correctly determines that Mrs. Campbell gives Colin 4 crayons. The student does not use the incorrect answer from Part A to determine this, instead using a new series of equations to correctly determine the number of crayons. (5.NF.B.4(z)). In Part A, the student writes an incorrect expression to represent $\frac{1}{4}$ of $\frac{2}{3}$ $\left(\frac{2}{3} \div \frac{1}{4}\right)$ (no credit for MP4). The student does not provide a visual model representing a denominator of 12 or 6 (no credit for MP7).

Total Awarded Points: 1 out of 4

Box of CrayonsTask

a. Mrs. Campbell has $\frac{2}{3}$ of a box of crayons. She gives $\frac{1}{4}$ of the $\frac{2}{3}$ of a box to Colin. What fraction of a whole box of crayons did Mrs. Campbell give to Colin? Use a diagram and an equation to support your answer.

$\frac{2}{3} \cdot \frac{1}{4} = \frac{8}{12} - \frac{3}{12} = \frac{5}{12}$

$\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$

$\frac{1}{4} \times \frac{3}{3} = \frac{3}{12}$

Mrs. Campbell gave Colin $\frac{5}{12}$ of the crayons.

b. A full whole box of crayons has 24 crayons in it. How many crayons did Mrs. Campbell give to Colin?

$\frac{24}{1} \div \frac{5}{12} = \frac{24}{1} \times \frac{12}{5} = \frac{288}{5}$

Around 10 - 15 crayons

$$
\begin{array}{r}
0576 \\
5\overline{)2880} \\
-25 \\
\hline
38 \\
-35 \\
\hline
30 \\
-30 \\
\hline
0
\end{array}
$$

Anchor 11 Litho 02275200183

Total Content Points: 0

Total Practice Points: 0

In Part A, the student finds an incorrect answer of $\frac{5}{12}$ (no credit for 5.NF.B.4(x)). In Part B, the student incorrectly determines that Mrs. Campbell gives Colin 10–15 crayons (no credit for 5.NF.B.4(z)).The student subtracts $\frac{1}{4}$ from $\frac{2}{3}$ instead of multiplying to find $\frac{1}{4}$ of $\frac{2}{3}$ (no credit for MP4). There is no visual model representing the problem (no credit for MP7).

Total Awarded Points: 0 out of 4