**Dividing Fractions**

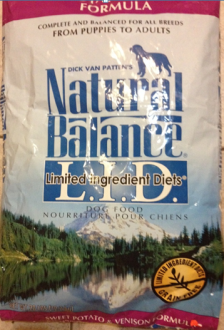
This set of activity activities are designed to help students to structure their thinking so that they are afforded the opportunity to make sense of the idea of division of fractions. The goal of this collection of activities is to allow the division algorithm to emerge from quality thinking and reasoning about the mathematics needed to divide fractions. While students will engage in many (all?) of the Standards for Mathematical Practices, the primary practice that is the focus of these activities is Practice #8: *Look for and express regularity in repeated reasoning*. As a result of developing this and the other mathematical practices, division of fractions will become part of a well-connected network of understanding.

The activities in this series of lessons have just a few questions in each. However, each question will likely take much time and were designed to elicit much conversation, discussion, debate, explanation, etc. That is, students should be thinking deeply about what they are doing and why they are doing it. Teachers should be challenging students to explain what “it” means as students describe the methods they used to answer each question.

This is also an excellent example of why the worksheets alone may not accomplish the intended goal if the user does not understand the purpose. By combining the workshop experience with the solutions, my hope is that the worksheets will accomplish the intended goal: for students to engage in repeated reasoning for the purpose of creating an algorithm for dividing fractions.

**Activity #1 – Focus on Proportional Reasoning**

Every morning when I wake up, I feed my two dogs, Tobie and Gracie. It seems like I am buying large bags of dog food so often that I wondered one morning…how many scoops of dog food do I deposit into their doggie dishes before running out of dog food?

I use a clear plastic cup (see picture) to scoop the dog food. I determined that it takes approximately 93 scoops (rounded to the nearest whole scoop) to exhaust the supply of dog food. I then need to go to the dog food store to buy a new 28 pound bag of food for Tobie and Gracie.

1. Draw a pair of line segments to represent the situation involving the number of scoops and the total amount of dog food in the bag. Label as much information on the segments as you can. You will use these segments to help you answer subsequent questions.

2. If I cut the “scoops” line segment into \_\_\_\_\_\_\_\_\_\_\_\_\_ pieces, each piece represents

\_\_\_\_\_\_\_\_\_\_\_\_\_ copies of the total number of scoops or \_\_\_\_\_\_\_\_\_\_\_\_\_ scoops.

3. To keep the situation ***in proportion*** (you may want to discuss what this means), cut the

“pounds” line segment into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_pieces where each piece represents

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ copies of the total number of pounds of dog food or \_\_\_\_\_\_\_\_\_\_\_ pounds.

4. Represent, using fractions, the number of pounds of dog food that fit into one scoop. Explain how you know.

**Activity 2 – The Dog Food Saga Continues**

In Activity 1, the number of scoops of dog food was rounded to the nearest whole number of scoops. In reality, it takes scoops before I run out of dog food and have to buy another 28 pound bag of dog food. As you respond to the items on this page, use fractions to represent all quantities.

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2. If I cut the “scoops” line segment into \_\_\_\_\_\_\_\_\_\_\_\_\_ pieces, each piece represents

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**Activity 3 – Baking Cookies**

I love Cowboy Cookies. The recipe shown calls for cup of flour. At my house, measuring cups are hard to find and on the day I wanted to bake Cowboy Cookies, I could only find a cup measuring cup. Describe how I can, as accurately as possible, measure cup of flour using only the cup measuring cup.



**Activity 4 – Coffee Blends**

Some people like to create their own coffee blends by mixing together different kinds of freshly roasted and ground coffee beans. One website, www.thecaptainscoffee.com, recommends different blends for people to try. One such blend is shown.



Suppose a person has pounds of Ethiopian Harrar coffee that they wish to blend with Sumatran Mandeling (of which they have abundant supply). How many pounds of this blend can be made?