**Tennessee Comprehensive Assessment Program / Mathematics**

# TCAP/CRA
# 2012-2013

**4**

# Task 3: Fractions of Apples Task
# Full Scoring Guide

**Task 3. Fractions of Apples Task**

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked.

25 red apples
15 green apples
10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|---|---|---|
| Red | | |
| Green | | |
| Yellow | | |

### 3. Fractions of Apples Task Scoring Guide

**The CCSS for Mathematical Content (2 points)**

4.NF.4c(a)   The student provides a diagram to show how many apples of each color are kept.                 _____

4.NF.4c(b)   The student writes correct multiplication equations to answer how many apples of each color are kept.                 _____

**Total Content Points** _____

**The CCSS for Mathematical Practice (3 points)**

MP1   The student makes sense of the problem by illustrating each type of apple divided into 5 groups with 3 groups being kept; completes all parts of the task.                 _____

   (MP1:  Make sense of problems and persevere in solving them.)

MP6   The student writes correct equations for the number of apples Colin wants to keep; provides accurate diagrams.                 _____

   (MP6:  Attend to precision.)

MP7   The student demonstrates that when multiplying by a fraction, only a portion is being utilized; therefore, the whole number factor must be broken into the number of groups indicated by the denominator and multiplied by the numerator.                 _____

   (MP7:  Look for and make use of structure.)

**Total Practice Points** _____

**Total Awarded Points** _____

**The CCSS for Mathematical Content Addressed in This Task**

**Build fractions from unit fractions by applying and extending previous understanding of operations on whole numbers.**

**Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.**

4.NF.4c   Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

**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 text indicates Mathematical Practices that are not addressed in this task.

Students' responses to a mathematical task provide evidence of what they understand and are able to do in relation to the standards and practices. Across tasks, this cumulative evidence shows students' understanding and abilities within a domain. When students do not respond completely to all parts of a task, they provide insufficient evidence of their mathematical understanding and abilities and therefore do not fully demonstrate the expectations of the standards and practices aligned with that task.

**Task 3. Fractions of Apples Task**

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked:

25 red apples
15 green apples
10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|---|---|---|
| 25 Red | 25 red apples [diagram: 5 boxes each labeled 5] ? red apples | $\frac{3}{5} \times 25 = 15$  $\times \frac{3}{5}$ over $15$ ... $\frac{5}{15}$ |
| 15 Green | 15 green apples [diagram: 5 boxes each labeled 3] ? green apples | $\frac{3}{5} \times 15 = 9$  $\times \frac{3}{9}$ ... $\frac{3}{9}$ |
| 10 Yellow | 10 yellow apples [diagram: 5 boxes each labeled 2] 3 yellow apples | $\frac{3}{5} \times 10 = 6$  $\times \frac{2}{6}$ ... $\frac{2}{2}$ |

Litho#: 9394

Guide 1     Litho 9394

Total Content Points: 2  (4.NF.4c(a), 4.NF.4c(b))

Total Practice Points: 3  (MP1, MP6, MP7)

The student provides diagrams showing each kind of apple divided into five equal groups and how many of each color are kept (4.NF.4c(a)). Correct multiplication equations are given to find how many apples of each color are kept (4.NF.4c(b)). The student attends to precision by writing correct equations for the number of apples that Colin wants to keep and by providing accurate diagrams (MP6). The student makes use of structure by demonstrating correct multiplication of a whole number by a fraction and indicating that the whole is divided into a number of groups determined by the denominator, with the numerator denoting the number of those groups being kept (MP7). By illustrating how many apples of each color are kept, the student makes sense of the problem and completes all parts of the task (MP1).

Total Awarded Points: 5 out of 5

## Task 3. Fractions of Apples Task

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked.

25 red apples
15 green apples
10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|-------|---------|------------------------|
| Red | (diagram of circled apples) 5  Colin keeps 15 apples. | $3 \times 5 = 15$ |
| Green | (diagram of apples) 1 2 3  Colin keeps 9 apples | $3 \times 3 = 9$ |
| Yellow | (diagram of apples) 1 2  Colin keeps 6 apples | $3 \times 2 = 6$ |

All together Colin keeps 30 apples.

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Guide 2                          Litho 9399

Total Content Points: 2          (4.NF.4c(a), 4.NF.4c(b))

Total Practice Points: 3         (MP1, MP6, MP7)

The student provides accurate diagrams showing how many apples of each color are kept (4.NF.4c(a)) and writes correct multiplication equations to answer how many apples of each color are kept (4.NF.4c(b)). The student attends to precision by writing correct equations for the number of apples that Colin wants to keep and by providing accurate diagrams (MP6). The student makes use of structure by providing correct multiplication equations ($3 \times 5 = 15$, $3 \times 3 = 9$, $3 \times 2 = 6$), together with correct diagrams illustrating that Colin will keep three out of each group of five apples (MP7). By illustrating equal groups of 5 apples and 3 apples out of each group being kept, the student makes sense of the problem and completes all parts of the task (MP1).

Total Awarded Points: 5 out of 5

**Task 3. Fractions of Apples Task**

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked.

> 25 red apples
> 15 green apples
> 10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|---|---|---|
| Red | 25 red apples [5 5 5 5 5] $\frac{3}{5}$ ? apples $25 \div 5 = 5$ | $3 \times 5 = 15$ red apples |
| Green | 15 green apples [3 3 3 3 3] $\frac{3}{5}$ ? apples $15 \div 5 = 3$ | $3 \times 3 = 9$ green apples |
| Yellow | 10 yellow apples [2 2 2 2 2] $\frac{3}{5}$ ? apples $10 \div 5 = 2$ | $3 \times 2 = 6$ yellow apples |

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Guide 3 Litho 9389

Total Content Points: 2 (4.NF.4c(a), 4.NF.4c(b))

Total Practice Points: 3 (MP1, MP6, MP7)

The student provides a diagram to show how many apples of each color are kept (4.NF.4c(a)) and writes correct multiplication equations to answer how many apples of each color are kept (4.NF.4c(b)). The student attends to precision by writing correct equations for the number of apples that Colin wants to keep and by providing accurate diagrams (MP6). The student makes use of structure by providing correct multiplication equations ($3 \times 5 = 15$, $3 \times 3 = 9$, $3 \times 2 = 6$), indicating that the whole is divided by the denominator of the fraction and multiplied by the numerator (MP7). By illustrating how many apples of each color are being kept, the student makes sense of the problem and completes all parts of the task (MP1).
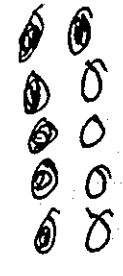
Total Awarded Points: 5 out of 5

## Task 3. Fractions of Apples Task

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked.

25 red apples
15 green apples
10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|-------|---------|------------------------|
| Red | | $\frac{3}{5} \times 25 = 15$ red apples |
| Green | | $\frac{3}{5} \times 15 = 9$ Green apples |
| Yellow | | $\frac{3}{5} \times 10 = 6$ Yellow apples |

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Guide 4                    Litho 9320

Total Content Points: 1          (4.NF.4c(b))

Total Practice Points: 3          (MP1, MP6, MP7)

The student writes correct multiplication equations to answer how many apples of each color are kept (4.NF.4c(b)). The student attends to precision by writing correct equations for the number of apples Colin wants to keep and provides diagrams that show the correct numbers of total apples and apples that Colin wants to keep (MP6). The student makes use of structure by demonstrating correct multiplication of a whole number by a fraction (MP7). By using equations to illustrate how many apples of each color are kept and showing visual models of the apples, the student makes sense of the problem and completes all parts of the task (MP1). Although total apples versus Colin's apples are correctly shown in the diagrams, they do not accurately depict the arrays divided into equal portions (no credit for 4.NF.4c(a)).

Total Awarded Points: 4 out of 5

**Task 3. Fractions of Apples Task**

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked.

    25 red apples
    15 green apples
    10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|---|---|---|
| Red | 25 <br> [diagram boxes] | wants to keep / Give to friend <br> $\begin{array}{r}5\\ \times 5\\ \hline 25\end{array}$ $\begin{array}{r}5\\ \times 3\\ \hline 15\end{array}$ $\begin{array}{r}5\\ \times 2\\ \hline 10\end{array}$ |
| Green | 15 <br> [diagram boxes] | wants to keep / Give to friend <br> $\begin{array}{r}3\\ \times 3\\ \hline 15\end{array}$ $\begin{array}{r}3\\ \times 3\\ \hline 9\end{array}$ $\begin{array}{r}3\\ \times 2\\ \hline 6\end{array}$ |
| Yellow | 10 <br> [diagram boxes] | wants to keep / Give to friend <br> $\begin{array}{r}2\\ \times 5\\ \hline 10\end{array}$ $\begin{array}{r}2\\ \times 3\\ \hline 6\end{array}$ $\begin{array}{r}2\\ \times 2\\ \hline 4\end{array}$ |

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Guide 5                    Litho 3355

Total Content Points: 1        (4.NF.4c(a))

Total Practice Points: 2       (MP1, MP7)

The student provides diagrams in which the whole is divided into five equal groups with three groups shaded to show how many apples of each color are kept (4.NF.4c(a)). The correct multiplication expressions show understanding of the structure of fractions (MP7). The student makes sense of the problem by illustrating 5 equal groups of apples with 3 groups kept and 2 given away (MP1). The response does not contain correct multiplication equations to answer how many apples of each color are kept, as the student has given expressions instead of equations (no credit for 4.NF.4c(b)). The student fails to attend to precision, as there are no correct equations provided (no credit for MP6).

Total Awarded Points: 3 out of 5

**Task 3. Fractions of Apples Task**

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked.

25 red apples
15 green apples
10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|---|---|---|
| Red |  | 3 groups = 15 apples  He wants 15 red apples. |
| Green |  | 3 groups = 9 apples  He wants 9 green apples |
| Yellow |  | 3 groups = 6 apples  He wants 6 yellow apples. |

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Guide 6                    Litho 13148

Total Content Points: 1        (4.NF.4c(a))

Total Practice Points: 1        (MP7)

The student provides diagrams that help to show how many apples of each color are kept by dividing the whole into five equal groups (4.NF.4c(a)). Using visual fraction models and explanations in place of equations, the student makes use of structure to demonstrate that multiplying a fractions entails use of portions (MP7). The response does not contain correct multiplication equations to answer how many apples of each color are kept (no credit for 4.NF.4c(b), no credit for MP6). Since written multiplication equations are missing, parts of the task are incomplete (no credit for MP1).
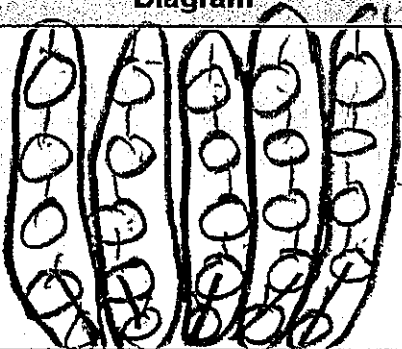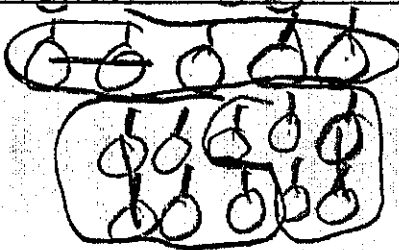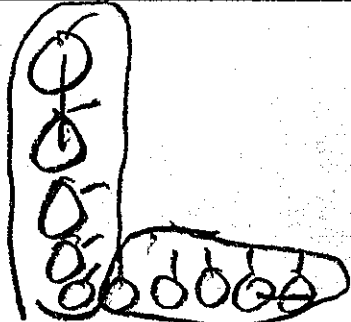
Total Awarded Points: 2 out of 5

### Task 3. Fractions of Apples Task

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked.

25 red apples
15 green apples
10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|-------|---------|------------------------|
| Red |  | $25 \times \frac{3}{5}$ |
| Green |  | $15 \times \frac{3}{5}$ |
| Yellow |  | $10 \times \frac{3}{5}$ |

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Guide 7                    Litho 9421

Total Content Points: 1        (4.NF.4c(a))

Total Practice Points: 1       (MP7)

The student provides diagrams showing the apples of each color divided into equal groups of five, which could be used to help find the number of apples Colin wants to keep (4.NF.4c(a)). Using visual fraction models, the student indicates some understanding of structure in demonstrating that multiplying by a fraction entails use of portions (MP7). The student does not illustrate 5 equal groups of apples with 3 groups being kept or include complete equations to find the number of apples Colin wants to keep; therefore, parts of the task are incomplete (no credit for MP1). The response does not contain correct multiplication equations to answer how many apples of each color are kept (no credit for 4.NF.4c(b), no credit for MP6).

Total Awarded Points: 2 out of 5

**Task 3. Fractions of Apples Task**

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked.

     25 red apples
     15 green apples
     10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|---|---|---|
| Red | 5 5 5 5 5   15   He will keep 15 | $\frac{3}{5} \times 5 = \frac{15}{25}$ |
| Green | 3 3 3 3 3   9   He will keep 9 | $\frac{3}{5} \times 3 = \frac{9}{15}$ |
| Yellow | 2 2 2 2 2   6   He will keep 6 | $\frac{3}{5} \times 2 = \frac{6}{10}$ |

Litho#: 3353

Guide 8                         Litho 3353

Total Content Points: 1          (4.NF.4c(a))

Total Practice Points: 0

The student provides diagrams to show how many apples of each color are kept (4.NF.4c(a)). The multiplication equations given to find how many apples of each color are kept are incorrect (no credit for 4.NF.4c(b)), which shows a lack of understanding of the structure of fractions (no credit for MP7). Inaccurate equations indicate lack of attention to precision (no credit for MP6). The student does not correctly complete all parts of the task (no credit for MP1).

Total Awarded Points: 1 out of 5

**Task 3. Fractions of Apples Task**

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked.

25 red apples
15 green apples
10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|-------|---------|-------------------------|
| Red | *what Colin what Colin keeps* 25 red apples $\quad$ ? | $\frac{3}{5} \times 25 =$ |
| Green | 15 green apples $\quad$ ? | $\frac{3}{5} \times 15 =$ |
| Yellow | 10 yellow apples | $\frac{3}{5} \times 10 =$ |

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Guide 9                    Litho 9415

Total Content Points: 0

Total Practice Points: 1        (MP7)

Showing basic understanding of the structure of fractions, the student indicates in the diagrams that multiplying by a fractions entails use of portions (MP7). The diagrams are not labeled, so it is unclear whether the student understands that the whole is divided into a number of equal groups equal to the denominator (no credit 4.NF.4c(a)). The student writes expressions rather than multiplication equations to answer how many apples of each color are kept (no credit for 4.NF.4c(b)). The student does not write correct equations or provide detailed diagrams to calculate the number of apples Colin want to keep, showing lack of attention to precision (no credit for MP6). The student does not complete all parts of the task since the response lacks solutions to the expressions and details for the portions shown in the diagrams (no credit for MP1).
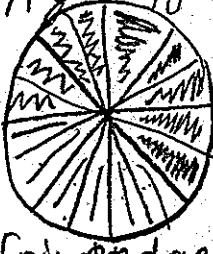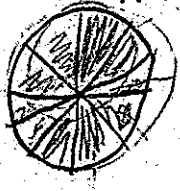
Total Awarded Points: 1 out of 5

**Task 3. Fractions of Apples Task**

Colin went apple picking. He picked 3 kinds of apples: red, green, and yellow. When he was home, he counted how many of each kind he had picked.

      25 red apples
      15 green apples
      10 yellow apples

Colin wants to keep $\frac{3}{5}$ of each kind of apple and he will give the rest to a friend.

Draw a diagram and write a multiplication equation that can help you decide how many apples of each kind Colin wants to keep.

| Apple | Diagram | Multiplication Equation |
|-------|---------|------------------------|
| Red | Colin gets $\frac{15}{25}$   This friend gets $\frac{10}{20}$ | $\begin{array}{r} \frac{3}{5} \\ \times\ 5 \\ \hline \frac{12}{25} \end{array}$ |
| Green | Colin gets $\frac{9}{10}$   His frineed gets $\frac{6}{10}$ | $\begin{array}{r} \frac{3}{5} \\ \times\ 3 \\ \hline \frac{9}{10} \end{array}$ |
| Yellow | Colin's friend gets $\frac{4}{10}$   Colin gets $\frac{6}{10}$ | $\begin{array}{r} \frac{3}{5} \\ \times\ 2 \\ \hline \frac{6}{10} \end{array}$ |

Litho#: 13106

Guide 10                    Litho 13106

Total Content Points: 0

Total Practice Points: 0

Although the student provides diagrams, they show counts of individual apples instead of groups of 5 with 3 groups shaded (no credit for 4.NF.4c(a)). The student does not write correct multiplication equations to answer how many apples of each color are kept (no credit for 4.NF.4c(b)). The response's lack of correct equations and accurate diagrams indicates a lack of precision (MP6). By not illustrating 5 equal groups of apples with 3 groups being kept, the student leaves parts of the task incomplete (no credit for MP1). There is no work shown to indicate that the student understands the multiplicative structure of fractions (no credit for MP7).

Total Awarded Points: 0 out of 5