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*Teaching Mathematics  
in a First Peoples Context*  
Grades 8 and 9

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A PUBLICATION OF



First Nations Education Steering Committee

113 - 100 Park Royal South  
West Vancouver, BC V7T 1A2

Toll Free: 1-877-422-3672  
Tel: 604-925-6087

[info@fnesc.ca](mailto:info@fnesc.ca) | [www.fnesc.ca](http://www.fnesc.ca)

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## Writing Team

Karmen Smith-Brillon	Project Manager: First Nations Education Steering Committee
Désirée Marshall-Peer	School District No. 83 (Salmon Arm)
Tianna Smith	First Nations Schools Association (Ladysmith – Stu"ate Lelum)
Kim Linkert	Wsanec School Board
Stacey Brown	School District No. 82 (Coast Mountains)
GT Publishing Services Ltd.	project coordination, writing, editing, and layout

## Advisory Team

Melania Alvarez-Adem	Pacific Institute for the Mathematical Sciences (PIMS)
Jo-ann Archibald	UBC Math Consortium
Russ Baker	Consultant
Karmen Smith-Brillon	First Nations Education Steering Committee
Ken Campbell	Curriculum Consultant
Richard DeMerchant	Ministry of Education
Anne Hill	Ministry of Education
Deborah Jeffrey	First Nations Education Steering Committee
Cynthia Nicol	University of British Columbia Math Consortium
Trish Rosborough	Ministry of Education
Denise Williams	First Nations Education Steering Committee

Questions concerning material in this document should be directed to FNESC:

First Nations Education Steering Committee  
Suite 113 -100 Park Royal South  
West Vancouver, BC V7T 1A2  
Phone: 604-925-6087  
Fax: 604-925-6097  
Toll-Free: 1-877-422-3672  
e-mail: [info@fnesc.ca](mailto:info@fnesc.ca) [www.fnesc.ca](http://www.fnesc.ca)

The *Mathematics 8 and 9 (2008)* curriculum document is available online at [www.bced.gov.bc.ca/irp/welcome.php](http://www.bced.gov.bc.ca/irp/welcome.php)



# Cooking with Fractions

## Context

First Peoples, like people in many other cultures, love to bring food when friends and family come together for cultural gatherings and special occasions. Many of the recipes used do not have specific measurements due to the recipes being passed on by an Elder who may use terms like “a handful of this,” “a pinch of that,” “enough water to feel right.”

## Prescribed Learning Outcomes

This unit can be used to help students achieve the following Prescribed Learning Outcomes for Mathematics 8:

- A3 demonstrate an understanding of percents greater than or equal to 0%
- A4 demonstrate an understanding of ratio and rate
- A5 solve problems that involve rates, ratios, and proportional reasoning
- A6 demonstrate an understanding of multiplying and dividing positive fractions and mixed numbers

## Resources

- ◆ student handout: Converting Fractions, Decimals, and Percents (distribute this at any point during the unit for student reference)
- ◆ student handout: Recipes (sample recipes to be used for various activities, particularly if students are not able to bring in their own from home)

## Materials Needed

- ◆ imperial measuring cups, measuring spoons, larger 2+ cup measurer
- ◆ recipes
- ◆ water for measuring

## Suggested Instruction and Assessment Approach

### Introduction

Ask students how many of them have experience with cooking, either at home or at school. What types of measurements do they use? Point out that, although metric measurements are the official standard in Canada, and often the standard used in schools, most homes in North America still use imperial measurements — cups, tablespoons, etc. — for cooking. (Note that both metric and imperial measurements are used throughout this unit; you may wish to focus on only one measurement system, and/or have students convert from one to the other as an extension activity.)

Bring in an Elder to demonstrate the making of fry bread or another dish of their choice. In most cases the Elder will prepare the recipe “by hand,” not with measuring instruments. This is a good opportunity for the students to try and match the “hand” measurements with the appropriate measuring cup/spoon. Once the students identify the correct measurements they may proceed with the making of the fry bread (a recipe is provided at the end of this unit).

Ask students to bring in recipes from home; these recipes will be used as a basis for practising multiplication and division of fractions, as well as proportional reasoning. Discuss with students

how it is beneficial to understand fractions when cooking. They may need to know how to make a recipe larger or smaller, depending on the size of the group they may be feeding.

## Lesson 1 – Multiplying and Dividing Fractions

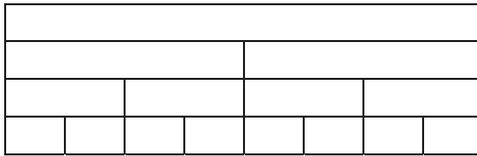
### PLO A6

Have students share their recipes with you and choose one that can be used as an example for multiplying fractional measurements. Use repeated addition to show how a fraction can be multiplied by a whole number. Explain that we need to triple the recipe (3x) for the family dinner. Demonstrate, using water, how for example,  $\frac{3}{4} \text{ c} \times 3 = \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = 2 \frac{1}{4}$  (pour water into larger 2+ cup measurer). Many learners retain the information if they can use hands-on methods. Triple the remaining fractions in the recipe. For example:

$$\frac{1}{2} \times 3, \quad \frac{1}{4} \times 3, \quad \frac{2}{3} \times 3, \quad \frac{1}{8} \times 3, \quad 1\frac{1}{2} \times 3, \quad 2\frac{1}{4} \times 3, \quad 1\frac{3}{4} \times 3$$

Demonstrate how something can be divided by taking the water from the measuring cup. ( $1 \frac{1}{2} \div 3$ : “If you have  $1 \frac{1}{2}$  c of soup and want to share it between 3 people, how much does each person each get?”). Using one of the students’ recipes, divide it by 2.

Another good way to demonstrate dividing is to make a cake and then use it like fraction strips. So a 9 x 11 inch cake can be used to illustrate halves, quarters, and eighths:



To help reinforce their multiplying and dividing fractions skills by increasing and decreasing the serving size in a recipe, have students:

1. Find a recipe that contains at least 3 fractions.
2. Rewrite the recipe for half as many people.
3. Rewrite the recipe for three times as many people as the original recipe.
4. Using the fry bread recipe (see the student handout), have the students double the recipe, triple it, multiply it 10 times.
5. Choose 2 more recipes, one is to be multiplied by  $1 \frac{1}{2}$ , doubled, and multiplied 5x. The other recipe is to be divided into thirds and halves.

Eventually the students will have the opportunity to make a class lunch of venison stew with scow (or fry) bread. Invite Elders, family, or whole school if appropriate.

## Lesson 2 – Rates, Ratios, and Proportions

### PLOs A4, A5

Define ratio: a relationship between two numbers of the same kind. In cooking, an example of a ratio would be one cup of sugar for every 5 cups of berries, which would be expressed as a ratio of 1:5. A ratio can also be written as a fraction:  $\frac{1}{5}$

Show how you can use this ratio to adjust a recipe for larger quantities: How many cups of sugar would you need for 15 cups of berries? For 40 cups of berries?

Explain to students what proportions are and how they go hand-in-hand with fractions; using the measuring cups/spoons to give visuals. Demonstrate how for every cup of flour needed for fry bread, 1 tsp. of baking powder is needed: 5 cup of flour requires 5 tsp. of baking powder.  $\frac{1 \text{ c} = 1 \text{ tsp}}{5 \text{ c} = 5 \text{ tsp}}$   
For every cup of flour put into the larger measuring cup, put 1 tsp. of baking powder into a separate measuring spoon.

Show how a larger recipe can be converted to feed only 1 person. Take a recipe that is designed to feed a family of 4.

Example: Apple Crisp – apples, 1 cup flour, 1 cup oatmeal, 1c sugar, and 1 cup butter (feeds 4)  
 $\frac{1 \text{ cup} = 4 \text{ people}}{x \text{ cup} = 1 \text{ person}}$  1 cup  $\div$  4 =  $\frac{1}{4}$  c per person

Demonstrate how to cross multiply and divide to find the missing proportion. Use manipulatives (e.g., jelly beans) to illustrate cross multiplying. For example: If you have 50 jelly beans and 10 students in the class, how many jelly beans does each student get? Using the board, show that:

50 jelly beans = 10 students  
then ? jelly beans = 1 student

$$\frac{50}{x} = \frac{10}{1}$$

$$\frac{50}{x} \times \frac{10}{1} \rightarrow 50 \times 1 = 10 \times x \rightarrow 50 = 10x \rightarrow x = 5$$

We multiply both sides of the equation by one of the denominators (in the above case, the  $x$ ). Repeat to eliminate the second denominator (1 for the above). Then divide both sides by the coefficient (10) to complete the equation.

Explain the advantages of knowing how to lay this proportion out.

Expand: Give the students a variety of recipes (taken from the collection brought in from their homes), and have them practise making recipes larger or smaller using the proportion method.

### Additional Problems

1. If 3 kilograms of salmon costs \$65, how many kilograms can you buy for \$100?
2. If 1 pizza will feed 8 people and there are 24 students in the class, how many pizzas are needed to feed everyone?
3. One salmon feeds 8 people and a single batch of fry bread will feed 4. How much of each do you need to cook to feed a group of 20 people?
4. You and a friend have gone fishing for salmon and you caught 7. If 1 salmon can feed 8 people, and you have 4 people in your family, how many meals can you get from your catch?

- Your family has decided to can the salmon that they caught. Each jar will hold  $\frac{3}{4}$  of a cup of salmon; 1 salmon will fill 10 jars. How many jars of canned salmon will be made from the 28 salmon caught? How many cups? If your family uses 5 jars a week, how many cups of salmon is being eaten? Using 5 jars a week, how many weeks will the canned salmon last?
- To make soapberry ice cream, it takes  $\frac{1}{3}$  cup of berries for 1 serving. It takes 10 minutes to pick 1 cup of berries. If you need to make soapberry ice cream for 25 people, how many cups of berries do you need? How long will it take to pick the berries?

### Lesson 3 – Percentages

PLOs A3, A4

Define percent a fraction of a number out of 100. A ratio can also be written as a fraction, which can be converted into a percentage:

$$10:100 = \frac{10}{100} = 10\%$$

ratio = fraction = percentage

To convert a fraction into a percent: take what you have been given and divide it by the total number. This gives you a decimal. To convert this into a percentage, simply multiply the decimal by 100 and add a % sign.

$$\frac{\text{part} = \%}{\text{whole} = 100\%} \rightarrow \frac{\text{part}}{\text{whole}} = \frac{\%}{100}$$

Demonstrate examples such as:

$$\frac{?l=75\%}{4l=100\%} \quad \frac{6\text{ cups}=?\%}{12\text{ cups}=100\%} \quad \frac{3\text{ tbsp}=60\%}{?tbsp=100\%} \quad \frac{6\text{ tsp}=15\%}{?tsp=100\%} \quad \frac{?cups=4\%}{22\text{ cups}=100\%}$$

Choosing from the student recipes again, challenge students to

- increase all of the ingredients by 60%, 75%, and 150%
- decrease all of the ingredients by 10%, 25%, and 50%

#### Example Problems:

- 10% of a 500 ml container of yogurt has been eaten. How many millilitres of yogurt are left?
- If you were to eat  $\frac{5}{8}$  of a tomato, what percent did you eat?
- You made 20 pieces of fry bread for a gathering, and 4 pieces were leftover at the end. What percentage of bread was eaten?
- The price of salmon is \$32 kg. If the price was to be raised 25%, how much is the new salmon price?

### Extension

Work with a cooking class to plan a year-end, whole school feast. Have students find the recipes, adjust the quantities to feed the number of people, and prepare the food.

# Converting Fractions, Decimals, and Percents

## A fraction to a decimal

Divide the denominator (the bottom part) into the numerator (the top part).

$$\frac{1}{4} = 1 \div 4.00 = 0.25$$

## A fraction to a percent

Multiply the fraction by 100 and reduce it. Then, attach a percent sign.

$$\frac{1}{4} \times \frac{100}{1} = \frac{100}{4} = \frac{25}{1} = 25\%$$

## A decimal to a fraction

Starting from the decimal point, count the decimal places. If there is one decimal place, put the number over 10 and reduce. If there are two places, put the number over 100 and reduce. If there are three places, put it over 1000 and reduce, and so on.

$$0.25 = \frac{25}{100} = \frac{1}{4} \qquad 0.5 = \frac{5}{10} = \frac{1}{2}$$

## A decimal to a percent

Move the decimal point two places to the right. Then, attach a percent sign.

$$0.25 = 25\% \qquad 0.4 = 40\%$$

## A percent to a decimal:

Move the decimal point two places to the right. Then, drop the percent sign.

$$25\% = 0.25 \qquad 60\% = 0.6$$

## A percent to a fraction:

Put the number over 100 and reduce. Then remove the percent sign.

$$25\% = \frac{25}{100} = \frac{1}{4}$$

## Recipes

### VENISON STEW

2 lbs. meat cut into 1-inch cubes	2 1/4 tsp. sugar
1/2 c. flour	1 1/4 tsp. salt
2 tbsp. oil	5 carrots, peeled, sliced and quartered
1 bay leaf	3/4 c. sliced celery
1 1/2 tbsp. Worcestershire sauce	3 med. potatoes, peeled and cut into eighths
3/4 med. chopped onion	5 c. water
1 1/4 c. beef bouillon	
1/3 tsp. pepper	

Coat meat with flour; set excess flour aside. In large skillet, heat oil. Add meat and brown. In slow cooker, combine browned beef, bay leaf, Worcestershire sauce, chopped onion, bouillon, pepper, salt, sugar and vegetables. Pour water over all. Cover and cook on low 8-10 hours. Turn control to HIGH. Thicken with flour left over from coating dissolved in a small amount of water. Cover and cook on HIGH 25-30 minutes or until slightly thickened

### FRY BREAD (Bannock)

3 c. flour  
1 tbsp. baking powder  
1/2 tsp. salt  
1 c. warm water

Combine flour, baking powder and salt in a large mixing bowl. Add warm water in small amounts and knead dough until soft but not sticky. Sometimes more flour or water will be needed. Cover bowl and let stand for about 15 minutes. Pull off large egg sized ball of dough and roll out into round about 1/4 inch thick. Punch hole in centre of each round piercing several times with fork to allow dough to puff.

In a heavy skillet fry (deep fry) rounds in lard or other shortening until bubbles appear on dough, turn over and fry on other side until golden.

**Scow bread** (baked) – instead of frying the bread, place dough in a bread pan. Spread out evenly. Bake at 350° for about 40 min.

Use fry bread to make a **Bannock Taco**: cover the fry bread with layers of taco seasoned ground venison meat sauce, shredded lettuce, cheddar cheese, chopped onions, and diced tomatoes. Cover the top with sour cream and salsa according to taste.

For more about bannock/fry bread, visit [www.for.gov.bc.ca/rsi/fnb/fnb.htm](http://www.for.gov.bc.ca/rsi/fnb/fnb.htm)