

SCALE CITY

KET

The Road to Proportional Reasoning: World Chicken Festival Handouts

TABLE OF CONTENTS

Click on a title to go directly to the handout.

Handout 1: The Measurement Challenge

A hands-on activity to help students review common cooking measurements

Handout 2: Applied Fractions

Problems involving the fractions and equivalencies of cooking

Handout 3: Circles

Practice finding the areas of circles

Handout 4: Circle Practice

More problems about the mathematics of circles

Handout 5: Sunnyside Up Biscuits

A handout to use with the “Sunnyside Up” interactive involving scaling up a biscuit recipe

Handout 6: Scale City Recipes

Real-life word problems about scaling recipes up

Handout 7: Scaling Down Recipes

Real-life word problems about scaling recipes down

Handout 8: Enrichment: Gears Are Circles

Problems that explore the proportional relationships of gears

CHICKEN FESTIVAL: HANDOUT 1

The Measurement Challenge

Name:

Date:

Rules: Teacher reads aloud each challenge. Students work in groups of three to four to present the items requested for each challenge. Each group places the answer to the challenges on a designated target before the bell rings. Teams with correct displays receive a point.

Round One: 5 seconds per challenge

1. Show me $\frac{1}{3}$ cup.
2. Show me 1 tablespoon.
3. Show me $\frac{1}{4}$ teaspoon.
4. Show me 1 teaspoon.
5. Show me 1 gallon.
6. Show me 2 quarts.
7. Show me $\frac{1}{2}$ cup.
8. Show me 1 tablespoon.
9. Show me $\frac{1}{2}$ teaspoon.
10. Show me $\frac{1}{4}$ cup.
11. Show me 1 cup.

Round Two: 30 seconds per challenge

1. Put 2 measuring tools together to make $\frac{3}{4}$ cup.
2. Put 2 measuring tools together to make $\frac{5}{6}$ cup.
3. Put 2 measuring tools together to make $\frac{7}{12}$ cup.
4. Put 2 measuring tools together to make $1\frac{1}{2}$ cups.
5. Show me $1\frac{1}{4}$ teaspoons.
6. There are 4 quarts in a gallon. Show me $1\frac{1}{2}$ gallons.
7. There are 3 teaspoons in a tablespoon. Using the numbers and spoons, show the equivalent to 2 tablespoons without using the tablespoon.
8. Using the $\frac{1}{4}$ cup measure and the numbers, show how many quarter cups make 3 cups.
9. There are 16 tablespoons in a cup. Using the tablespoon and numbers, show how many tablespoons there are in $\frac{1}{2}$ cup.
10. There are 4 cups in a quart and 4 quarts in a gallon. Using the cup and numbers, show how many cups are in a gallon.

The Measurement Challenge

Round Three: 30 seconds per question (90 seconds for question 10)

1. Flour is the main ingredient in banana bread. If you are making one loaf of banana bread, what measuring tool would you most likely use to measure the flour?
2. Show the measuring tool that is less than a $\frac{1}{4}$ cup and more than a teaspoon.
3. Use numbers and measuring tools to display the answer to this question: Which measuring cup is smaller: $\frac{2}{3}$ cup or $\frac{3}{4}$ cup?
4. Display the amount that solves this problem: 1 cup minus $\frac{3}{4}$ cup.
5. There are 4 cups in a quart. Display the amount that solves this problem: 2 quarts minus 6 cups.
6. There are 3 teaspoons in a tablespoon. Using a tablespoon and numbers, show how many tablespoons are in 24 teaspoons.
7. The recipe calls for $\frac{3}{4}$ cups whole-wheat flour. Double the recipe. Show much flour is needed.
8. $\frac{1}{4}$ -teaspoon salt is used in the recipe. Show how much salt you need to make 12 batches of the recipe.
9. Which cup is closer in amount to $\frac{1}{3}$ cup? $\frac{1}{4}$ cup or $\frac{1}{2}$ cup?
10. How could you measure $\frac{1}{6}$ of a cup? Show the measurements needed and be prepared to explain.

KEY: CHICKEN FESTIVAL: HANDOUT 1

The Measurement Challenge

Round Two: 30 seconds per challenge

1. Put 2 measuring tools together to make $\frac{3}{4}$ cup. *$\frac{1}{2}$ cup and $\frac{1}{4}$ cup*
2. Put 2 measuring tools together to make $\frac{5}{6}$ cup. *$\frac{1}{2}$ cup and $\frac{1}{3}$ cup*
3. Put 2 measuring tools together to make $\frac{7}{12}$ cup. *$\frac{1}{3}$ cup and $\frac{1}{4}$ cup*
4. Put 2 measuring tools together to make $1 \frac{1}{2}$ cups.
5. Show me $1 \frac{1}{4}$ teaspoons.
6. There are 4 quarts in a gallon. Show me $1 \frac{1}{2}$ gallons. *1-gallon container and 2-quart container*
7. There are 3 teaspoons in a tablespoon. Using the numbers and spoons, show the equivalent to 2 tablespoons without using the tablespoon. *6 teaspoons, $12 \frac{1}{2}$ teaspoons, $24 \frac{1}{4}$ teaspoons*
8. Using the $\frac{1}{4}$ cup measure and the numbers, show how many quarter cups make 3 cups. *12*
9. There are 16 tablespoons in a cup. Using the tablespoon and numbers, show how many tablespoons there are in $\frac{1}{2}$ cup. *8*
10. There are 4 cups in a quart and 4 quarts in a gallon. Using the cup and numbers, show how many cups are in a gallon. *16*

Round Three: 30 seconds per question (90 seconds for question 10)

1. Flour is the main ingredient in banana bread. If you are making one loaf of banana bread, what measuring tool would you most likely use to measure the flour? *1 cup*
2. Show the measuring tool that is less than a $\frac{1}{4}$ cup and more than a teaspoon. *Tablespoon*
3. Use numbers and measuring tools to display the answer to this question: Which measuring cup is smaller: $\frac{2}{3}$ cup or $\frac{3}{4}$ cup? *$\frac{2}{3}$ cup*
4. Display the amount that solves this problem: 1 cup minus $\frac{3}{4}$ cup. *$\frac{1}{4}$ cup*
5. There are 4 cups in a quart. Display the amount that solves this problem: 2 quarts minus 6 cups. *2 cups*
6. There are 3 teaspoons in a tablespoon. Using a tablespoon and numbers, show how many tablespoons are in 24 teaspoons. *8*
7. The recipe calls for $\frac{3}{4}$ cups whole-wheat flour. Double the recipe. Show much flour is needed. *$1 \frac{1}{2}$ cups*
8. $\frac{1}{4}$ -teaspoon salt is used in the recipe. Show how much salt you need to make 12 batches of the recipe. *3 teaspoons or 1 tablespoon*
9. Which cup is closer in amount to $\frac{1}{3}$ cup? $\frac{1}{4}$ cup or $\frac{1}{2}$ cup? *$\frac{1}{4}$ cup is $\frac{1}{12}$ less, $\frac{1}{2}$ cup is $\frac{2}{12}$ more*
10. How could you measure $\frac{1}{6}$ of a cup? Show the measurements needed and be prepared to explain.
One option: $2 (\frac{1}{3} \text{ cups}) - \frac{1}{2} \text{ cup} = \frac{4}{6} - \frac{3}{6} = \frac{1}{6}$
Another option: $\frac{1}{4} \text{ cup} - (1 \text{ Tablespoon} + 1 \text{ teaspoon}) = \frac{3}{12} \text{ cup} - (\frac{1}{16} \text{ cup} + \frac{1}{48} \text{ cup}) = \frac{12}{48} \text{ cup} - (\frac{3}{48} + \frac{1}{48})$
 $= \frac{12}{48} - \frac{4}{48} = \frac{8}{48} = \frac{1}{6}$
Other options: 8 teaspoons ($\frac{1}{6}$ of 48) or 3 tablespoons (9 teaspoons) minus 1 teaspoon or 2 tablespoons (6 teaspoons) + 2 teaspoons

CHICKEN FESTIVAL: HANDOUT 2

Applied Fractions

Name: _____

Date: _____

- Underline the measurement that is bigger.
 - teaspoon or tablespoon
 - cup or quart
 - gallon or quart
- There are 3 teaspoons in a tablespoon. Write the equivalent in tablespoons.
 - 15 teaspoons = _____ tablespoons
 - 9 teaspoons = _____ tablespoons
- There are 16 tablespoons in a cup. Write the equivalent in cups.
 - 4 tablespoons = _____ cup
 - 8 tablespoons = _____ cup
 - 32 tablespoons = _____ cups
- There are 4 quarts in a gallon. There are 4 cups in a quart. Write the equivalent.
 - 8 cups = _____ quarts
 - 16 cups = _____ gallon
 - 2 quarts = _____ gallon
- There are 16 ounces in a pound. Write the equivalent.
 - 4 ounces = _____ pound
 - 8 ounces = _____ pound
 - 12 ounces = _____ pound
- There are 8 fluid ounces in a cup. Write the equivalent.
 - 2 cups = _____ fluid ounces
 - $\frac{1}{2}$ cup = _____ fluid ounces
 - 10 cups = _____ fluid ounces

7. There are 64 fluid ounces in $\frac{1}{2}$ gallon. There are 34 fluid ounces in a liter.

A. 2 liters = _____ ounces

B. 1 gallon = _____ ounces

C. $\frac{1}{2}$ liter = _____ ounces

8. Use the equivalency information given above. Write the greater than ($>$), less than ($<$), or equal symbol between the following amounts.

A. 2 liters _____ $\frac{1}{2}$ gallon

B. 2 liters _____ $\frac{3}{4}$ gallon

C. $\frac{1}{2}$ liter _____ 3 cups

D. 1 ounce _____ $\frac{1}{16}$ pound

E. 16 ounces _____ $\frac{1}{2}$ pound

F. 8 ounces _____ $\frac{1}{2}$ pound

G. 4 quarts _____ 16 cups

H. 3 cups _____ 1 quart

I. 5 quarts _____ 1 gallon

KEY: CHICKEN FESTIVAL: HANDOUT 2

Applied Fractions

- Underline the measurement that is bigger.
 - teaspoon or tablespoon
 - cup or quart
 - gallon or quart
- There are 3 teaspoons in a tablespoon. Write the equivalent in tablespoons.
 - 15 teaspoons = 5 *tablespoons*
 - 9 teaspoons = 3 *tablespoons*
- There are 16 tablespoons in a cup. Write the equivalent in cups.
 - 4 tablespoons = $\frac{1}{4}$ *cup*
 - 8 tablespoons = $\frac{1}{2}$ *cup*
 - 32 tablespoons = 2 *cups*
- There are 4 quarts in a gallon. There are 4 cups in a quart. Write the equivalent.
 - 8 cups = 2 *quarts*
 - 16 cups = 1 *gallon*
 - 2 quarts = $\frac{1}{2}$ *gallon*
- There are 16 ounces in a pound. Write the equivalent.
 - 4 ounces = $\frac{1}{4}$ *pound*
 - 8 ounces = $\frac{1}{2}$ *pound*
 - 12 ounces = $\frac{3}{4}$ *pound*
- There are 8 fluid ounces in a cup. Write the equivalent.
 - 2 cups = 16 *fluid ounces*
 - $\frac{1}{2}$ cup = 4 *fluid ounces*
 - 10 cups = 80 *fluid ounces*

KEY: Applied Fractions

7. There are 64 fluid ounces in $\frac{1}{2}$ gallon. There are 34 fluid ounces in a liter.

A. 2 liters = 68 ounces

B. 1 gallon = 128 ounces

C. $\frac{1}{2}$ liter = 17 ounces

8. Use the equivalency information given above. Write the greater than ($>$), less than ($<$), or equal symbol between the following amounts.

A. 2 liters $>$ $\frac{1}{2}$ gallon

B. 2 liters $<$ $\frac{3}{4}$ gallon

C. $\frac{1}{2}$ liter $<$ 3 cups

D. 1 ounce = $\frac{1}{16}$ pound

E. 16 ounces $>$ $\frac{1}{2}$ pound

F. 8 ounces = $\frac{1}{2}$ pound

G. 4 quarts = 16 cups

H. 3 cups $<$ 1 quart

I. 5 quarts $>$ 1 gallon

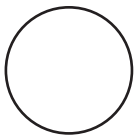
CHICKEN FESTIVAL: HANDOUT 3

Circles

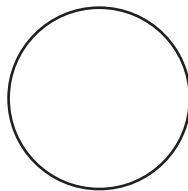
Name: _____

Date: _____

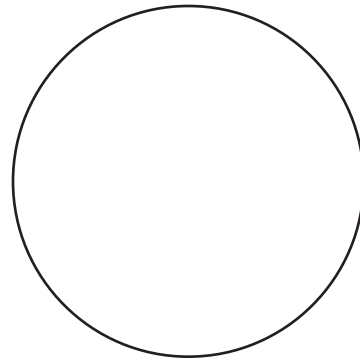
1-3. The circumference is the distance around the circle. The diameter is the distance across. Estimate where the center of the circle is located and using string or paper, measure how many diameters of each circle are in the circumference. Using your measurement, give an estimate of circumference divided by diameter.



1. _____



2. _____



3. _____

We have learned that $\pi = \text{circumference} \div \text{diameter}$. Use a calculator that has the value of pi or use 3.14 as the value of pi and find the circumference or diameter as requested in questions 4 and 5.

4. If the diameter of the circle is 4.5 feet, what is the circumference? (Round to the nearest tenth.)

5. If the circumference of the circle is 365 inches, what is the diameter? (Round to the nearest tenth.)

6. The formula for finding the area of a circle is $\text{Area} = \pi r^2$. Calculate the areas of two circles, one with a 1-foot diameter and one with a 10.5-foot diameter. Round to the nearest tenth.

KEY: CHICKEN FESTIVAL: HANDOUT 3

Circles

1-3. The circumference is the distance around the circle. The diameter is the distance across. Estimate where the center of the circle is located and using string or paper, measure how many diameters of each circle are in the circumference. Using your measurement, give an estimate of circumference divided by diameter.

Students should find that there are a little more than 3 lengths of the diameter in each circumference.

We have learned that $\pi = \text{circumference}/\text{diameter}$. Use a calculator that has the value of pi and find the circumference or diameter as requested in numbers 4 and 5.

4. If the diameter of the circle is 4.5 feet, what is the circumference? (Round to the nearest tenth.)

$$\pi = \text{circumference}/\text{diameter}$$

$$\pi = \text{circumference}/4.5 \text{ feet}$$

$$4.5 \text{ feet } (\pi) = \text{circumference}$$

$$\text{circumference} = 14.1 \text{ feet}$$

5. If the circumference of the circle is 365 inches, what is the diameter? (Round to the nearest tenth.)

$$\pi = \text{circumference}/\text{diameter}$$

$$\pi = 365/\text{diameter}$$

$$\pi \times \text{diameter} = 365$$

$$\text{diameter} = 365/\pi$$

$$\text{diameter} = 116.2 \text{ inches}$$

6. The formula for finding the area of a circle is $\text{Area} = \pi r^2$. Calculate the areas of the two circles. Round to the nearest tenth.

1-foot diameter 10.5-foot diameter

$$\text{Area} = \pi r^2$$

$$\text{Area} = \pi r^2$$

$$\text{Area} = \pi (0.5)^2$$

$$\text{Area} = \pi (5.25)^2$$

$$A = 0.8 \text{ ft}^2$$

$$A = 86.6 \text{ ft}^2$$

CHICKEN FESTIVAL: HANDOUT 4

Circle Practice

Name:

Date:

1. We have used many terms about circles today. Draw a circle below and label the circumference, diameter, and radius. You may use colored pencils, a ruler, a compass, and/or string.
2. If the diameter of a circle is 5 inches, what is the circumference? (Round to the nearest inch.)
3. If the circumference of the circle is 32 inches, what is the diameter? (Round to the nearest inch.)
4. Is the area of Circle 2 ten times bigger than the area of Circle 1? Calculate and find out. Round to the nearest square foot.

Circle 1

Diameter = 2 inches

Circle 2

Diameter = 20 inches

5. Compare the areas of a 2-inch and 20-inch circle by representing the small circle as a fraction of the larger circle. What percent of the area of the larger circle is the area of the smaller circle?

6. As a craft project for 4-H club, Cam is making a tablecloth for her grandmother's dining room table. A ribbon will go around the edge of the tablecloth. The table is 48 inches in diameter. How many inches of ribbon are needed to go around the edge? (Give your answer to rounded to the nearest inch.)

7. Jack's older brother says pi means a piece of a circle. Jack tells him pi is a ratio, but he needs you to explain what the ratio is. Define the ratio of pi.

8. A group of middle school students likes to create accessories for their kick scooters. One decoration for wheels with hubs comes from the center of the wheel out to create a spiral of design when the wheel is turning. Each decorative piece is as long as the radius of the hub. The hub diameter is half the size of the wheel. Fill in the chart with the size of the radius or lengths of material needed for each scooter wheel. Remember, 1 cm = 10 mm.

Diameter of Wheel	Diameter of Hub	Radius of Hub	Length of Material in cm
100 mm			
110 mm			
140 mm			
150 mm			

9. A community center uses circles as symbols of community and unity. An artist has designed an abstract mural of circles for one wall. Given the diameter of the circles, determine the radius, area, and amount of paint needed for each circle. Round your answers to the nearest square foot.

Diameter and Color	Radius	Area	Total Area Per Color
4 feet green			
6 feet green			
3 feet blue			
2 feet blue			
1 foot yellow			
2 feet yellow			
6 feet purple			

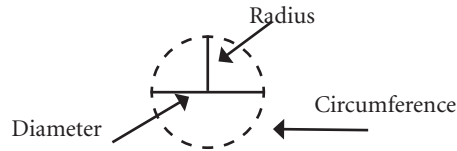
A pint of paint covers 25 square feet. Half-pint containers are also available.

Diameter and Color	Paint Needed
Green	
Blue	
Yellow	
Purple	

KEY: CHICKEN FESTIVAL: HANDOUT 4

Circle Practice

1. We have used many terms about circles today. Draw a circle below and label the circumference, diameter and radius. You may use colored pencils, a ruler, a compass, and/or string.



2. If the diameter of the circle is 5 inches, what is the circumference? (Round to the nearest inch.)

$$\pi = \text{circumference} \div \text{diameter}$$

$$\pi = \text{circumference} \div 5 \text{ inches}$$

$$5 \text{ inches} \cdot \pi = \text{circumference}$$

$$\text{circumference} = 16 \text{ inches}$$

3. If the circumference of the circle is 32 inches, what is the diameter? (Round to the nearest inch.)

$$\pi = \text{circumference} \div \text{diameter}$$

$$\pi = 32 \div \text{diameter}$$

$$\pi \cdot \text{diameter} = 32$$

$$\text{diameter} = 32 \div \pi$$

$$\text{diameter} = 10 \text{ inches}$$

4. Is the area of Circle 2 ten times bigger than the area of Circle 1? Calculate and find out. Round to the nearest square foot.

Circle 1

Diameter = 2 inches

$$\text{Area} = \pi (1)^2$$

$$A = 3 \text{ ft}^2$$

Circle 2

Diameter = 20 inches

$$\text{Area} = \pi (10)^2$$

$$A = 314 \text{ ft}^2$$

Teaching Tip:

As students are becoming accustomed to seeing how increasing the radius of a circle affects its area, you might do more simple problems like this one in which they see what happens when you double or triple the diameter or the radius.

5. Compare the areas of a 2-inch and 20-inch circle writing the small circle as a fraction of the larger circle. What percent of the area of the larger circle is the area of the smaller circle?

$$3 \div 314 = .01 \text{ or } 1\% \text{ of the area of the larger circle}$$

6. As a craft project for 4-H club, Cam is making a tablecloth for her grandmother's dining room table. A ribbon will go around the edge of the tablecloth. The table is 48 inches in diameter. How many inches of ribbon are needed to go around the edge? (Give your answer to the nearest inch.)

$$\pi = \text{circumference} \div \text{diameter}$$

$$\pi = \text{circumference} \div 48 \text{ inches}$$

$$\pi (48 \text{ inches}) = \text{circumference}$$

$$151 \text{ inches of ribbon}$$

7. Jack's older brother says pi means a piece of a circle. Jack tells him pi is a ratio, but he needs you to explain what the ratio is. Define the ratio of pi.

$\pi = \text{circumference} \div \text{diameter}$. The value of this ratio is a constant that is slightly more than three. It's often represented as 3.14, which is approximately 3 and $\frac{1}{7}$. However, it's an irrational number that never ends and never repeats its sequences.

8. A group of middle school students likes to create accessories for their kick scooters. One decoration for wheels with hubs comes from the center of the wheel out to create a spiral of design when the wheel is turning. Each decorative piece is as long as the radius of the hub. The hub diameter is half the size of the wheel. Fill in the chart with the size of the radius or lengths of material needed for each scooter wheel. Remember, 1 cm = 10 mm.

Diameter of Wheel	Diameter of Hub	Radius of Hub	Length of Material in cm
100 mm	50 mm	25 mm	2.5 cm
110 mm	55 mm	27.5 mm	2.75 cm
140 mm	70 mm	35 mm	3.5 mm
150 mm	75 mm	37.5 mm	3.75 mm

9. The community center uses circles as symbols of community and unity. An artist has designed an abstract mural of circles for one wall. Given the diameter of the circles, determine the radius, area and amount of paint needed for each circle. Round your answers to the nearest square foot.

Diameter and Color	Radius	Area	Total Area Per Color
4 feet green	2 feet	13 sq. feet	41 sq. feet
6 feet green	3 feet	28 sq. feet	
3 feet blue	1.5 feet	7 sq. feet	10 sq. feet
2 feet blue	1 foot	3 sq. feet	
1 foot yellow	0.5 feet	1 sq. feet	4 sq. feet
2 feet yellow	1 foot	3 sq. feet	
6 feet purple	3 feet	28 sq. feet	28 sq. feet

A pint of paint covers 25 square feet. Half-pint containers are also available.

Diameter and Color	Paint Needed
Green	2 pints
Blue	$\frac{1}{2}$ pint
Yellow	$\frac{1}{2}$ pint
Purple	1 $\frac{1}{2}$ pints

CHICKEN FESTIVAL: HANDOUT 5

Sunnyside Up Biscuits

Name: _____

Date: _____

You are adjusting a recipe so there are 2 biscuits for each person. There are 108 people total. The original recipe makes 12 biscuits.

1. How many times do you need to increase the recipe? (How many batches of biscuits are needed?) Show your work.

2. Complete the biscuit recipe chart.

Ingredients	Original Amount	Increased Amount	Shopping List
Flour	2 cups		_____ 5-lb. bags
Baking Powder	1 tbsp.		_____ 10-oz. package
Salt	1/2 tsp.		_____ 26-oz. package
Shortening	1/4 cup		_____ 3 lb.-can
Milk	3/4 cup		_____ quarts

Conversion Hints:

20 cups in a 5-pound bag of flour

Baking powder: 2 tablespoons in one ounce

Salt: 6 tsp. in one ounce

Shortening: 6 cups in a 3-pound can

Milk: 4 cups in a quart

3. Calculate the amount of the ingredients that you will have left over.

Ingredients	Left Over after Recipe
Flour	
Baking Powder	
Salt	
Shortening	
Milk	

KEY: CHICKEN FESTIVAL: HANDOUT 5

Sunnyside Up Biscuits

You are adjusting a recipe so there are 2 biscuits for each person. There are 108 people total. The original recipe makes 12 biscuits.

1. How many times do you need to increase the recipe? (How many batches of biscuits are needed?) Show your work. (Here are just a few approaches to the problem.)

Find out how many total biscuits are needed. $2 \times 108 = 216$
 Divide the total biscuits by the number in each batch. $216 \div 12 = 18$ or $[2(108)] \div 12$

Find out how many biscuit recipes are needed for 108. $108 \div 12 = 9$
 Double that amount so everyone gets 2. $9 \times 2 = 18$

Let x = the number of batches
 Think about what elements should be equal.
 The number of biscuits needed should be equal to the number of biscuits made.
 $108(2)$ is the number of biscuits needed since all 108 people can eat 2 biscuits
 12 times x is the number of biscuits made (the number of biscuits in a batch times the number of batches)
 $108(2) = 12x$
 $x = 216 \div 12 = 18$

2. Complete the biscuit recipe chart.

Ingredients	Original Amount	Increased Amount	Shopping List
Flour	2 cups	36 cups	<u>2</u> 5 lb.-bags
Baking Powder	1 tbsp.	18 tbsp.	<u>1</u> 10 oz.-package
Salt	1/2 tsp.	9 tsp.	<u>1</u> 26 oz.-package
Shortening	1/4 cup	4.5 cups	<u>1</u> 3 lb.-can
Milk	3/4 cup	13.5 cups	<u>4</u> quarts

Conversion Hints:

20 cups in a 5-pound bag of flour
 Baking powder: 2 tablespoons in one ounce
 Salt: 6 tsp. in one ounce
 Shortening: 6 cups in a 3-pound can
 Milk: 4 cups in a quart

3. Calculate the amount of the ingredients that you will have left over.

Ingredients	Left Over after Recipe
Flour	4 cups
Baking Powder	2 tbsp. or 1 ounce
Salt	24.5 ounces
Shortening	1.5 cups
Milk	2.5 cups

CHICKEN FESTIVAL: HANDOUT 6

Scale City Recipes

Name: _____ **Date:** _____

1. Your mother suggests there is a much faster way to prepare your share of the food for the family reunion. She suggests buying in large packages from the grocery store and purchasing the chicken from the deli. 108 people are coming to the reunion. Can you buy all the food for \$250?

Food Item	Servings Per Package	Price	Servings Needed
10-inch pre-sliced pie	8 pieces	\$5.00	1 piece per person
Frozen biscuits	20 biscuits	\$3.25	2 biscuits per person
Bucket of chicken	9 pieces	\$10.00	1 piece per person
Tea	1 gallon	\$2.50	1/2 gallon for 4 people

Food Item	Servings Per Package	Number of Packages Needed	Cost of 1 Package	Cost of Food	Running Total
Pie			\$5.00		
Biscuits			\$3.25		
Chicken			\$10.00		
Tea			\$2.50		

Can you buy all the food for \$250?

2. Bing’s family is making dumplings for the New Year celebration. Her family of three uses the following recipe to make dumplings. Convert the recipe to feed 60 people.

Serves 3	Serves 60	Packaging Guide	Shopping List
15 dumpling wraps		45 wraps per package	_____ packages dumpling wraps
1/4 lb. ground pork		1 lb. packages	_____ lbs. ground pork
5 mushrooms		25 per 1/2 lb.	_____ lbs. mushrooms
1 large clove garlic		8 cloves in a bulb	_____ bulbs garlic
1/8 tsp. ground ginger		3 tsp. in a tbsp. 1.5-oz. container has 3/4 cup	_____ 1.5-oz. container ground ginger
1 green onion, minced		8 green onions in a bunch	_____ bunches green onions
2 tsp. soy sauce		20-oz. bottle has 3/4 cup	_____ 20-oz. bottles soy sauce
1/16 tsp. black pepper		2-oz. container has 3/4 cup	_____ 2-oz. container black pepper
1 egg		12 in a dozen	_____ dozen eggs

3. To raise money for the local animal shelter, Kris's school is making dog biscuits to sell. Six biscuits will be sold as a unit for three dollars per package. A local grocery is donating the ingredients for the fundraiser.

A. The school wants to raise \$1,500 for the shelter. How many packages will they need to sell?

B. How many dog biscuits will they need to make?

C. If the recipe makes 60 biscuits, how many batches of the recipe will be needed?

D. Complete the chart.

Basic Yeast Dog Treats Recipe

Ingredients	Original Amount	Increased Amount	Shopping List
Unbleached flour	3.5 cups		_____ 10-lb. bags _____ 5 lb.-bags
Whole wheat flour	2 cups		_____ 10-lb. bags _____ 5-lb. bags
Cornmeal	1 cup		_____ 5-lb bags
Skim milk powder	1/2 cup		_____ 4.4-lb. container
Dry yeast	1 packet		_____ pkgs. of 3 packets
Water	3.5 cups		_____ gallons
Chicken bouillon cubes	3		_____ 3.25-oz. containers

Conversion Hints:

40 cups in a 10-lb. bag of flour

20 cups in a 5-lb. bag of flour

13.5 cups in 5-lb. cornmeal

29 cups in a 4.4-lb. container of nonfat dry milk

Dry yeast sold in packages of 3 packets

16 cups water in a gallon

25 bouillon cubes per 3.25-oz. container

KEY: CHICKEN FESTIVAL: HANDOUT 6

Scale City Recipes

1. Your mother suggests there is a much faster way to prepare your share of the food for the family reunion. She suggests buying in large packages from the grocery store and purchasing the chicken from the deli. 108 people are coming to the reunion. Can you buy all the food for \$250?

Food Item	Servings Per Package	Price	Servings Needed
10-inch pre-sliced pie	8 pieces	\$5.00	1 piece per person
Frozen biscuits	20 biscuits	\$3.25	2 biscuits per person
Bucket of chicken	9 pieces	\$10.00	1 piece per person
Tea	1 gallon	\$2.50	1/2 gallon per 4 people

Food Item	Servings Per Package	Number of Packages Needed	Cost of 1 Package	Cost of Food	Running Total
Pie	8	14	\$5.00	\$70.00	\$70.00
Biscuits	10	11	\$3.25	\$35.75	\$105.75
Chicken	9	12	\$10.00	\$120.00	\$225.75
Tea	8	14	\$2.50	\$35.00	\$260.75

Can you buy all the food for \$250? *No, the total cost is \$260.75.*

2. Bing's family is making dumplings for the New Year celebration. Her family of three uses the following recipe to make dumplings. Convert the recipe to feed 60 people.

Serves 3	Serves 60	Packaging Guide	Shopping List
15 dumpling wraps	300 dumpling wraps	45 wraps per package	<u>7</u> packages dumpling wraps
1/4 lb. ground pork	5 lb. ground pork	1-lb. packages	<u>5</u> packages ground pork
5 mushrooms	100 mushrooms	25 per 1/2 lb.	<u>2</u> lb. mushrooms
1 large clove garlic	20 cloves	8 cloves in a bulb	<u>3</u> garlic bulbs
1/8 tsp. ground ginger	2 1/2 tsp. ginger	3 tsp. in a tbsp. 1.5-oz. container has 3/4 cup	<u>1</u> 1.5-oz. container ground ginger
1 green onion, minced	20 green onions	8 green onions in a bunch	<u>3</u> bunches green onions
2 tsp. soy sauce	40 tsp. soy sauce	20-oz. bottle has 3/4 cup	<u>1</u> 20-oz. bottle soy sauce
1/16 tsp. black pepper	1 1/4 tsp. black pepper	2-oz. container has 3/4 cup	<u>1</u> 2-oz. bottle black pepper
1 egg	20 eggs	12 in a dozen	<u>2</u> dozen eggs

3. To raise money for the local animal shelter, Kris’s school is making dog biscuits to sell. Six biscuits will be sold as a unit for three dollars per package. A local grocery is donating the ingredients for the fundraiser.

A. The school wants to raise \$1,500 for the shelter. How many packages will they need to sell?

$$1500/3 = 500 \text{ packages}$$

B. How many dog biscuits will they need to make?

$$6 \times 500 = 3000 \text{ dog biscuits}$$

C. If the recipe makes 60 biscuits, how many batches of the recipe will be needed?

$$3000 \div 60 = 50$$

D. Complete the chart.

Basic Yeast Dog Treats Recipe

Ingredients	Original Amount	Increased Amount	Shopping List
Unbleached flour	3.5 cups	175 cups	<u>4</u> 10-lb. bags <u>1</u> 5-lb. bag
Whole wheat flour	2 cups	100 cups	<u>2</u> 10-lb. bags <u>1</u> 5-lb. bag
Cornmeal	1 cup	50 cups	<u>4</u> 5-lb. bags
Skim milk powder	1/2 cup	25 cups	<u>1</u> 4.4-lb. container
Dry yeast	1 packet	50 packets	<u>17</u> pkgs. of 3 packets
Water	3.5 cups	175 cups	<u>10 and 15/16</u> gallons
Chicken bouillon cubes	3	150 cubes	<u>6</u> 3.25 oz. containers

Conversion Hints:

- 40 cups in a 10-lb. bag of flour
- 20 cups in a 5-lb. bag of flour
- 13.5 cups in 5-lb. cornmeal
- 29 cups in a 4.4-lb. container of nonfat dry milk
- Dry yeast sold in packages of 3 packets
- 16 cups water in a gallon
- 25 bouillon cubes per 3.25-oz. container

CHICKEN FESTIVAL: HANDOUT 7

Scaling Down Recipes

Name: _____

Date: _____

1. Minnie's grandmother's blueberry pancake recipe feeds 12 people. One weekend when Minnie was staying alone with her grandma, they decided to make pancakes. Grandma had only one cup of flour.

A. How could Grandma and Minnie adjust the recipe using 1 cup flour?

Grandma's Blueberry Pancakes for 12

3 cups all-purpose flour

2 tablespoons sugar

3/4 teaspoon salt

3 eggs

1 1/2 tablespoons baking powder

1 teaspoon vanilla

1/2 cup vegetable oil

1 cup blueberries

There are 3 teaspoons in a tablespoon

There are 16 tablespoons in a cup.

B. How many people would the adjusted recipe feed?

Adjusted Recipe

_____ cup flour

_____ teaspoons sugar

_____ teaspoons salt

_____ eggs

_____ tablespoon baking powder

_____ teaspoon vanilla

_____ cup vegetable oil

_____ cup blueberries

2. A pimento cheese recipe calls for 1/2 cup of pimento and makes enough for 36 sandwiches. The family only has 1/3 cup pimento. If they scale back the recipe to use 1/3 cup pimento, how many sandwiches will they be able to make?

3. The family says Grandma's pickles are the most important ingredient in making her potato salad special. They have 1/2 cup of pickles. Her original recipe needs 3/4 cup pickles and makes 24 servings. Grandma scales down the recipe. If she makes enough potato salad to use all the pickles, how many servings will she make?

KEY: CHICKEN FESTIVAL: HANDOUT 7

Scaling Down Recipes

1. Minnie's grandmother's blueberry pancake recipe feeds 12 people. One weekend when Minnie was staying alone with her grandma, they decided to make pancakes. Grandma had only one cup of flour.

A. How could Grandma and Minnie adjust the recipe using 1 cup flour?

Grandma's Blueberry Pancakes for 12

3 cups all-purpose flour
2 tablespoons sugar
 $\frac{3}{4}$ teaspoon salt
3 eggs
1 $\frac{1}{2}$ tablespoons baking powder
1 teaspoon vanilla
 $\frac{1}{2}$ cup vegetable oil
1 cup blueberries

Adjusted Recipe

1 cup flour
2 teaspoons sugar
 $\frac{1}{4}$ teaspoon salt
1 egg
 $\frac{1}{2}$ tablespoon baking powder
 $\frac{1}{3}$ teaspoon vanilla
 $\frac{1}{6}$ cup vegetable oil
 $\frac{1}{3}$ cup blueberries

There are 3 teaspoons in a tablespoon

There are 16 tablespoons in a cup.

B. How many people would the adjusted recipe feed? *4 people*

2. A pimento cheese recipe calls for $\frac{1}{2}$ cup of pimento and makes enough for 36 sandwiches. The family only has $\frac{1}{3}$ cup pimento. If they scale back the recipe to use $\frac{1}{3}$ cup pimento, how many sandwiches will they be able to make?
24 sandwiches

(Students may think of other ways to solve this problem.)

Amount in original recipe/total servings = amount in revised recipe/total servings

$$(\frac{1}{2})/36 = (\frac{1}{3})/x$$

$$\frac{1}{2}x = \frac{1}{3} \cdot 36$$

$$\frac{1}{2}x = \frac{36}{3}$$

$$\frac{1}{2}x = 12$$

$$x = 24$$

3. The family says Grandma's pickles are the most important ingredient in making her potato salad special. They have $\frac{1}{2}$ cup of pickles. Her original recipe needs $\frac{3}{4}$ cup pickles and makes 24 servings. Grandma scales down the recipe. If she makes enough potato salad to use all the pickles, how many servings will she make?

16 servings

(Students may think of other ways to solve this problem.)

Amount in original recipe/total servings = amount in revised recipe/total servings

$$(\frac{1}{2})/x = (\frac{3}{4})/24$$

$$(\frac{1}{2})(24) = (\frac{3}{4})x$$

$$12 = \frac{3}{4}x$$

$$16 = x$$

CHICKEN FESTIVAL: HANDOUT 8

Enrichment: Gears Are Circles

Name:

Date:

1. Two gears move in a 2:1 ratio. The larger gear has a diameter twice the size of the smaller gear. The smaller gear turns twice as fast as the larger gear.

A. Describe the sizes and speeds of two gears with a 3:1 ratio.

B. Describe the sizes and speeds of two gears with a 5 to 1 ratio.

2. Another way to determine gear ratio is by the number of teeth on one gear in proportion to the number of teeth on another gear.

A. If one gear has 60 teeth and another gear has 15 teeth, what is the gear ratio?

B. If one gear has 50 teeth and another gear has 25 teeth, what is the gear ratio?

3. Electric mixers and windshield wipers operate with worm gears. Worm gears have a shaft and wheel gear. The shaft has grooves that connect with the teeth of the wheel gear. Every time the shaft turns around once, the wheel moves one gear. If the wheel gear has 36 teeth, the gear ratio is 36:1. What is the gear ratio when the wheel has 44 teeth?

4. Consider a bicycle with wheels that are 26 inches in diameter.

A. What would be the circumference of this wheel? (Round to the nearest inch.)

Enrichment: Gears Are Circles

B. So if the wheel goes around twice, how far does the 26-inch bike travel? (Round to the nearest inch.)

C. The chain wheel is the front gear by the pedal. The free wheel is the gear by the back tire. If the front chain wheel is on a gear with 24 teeth and the free wheel has 32 teeth, what is the decimal value of the gear ratio?

D. For each pedal stroke, the rear wheel turns proportionately to the gear ratio. How far does the bike travel when a person pedals once?

KEY: CHICKEN FESTIVAL: HANDOUT 8

Enrichment: Gears Are Circles

1. Two gears move in a 2:1 ratio. The larger gear has a diameter twice the size of the smaller gear. The smaller gear turns twice as fast as the larger gear.

A. Describe the sizes and speeds of two gears with a 3:1 ratio.

The larger gear has a diameter 3 times the size of the smaller gear. The smaller gear turns 3 times as fast as the larger gear.

B. Describe the sizes and speeds of two gears with a 5 to 1 ratio.

The larger gear has a diameter 5 times the size of the smaller gear. The smaller gear turns around 5 times for every one turn of the larger gear.

2. Another way to determine gear ratio is by the number of teeth on one gear in proportion to the number of teeth on another gear.

A. If one gear has 60 teeth and another gear has 15 teeth, what is the gear ratio? *4:1*

B. If one gear has 50 teeth and another gear has 25 teeth, what is the gear ratio? *50/25 or 2:1*

3. Electric mixers and windshield wipers operate with worm gears. Worm gears have a shaft and wheel gear. The shaft has grooves that connect with the teeth of the wheel gear. Every time the shaft turns around once, the wheel moves one gear. If the wheel gear has 36 teeth, the gear ratio is 36:1. What is the gear ratio when the wheel has 44 teeth? *44:1*

4. Consider a bicycle with wheels that are 26 inches in diameter.

A. What would be the circumference of this wheel? (Round to the nearest inch.)

$$\pi = \text{circumference} \div \text{diameter}$$

$$\pi \times 26 = 82 \text{ inches}$$

B. So if the wheel goes around twice, how far does the 26-inch bike travel? (Round to the nearest inch.)

$$164 \text{ inches}$$

C. The chain wheel is the front gear by the pedal. The free wheel is the gear by the back tire. If the front chain wheel is on a gear with 24 teeth and the free wheel has 32 teeth, what is the decimal value of the gear ratio?

$$24 \div 32 = 0.75$$

D. For each pedal stroke, the rear wheel turns proportionately to the gear ratio. How far does the bike travel when a person pedals once?

$$0.75 \times 82 = 62 \text{ inches}$$