

Title: Fraction Camp

Brief Overview:

Students will be engaged in activities using manipulatives to complete tasks involving fractions and decimals. They will be incorporating decimals, in the form of money, during a mock-shopping trip. The students will be able to make equivalent fractions and use fractions when designing a map and flag.

Links to NCTM 2000 Standards:

- **Standard 1: Number and Operations**

Mathematics instructional programs should foster the development of number and operation sense so that all students understand numbers, ways of representing numbers, relationships among numbers, and number systems; understand the meaning of operations and how they relate to each other; and use computational tools and strategies fluently.

- **Standard 2: Patterns, Functions, and Algebra**

Mathematics instructional programs should include attention to patterns, functions, symbols, and models so that all students understand various types of patterns and functional relationships; and use symbolic forms to represent and analyze mathematical situations and structures.

- **Standard 3: Geometry and Spatial Sense**

Mathematics instructional programs should include attention to geometry and spatial sense so that all students use visualization and spatial reasoning to solve problems both within and outside of mathematics.

- **Standard 4: Measurement**

Mathematics instructional programs should include attention to measurement so that all students apply a variety of techniques, tools, and formulas for determining measurements.

- **Standard 5: Data Analysis, Statistics, and Probability**

Mathematics instructional programs should include attention to data analysis, statistics, and probability so that all students pose questions and collect, organize, and represent data to answer those questions; and interpret data using methods of exploratory data analysis.

- **Standard 6: Problem Solving**

Mathematics instructional programs should focus on solving problems as part of understanding mathematics so that all students build new mathematical knowledge through work with problems; apply a wide variety of strategies to solve problems and adapt the strategies to new situations; and monitor and reflect on their mathematical thinking in solving problems.

- **Standard 7: Reasoning and Proof**

Mathematics instructional programs should focus on learning to reason and construct proofs as part of understanding mathematics so that all students select and use various types of reasoning and methods of proof as appropriate.

- **Standard 8: Communication**

Mathematics instructional programs should use communication to foster an understanding of mathematics so that all students organize and consolidate their mathematical thinking with others; express mathematical ideas coherently and clearly to peers, teachers, and others; and use the language of mathematics as a precise means of mathematical expression.

- **Standard 9: Connections**

Mathematics instructional programs should emphasize connections to foster an understanding of mathematics so that all students recognize and use connections among different mathematical ideas; understand how mathematical ideas build on one another to produce a coherent whole; and recognize, use, and learn about mathematics in contexts outside of mathematics.

- **Standard 10: Representation**

Mathematics instructional programs should emphasize mathematical representation to foster an understanding of mathematics so that all students create and use representations to organize, record, and communicate mathematical ideas; and develop a repertoire of mathematical representations that can be used purposefully, flexibly, and appropriately.

Grade/Level:

Grade 5

Duration/Length:

This unit will take a minimum of 5 class periods (45-60 min) to complete.

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Recognizing fractions as part of a whole
- Working with equivalent fractions
- Adding and/or multiplying fractions
- Graphs
- Proper format of a business letter
- Cardinal directions

Student Outcomes:

Students will:

- work cooperatively in groups.
- demonstrate fractional parts of a whole by using manipulatives.
- identify equivalent fractions.
- graph results of class survey.
- explain reasoning behind decisions they made.

Materials/Resources/Printed Materials:

- Student Resource pages 1 - 8
- Teacher Resource pages 1 - 3
- Fraction Calculator (optional)
- Geoboards
- Pattern Blocks
- Fraction Builder manipulatives
- Large white paper
- Crayons, markers, or colored pencils
- Rulers
- Scissors and glue
- English/Language textbook for reference

Development/Procedures:

The students will be given a scenario concerning a radio station that is conducting a contest to send a group of four students to fraction camp.

WPIE is having a contest to send four students to fraction camp. This isn't a contest that you get to just call in to win. If you want to win, you have to work. You're going to have to shop, pack your bag, and create a flag.

Once you've completed these tasks you will be required to write a business letter justifying why the radio station should pick your group based on all your work and mathematical thinking.

Task 1:

- Teacher needs to prepare a bar graph or pictograph on the chalkboard and provide cut out sleeping bags in red, green, and blue for students. A pattern for these have been provided on Teacher Resource Page #1.
- Students will choose a cut out to represent their favorite color sleeping bag.

- They will write their names on their sleeping bag and using tape place their sleeping bag on the board in the appropriate spot. Teacher will demonstrate.
- After the graph is complete the class will discuss the results of their survey. Finally, the class will determine the fraction of the class who chose red, blue, or green as their favorite color sleeping bag.

Task 2:

- Students will be given Student Resource Page #1 with items listed that are needed for the camping trip. Students will be also given Student Resource Page #2 with the prices of the items listed on it.
- Students will use the information that has been provided to purchase all of the required items from the choices given. They must justify their choices with an explanation of why they chose the particular items.
- Two items will be presented with a percentage off the regular price. Students will have to take the full price and determine the final sale price. At this point students are encouraged to use calculators. Teacher should model the correct procedure for solving a problem involving percentages. The students may also need a quick review on correct procedure for using a calculator.
- Students will total their final cost based on items they selected. They will need to spend as little as they can on their supplies. This means that they need to choose the items that they purchase carefully.

Task 3:

- Once students have completed their shopping, they need to use pattern blocks to determine whether all their items will fit in their bag.
- Students will be given Student Resource Page #3 containing a model of the backpack and Student Resource Page #4 containing a list of the supplies listed as a fraction of the total space. Teacher will use Teacher Resource Page #2 to score this activity.
- Students will use the provided pattern blocks to manipulate all of the fractional portions into the space of the backpack. The students will then trace the outline of the pattern blocks that represents the items and label them for the teacher to review.

Task 4:

- Students will use Student Resource Page #5 to complete a fraction flag. Students will pick a fraction (e.g., 4ths, 24ths) to identify their group. See Student Resource Page # 5.
- Students will create a model of their flag on a geoboard. The students need to take the geoboard and rubber bands and divide the geoboard into equal parts.

- Students will share their geoboard model with the teacher. Once the teacher approves the model the students will make their flags with the art supplies provided by teacher.

Task 5:

- Teacher will provide students with Student Resource Page #6, Student Resource Page #7, and fraction builder manipulatives.
- The students will be given the scenario that they are to cook the meals for a day. This includes breakfast, lunch, and dinner. The only problem is that the recipe is for one and they have to serve four.
- Students will use fraction builders if needed to convert the recipes from 1 serving to four servings. Students need to be reminded that all fractions need to be reduced to lowest terms.

Task 6: (Performance Assessment Activity)

- Teacher will provide students with Student Resource Page #8.
- Students may use English/Language textbook as a reference for correct business letter format.
- Students will use provided writing prompt to write a business letter to the radio station explaining why they should be chosen as the winner of the contest.
- Students will be required to include why they made the mathematical decisions they did.
- Teacher will use Teacher Resource Page #3 to score letter.

Performance Assessment:

There will be continuous assessment throughout all activities, using teacher observation, student resource sheets, and rubrics. There will be a final assessment consisting of a business letter. The rubrics that are provided may be adapted to meet the teacher's own objectives.

Extension/Follow Up:

- Students may take a shopping trip to a real grocery store and calculate a grocery order.
- Students could complete a cooking activity where the students will be asked to bring in a recipe and convert the recipe to feed all of their classmates. The students then can cook the food and bring it in to share with the class.
- Students could graph the color of sleeping bags they choose on their shopping trip. Then they could compare it to the original graph of everyone's favorite color sleeping bag.

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Woods' Outdoor Camping Store

SALE: Tents 20% off

Cots 10% off

Item	Description	Price
small dome tent	2people, 50 sq. feet	\$69.95
medium dome tent	4people, 70 sq. feet	\$149.95
large dome tent	6people, 90 sq. feet	\$199.95
screen room	12x20 floor	\$134.95
screen room	18x32 floor	\$184.95
camp cot		\$17.95
lightweight cot	Aluminum	\$59.95
army-style cot		\$64.95
bunk bed cot	2 people	\$75.95
Deluxe sleeping bag	popular character	\$39.95
basic sleeping bags	blue, green, or red	\$22.95
super deluxe bag	pillow/sheets built in	59.95
small gear bag	backpack holds 2-4 lbs.	\$9.95
medium gear bag	backpack holds 6-8 lbs.	\$15.95
large gear bag	backpack holds 9-11 lbs.	\$21.95
super gear bag	detachable wheels 30 lbs. limit	\$45.95

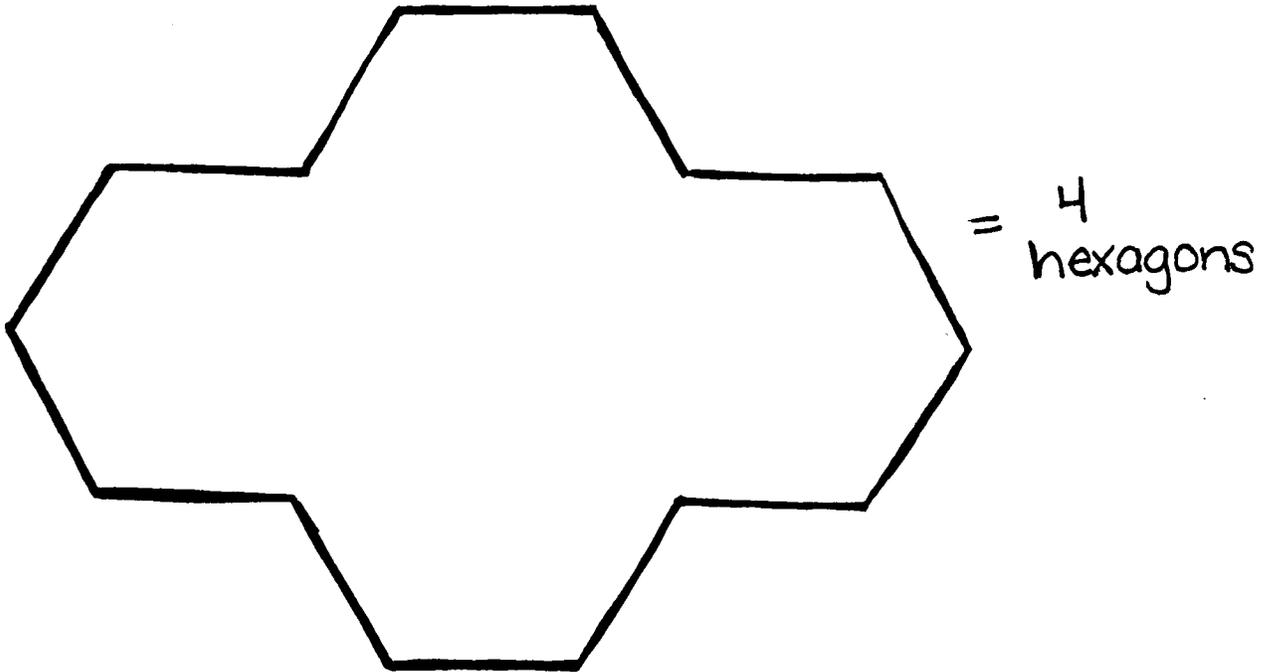


Name _____ Date _____

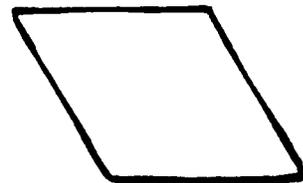
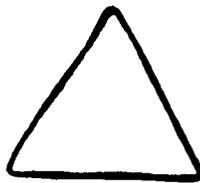
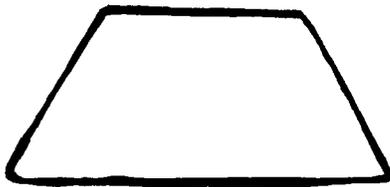
Woods' Outdoor Camping Store

Directions: Fill in the chart below to complete the shopping trip.

Item	Sale Calculation	Price
Tent	20% off	
Screen room		
4 Cots	10% off	
4 Sleeping bags		
4 Gear Bags		
		Total \$



This is the outline of the opening of your backpack. Use the list of items that have to be packed and your pattern blocks, and figure where each item needs to be placed so that everything will fit in the bag. After you have placed everything using the pattern blocks, draw the space each item takes up and label it correctly with the item name.



Trapezoid

Triangle

Rhombus

These are the only blocks that will be used while completing this activity.

It's Time to Pack Your Bag! !

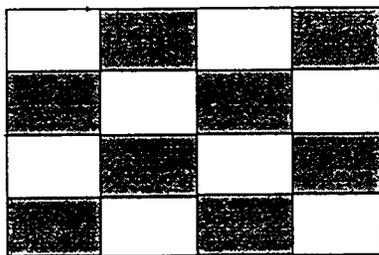
You will have to pack the following items in your backpack: Tent, clothes, food, toiletries, and tools. Listed below you will find each item and the amount of space it takes up in your backpack.

<u>ITEM</u>	<u>SPACE IT TAKES UP</u>
Tent	1/4
Clothes	1/8
Food	1/3
Toiletries	1/8
Tools	1/6

Fraction Flag



You need to have a flag to identify your group. The only type of flag that the camp allows is fraction flags. Fraction flags are always divided into equal parts. The sample flag shown below is divided into 16ths. You notice that the flag can be different colors but the parts need to be equal. Your group needs to make a fraction flag of your own. Use your geoboards to design a flag. Show your design to the teacher to be approved. Then use the materials you have been given to construct your flag. Be creative. There are lots of possible fractions that you can create.



Example flag

Name _____ Date _____

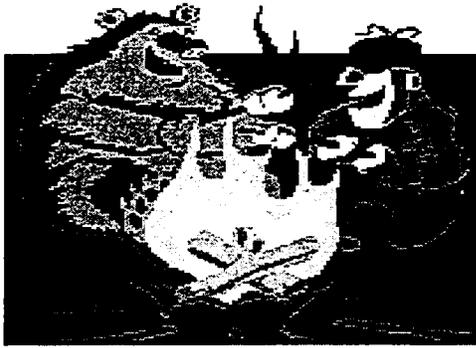
Recipes

DIRECTIONS: Use the charts below to complete the meal conversions from one serving to four servings.

Breakfast	One serving	Four servings
Cereal	$\frac{3}{4}$ cup	
Milk	$\frac{1}{3}$ cup	
Banana	1 whole	

Lunch	One serving	Four servings
Hot dog	1	
Baked beans	$\frac{3}{8}$ cup	
Potato salad	$\frac{2}{5}$ cup	
Potato chips	$\frac{3}{4}$ cup	
Grape juice	1 cup	

Dinner (one serving of beef stew is 2 cups)	Items needed for 1 serving	Items needed for 4 serving
Beef	$\frac{1}{3}$ cup	
Potatoes	$\frac{3}{8}$ cup	
Vegetables	$\frac{3}{4}$ cup	
Water	4 cups	
Onions	$\frac{1}{8}$ cup	
Seasoning	$\frac{1}{12}$ cup	



Recipes

You are given the job of cooking for your group today. Here are the recipes for the entire day. The only problem is the recipes are for one person. You must determine how much of each item you will need to prepare the meals for four people.

(You may use fraction builders to help you, if needed.)

BREAKFAST

$\frac{3}{4}$ cup of cereal

$\frac{1}{3}$ cup milk

1 banana

LUNCH

1 hot dog

$\frac{3}{8}$ cup of baked beans

$\frac{2}{5}$ cup of potato salad

$\frac{3}{4}$ cup of potato chips

8 oz. grape juice

DINNER (This recipe will make one serving, which is 2 cups.)

$\frac{1}{3}$ cup of beef

$\frac{3}{8}$ cup of potatoes

$\frac{3}{4}$ cup of vegetables

4 cups of water

$\frac{1}{8}$ cup onions

$\frac{1}{12}$ cup seasoning

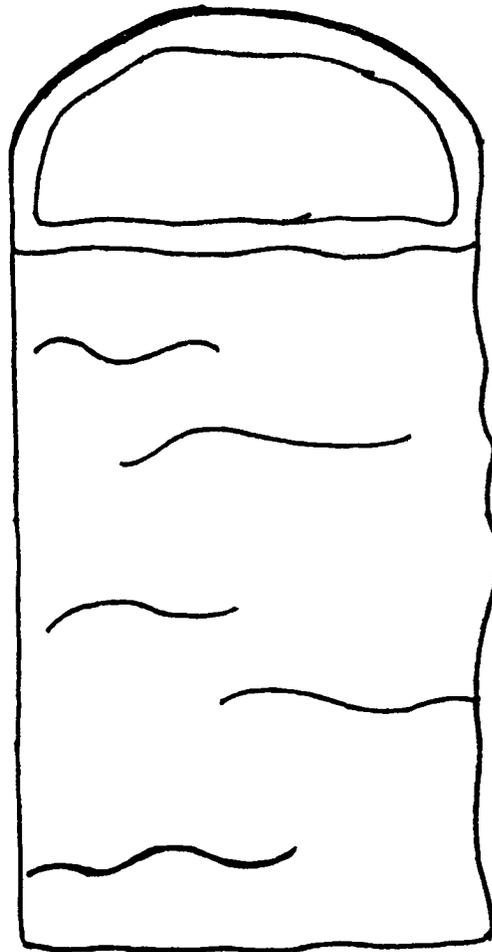


Fraction Camp Writing Prompt

As you know, you have been working on several tasks trying to win a trip to *Fraction Camp*. You must now write a business letter to the Radio Station explaining why you should be chosen. You will have to explain how you completed the tasks during the week. Be sure to explain how and why you solved the math problems the way you did. Your best work is expected! Good luck.

F _____
A _____
T _____
P _____

Sleeping Bag Pattern



Answers to Backpacking Activity Sheet #4

The backpack is equal to 4 hexagons.

One whole = $24/24$

Tent: $1/4 = 2$ trapezoids or $6/24$

Clothes: $1/8 = 1$ trapezoid or $3/24$

Food: $1/3 = 4$ rhombus or $8/24$

Toiletries: $1/8 = 3$ triangles or $3/24$

Tools: $1/6 = 4$ triangles or $4/24$

Fraction Camp

F (Form)
 A (Audience)
 T (Topic)
 P (Purpose)

Business letter
 Radio station
Fraction Camp Tasks
 Win trip to camp

RUBRIC

Excellent Very Good Satisfactory Unsatisfactory

Description	4	3	2	1	Point column (add your score)
I did the following:					
used business letter format					
used correct spelling					
used correct capitalization					
used correct punctuation					
used math vocabulary					
gave mathematical support for my answers from the week's tasks					
used good math reasoning to support answers					----- Total /28