SCAFFOLDING TASK: Eggsactly

STANDARDS FOR MATHEMATICAL CONTENT

MCC4.NF.3 Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

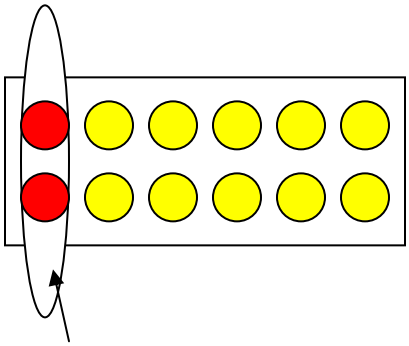
STANDARDS FOR MATHEMATICAL PRACTICE

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.

BACKGROUND KNOWLEDGE

Students should understand how to name fractions and that the denominator represents the number of equal-sized pieces while the numerator represents the number of pieces being considered. Students should also have some understanding of how to divide twelve into subsets of 1, 2, 3, 4, and 6.

Using a dozen, and later eighteen, eggs as a whole allows students to add and subtract values from the dozen eggs and then search for equivalent fractions. Students should be encourage to see that twelve eggs or eighteen eggs can be group in other ways than 12 or 18, for example they could be grouped in two sets of 6 or three sets of 6 respectively.



For example, these red circles could represent two eggs used in a recipe. The student should be able to do several mathematical steps with this one representation. Students should be able to see the subset as both $^{2}/_{12}$ and $1/6$. Also students are required to write a number sentence to represent that two eggs are removed from the carton: $^{12}/_{12} - {}^{1}/_{12} - {}^{1}/_{12} = {}^{10}/_{12}$ or $^{12}/_{12} - {}^{2}/_{12} = {}^{10}/_{12}$. Students may also be able to see equivalent number sentences: $^{6}/_{6} - 1/6 = 5/6$.

Before asking students to work on this task, be sure students are able to:

- identify the number of equal pieces needed to cover one whole as the denominator
- show equivalent fractions with an area model
- record on the student sheet equivalent fractions or fraction sets (either by coloring or gluing die cut yellow and red circles)
- write an equation which shows the equivalent fractions

ESSENTIAL QUESTIONS

- What is a fraction and how can it be represented?
- How can equivalent fractions be identified?
- How can fraction represent parts of a set?
- How can I add and subtract fractions of a given set?

MATERIALS

- 18 Two sided counters
- Eggstactly recording sheet
- Crayons or colored pencils

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

It is crucial that students understand that fractions represent part of a whole as well as part of a set. In sets, the whole is the total number of objects or the denominator and subsets of the whole make up the fraction parts or the numerator. As students work through this activity, they are first asked to see the "whole" as a twelve eggs and then to see the "whole" as eighteen eggs. They can explore the sets with two sided counters, but ultimately they will need to represent them with drawings.

Comments

Sets of Two-sided counters should be available to the students. The students can use these to represent the "eggs" in the assignment. Students will need sets of 12 and 18 eggs and they can then flip them over to show some as red and some as yellow to represent fractional parts of a dozen.

If available, students can glue die-cut yellow and red circles. Alternately, students can manipulate the fraction sets online and easily print and then label their work. One site is: http://illuminations.nctm.org/ActivityDetail.aspx?ID=11. Make sure students use "sets" to represent their fractions.

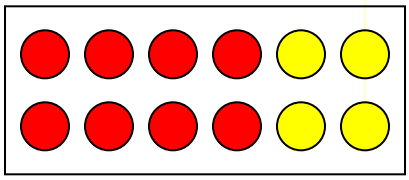
This task could be introduced by bringing in a dozen eggs, either real or plastic. Students have some prior knowledge of this and will be comfortable with seeing the box as now representative of a whole.

Task Directions

Students will follow directions below from the "Twelve Eggsactly" and the "Eighteen Eggsactly" student recording sheet.

- Obtain a set of two sided counters.
- Use the two sided counters to act out each recipe in the lesson.
- Identify each fraction of eggs being used.
- Write a number sentence for each recipe
- Identify any equivalent fractions and write number sentences using these equivalent fractions.

Example: If a recipe calls for 8 eggs a student would have to represent his using two sided counters, red for those eggs being used and yellow for those that still remain



1. What fraction of the entire set is 8 eggs? *8/12*

2. Can you represent this fraction another way? *4/6 or 2/3*

3. How many eggs still remain? *4 eggs*

4. What fraction of the set still remains? *4/12*

5. Can you represent this fraction another way? *2/6 or 1/3*

6. Write a fraction sentence to show how many eggs were removed and how many still remain: *12/12 - 8/12 = 4/12 or 12/12 - 4/12 = 8/12 or 6/6 - 4/6 = 2/6 etc.*

FORMATIVE ASSESSMENT QUESTIONS

- How are you keeping your work organized?
- Have you found all of the possible equivalent fractions? How do you know?
- How do you know these two fractions are equivalent?
- How many different illustrations can be created to show equivalent fractions**?** How do you know?
- Is there any other way you could write your number sentence?

DIFFERENTIATION

Extension

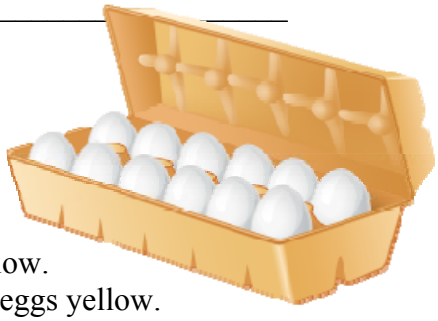
- Once students have completed the task above, this lesson can be extended to other sets, such as the "Eighteen Eggsactly" lesson which uses a set of 18 eggs to represent one whole.
- Students will need to model the "Eighteen Eggsactly" lesson using two sided counters again and this will provide meaningful practice adding and subtracting fraction with the same denominator. It will also challenge them to find more equivalent fractions than the "Twelve Eggsactly" lesson can provide.

Intervention

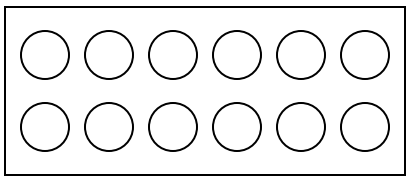
- Allow students to first gain a lot of experience with smaller sets of "eggs". Using the two sided counters create sets of 6 or 8 "eggs" to explore adding, subtracting and finding equivalent fractions.
- Some students could benefit from more concrete manipulatives such as egg cartons and plastic eggs.
- Students can manipulate the fractions online and represent them as a set and easily print and then label their work. One site for fraction sets is: http://www.illuminations.nctm.org

Name _____ Date _____

Twelve Eggsactly



Your brother needs help baking cookies for the school bake sale.
One recipe he has calls for six eggs. Remove six eggs from the carton below.
To show you have removed eggs color them red. Shade in the remaining eggs yellow.



1. What fraction of the entire set is 6 eggs? _____

2. Can you represent this fraction another way?
_____

3. How many eggs still remain? _____

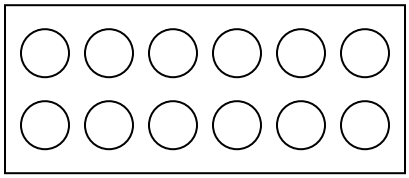
4. What fraction of the set still remains? _____

5. Can you represent this fraction another way? _____

6. Write a fraction sentence to show how many eggs were removed and how many still remain:

_____

Your brother needs help baking brownies for the school bake sale.
One recipe he has calls for eight eggs. Remove eight eggs from the carton below.
To show you have removed eggs color them red. Shade in the remaining eggs yellow.



1. What fraction of the entire set is 8 eggs? _____

2. Can you represent this fraction another way?
_____

3. How many eggs still remain? _____

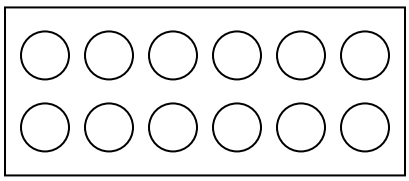
4. What fraction of the set still remains? _____

5. Can you represent this fraction another way? _____

6. Write a fraction sentence to show how many eggs were removed and how many still remain:

_____

Your sister also needs help baking cupcakes for the school bake sale.
One recipe she has calls for ¼ of a dozen. Remove ¼ of the eggs from the carton below.
To show you have removed eggs color them red. Shade in the remaining eggs yellow.



1. What fraction of the entire set is ¼ of the eggs? _____

2. Can you represent this fraction another way? _____

3. How many eggs still remain? _____

4. What fraction of the set still remains? _____

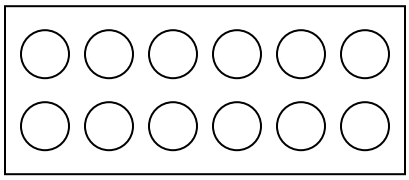
5. Can you represent this fraction another way? _____

6. Write a fraction sentence to show how many eggs were removed and how many still remain:

_____

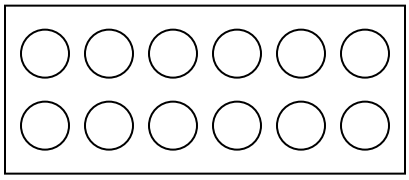
Use the cartons below to show all the different ways to represent ⅓ of a dozen eggs. Then write a number sentence for each model to show how many eggs were removed and how many still remain.

Number Sentences



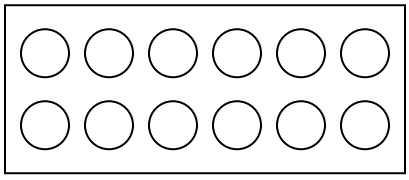
_____

_____



_____

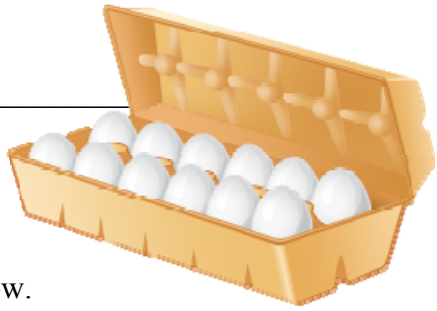
_____



_____

_____

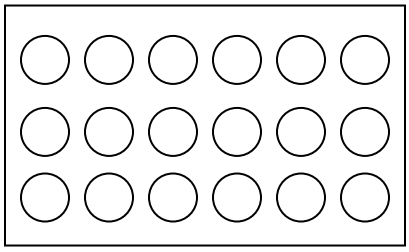
How many cartons of eggs did your mother have to buy in order for your brother to make cookies and brownies and for your sister to make cupcakes? Use pictures, numbers and words to show your answer.



Name _____ Date _____

Eighteen Eggsactly

Your brother needs help baking cookies for the school bake sale.
One recipe he has calls for six eggs. Remove six eggs from the carton below.
To show you have removed eggs color them red. Shade in the remaining eggs yellow.



1. What fraction of the entire set is 6 eggs? _____

2. Can you represent this fraction another way?
_____

3. How many eggs still remain? _____

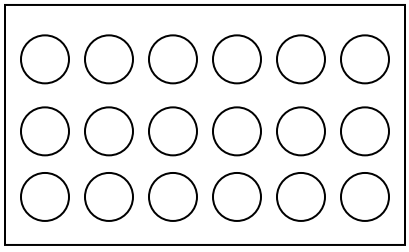
4. What fraction of the set still remains? _____

5. Can you represent this fraction another way? _____

6. Write a fraction sentence to show how many eggs were removed and how many still remain:

_____

Your brother needs help baking brownies for the school bake sale.
One recipe he has calls for eight eggs. Remove eight eggs from the carton below.
To show you have removed eggs color them red. Shade in the remaining eggs yellow.



1. What fraction of the entire set is 6 eggs? _____

2. Can you represent this fraction another way? _____

3. How many eggs still remain? _____

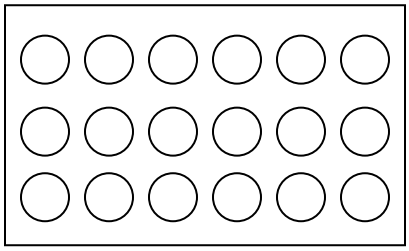
4. What fraction of the set still remains? _____

5. Can you represent this fraction another way? _____

6. Write a fraction sentence to show how many eggs were removed and how many still remain:

_____

Your sister also needs help baking cupcakes for the school bake sale.
One recipe she has calls for ⅚ of a dozen. Remove ⅚ of the eggs from the carton below.
To show you have removed eggs color them red. Shade in the remaining eggs yellow.



1. What fraction of the entire set is ⅚ of the eggs? _____

2. Can you represent this fraction another way? _____

3. How many eggs still remain? _____

4. What fraction of the set still remains? _____

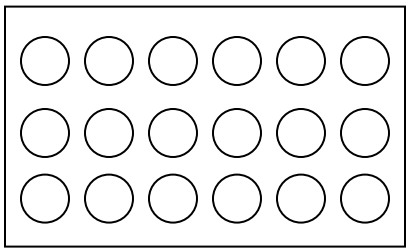
5. Can you represent this fraction another way? _____

6. Write a fraction sentence to show how many eggs were removed and how many still remain:

_____

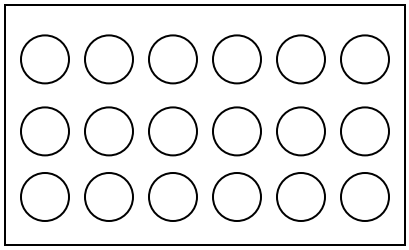
Use the cartons below to show all the different ways to represent ⅓ of a carton of eggs. Then write a number sentence for each model to show how many eggs were removed and how many still remain.

Number Sentences



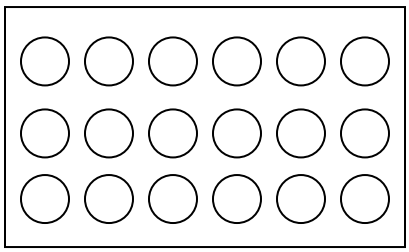
_____

_____



_____

_____



_____

_____

How many cartons of eggs did your mother have to buy in order for your brother to make cookies and brownies and for your sister to make cupcakes? Use pictures, numbers and words to show your answer.