

# Milk by the Gallon, Strawberries by the Quart

## Objective

Students will learn about converting common units of measurement—from cup to pint, pint to quart, and quart to gallon. Students will practice conversion by following simple recipes. Students will learn about glyphs and create glyphs to share information about themselves.

## Background

Gallons, quarts, pints, ounces and pounds are measuring units used for buying and cooking food. At the grocery store, your mother may buy milk in a gallon jug, cheese by the pound, eggs by the dozen, berries by the quart or pint, and cereal by the ounce. Once you get the food home and are ready to prepare it, you may need to know how to convert these units of measurement. There are 16 ounces in a pound and eight ounces in a half pound. There are two cups in a pint, two pints in a quart and four quarts in a gallon.

## Milk by the Gallon

Oklahoma cows produced 720 million pounds of milk in 2015. When your mom or dad buy milk at the grocery store, they don't buy it by the pound, though. They buy it by the gallon, half gallon or quart. When you get it in the cafeteria, you probably get it by the pint or half pint. Cheese is a milk product that is sold by the ounce or the pound. Yogurt comes in quart containers, and ice cream is sold by the pint, quart or gallon.

Milk from the grocery store is pasteurized and homogenized. Pasteurized milk has been heated to kill germs that could be harmful. The process is named for Dr. Louis Pasteur, who made the discovery in 1856 that heat kills bad germs. Milk that is homogenized has had the milk fat, or cream, broken up into small particles. In milk that is not homogenized, the cream rises to the top. With homogenized milk, the cream is evenly distributed, like it would be if you shook the container of milk very hard. Skim milk, 1 percent milk and 2 percent milk have had the cream all or partially removed.

Milk provides key nutrients such as calcium, Vitamin D, and potassium. Older children, teens, and adults need three cups of milk per day, while children four to eight years old need 2 1/2 cups, and children two to three years old need two cups.

Milk was named Oklahoma's official state beverage in 2002.

## Strawberries by the Quart

Strawberries grow on Oklahoma farms and gardens in the springtime. They are available to buy from farmer's markets or U-Pick operations. When you buy fresh strawberries from the farmer's market, you usually buy them by the quart or pint. When you buy them frozen from the grocery store, you buy them by the ounce or the pound. One quart of strawberries equals 1 1/2 pounds. The cost of 1 pound of strawberries multiplied by 1.5 equals the cost of strawberries sold

## Oklahoma Academic Standards

### GRADE 1

Number & Operations: 3.1.  
Measurement: 2.5. Data:  
1.2,3  
Speaking and Listening:  
R.1,2,3; W.1,2. Critical  
Reading and Writing: W.1

### GRADE 2

Measurement: 2.3. Data:  
1.2,4  
Speaking and Listening:  
R.1,2,3; W.1,2. Critical  
Reading and Writing: W.1

### GRADE 3

Number & Operations: 3.4.  
Data: 1.1,2  
Speaking and Listening:  
R.1,2,3; W.1,2. Critical  
Reading and Writing: W.1

## Scarecrow

The scarecrow is a farmer's friend. As the name implies, they are placed in the field to scare crows away. Crows are notorious for eating up newly planted crops. Typically, scarecrows are made to look human, by stuffing old pants, a shirt, and a hat with straw. Before they used scarecrows, farmers sometimes had children or farm workers stand around in the newly planted fields of crops to shoo away pesky crows with pitchforks and other farming implements. Eventually they realized that if they fashioned something that resembled a farmer, and placed it in their fields, they could trick the crows, keeping them from destroying their crops.

As early as 1592, scarecrows were put to use by farmers in fields around the world. The first recorded scarecrows were used in Egypt, on the Nile River, when to keep quail out of the wheat fields.

The scarecrow is quite a popular fellow the world over and has a different name, depending on where you live. In Scotland they are called "Tattie Boggles." In England they are called "Mommets." They are called "Kuebiko" in Japan. Scarecrows also go by the names: "Scarebird," "Jack-of Straw," "Bogle," "Flay-Crow," "Mawpin," "Moggy," "Shay," "Guy," "Bogeyman," "Kakashi," "Shuft," "Shoy Hoy," "Yard Folk," "Hodemedod," "Crop Watcher" and "Rook Scarer."

See the lesson "Garden Guard" for more information about scarecrows, with learning activities.

by the quart.

Strawberries are grouped into three general categories: June-bearing, Ever-bearing, and Day-neutral. June-bearing strawberries produce a single crop from May through mid-June in Oklahoma. They are the best adapted for Oklahoma's climate. Although the plants can last 5 to 6 years with careful cultivation, most producers use them as an annual crop, replanting yearly. Strawberries require both a male and female to produce fruit.

Eight strawberries will provide 140 percent of the recommended daily intake of Vitamin C for kids. One cup of strawberries is only 55 calories. Strawberries contain no fat, cholesterol, or salt. Oklahoma designated the strawberry as official state fruit in 2005.

## Blueberries by the Pint

Blueberries are available fresh from Oklahoma berry producers in the spring. Most producers who grow blueberries also grow blackberries, which are ready for harvest later in the spring and early summer. Blueberries grow in clusters and range in size from that of a small pea to a marble. Blueberries with any hint of red are not fully ripened. Once blueberries are picked, they will not ripen any further.

Blueberries are the most widely grown fruit crop in the US, and 90 percent of all blueberries are grown in the US. They are one of only a few foods we still eat today that are native to North America,

Blueberries are rich in Vitamin C, manganese and dietary fiber. Fresh blueberries are usually sold by the pint or quart. Depending on density and moisture content, 1 pint of blueberries = 3/4 pound or 2 cups, and 1 quart = 1-1/2 pounds or 4 cups

## Soybeans by the Cup

Until recently, soybeans were not something you could easily buy in the grocery store. There are many common grocery products made from soybeans—salad oils, infant formula, sauces, mayonnaise, etc., but until Edamame became a popular snack food, you probably would have had trouble finding a bag of plain old soybeans. Edamame is a preparation of immature soybeans in the pod, commonly found in the cuisines of Japan, China, and Hawaii. The pods are boiled in water together with condiments, such as salt, and served whole. They are widely available as a healthy snack. Edamame and all preparations of soybeans are rich in carbohydrates, protein, dietary fiber, and micronutrients, particularly folates, manganese, and vitamin K (table).

The health benefits from soy are also available in soy milk. Soy milk is not technically a milk, but a beverage made from soybeans. It is the liquid that remains after soybeans are soaked, finely ground, and then strained. Since it doesn't contain any lactose, soy milk is suitable for people who cannot tolerate lactose.

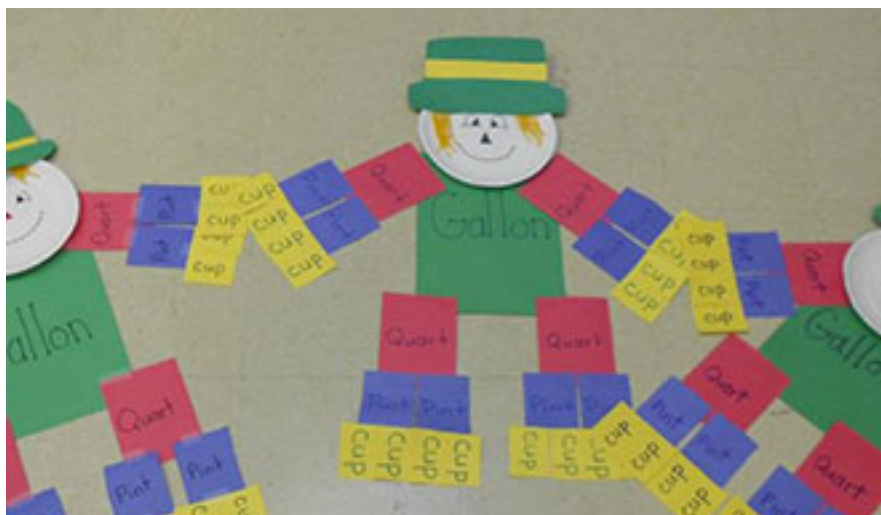
George Washington Carver developed more than 300 uses for

soybean, including edible oil and meal, with his research at Tuskegee Institute in Alabama. Because it is a legume, it was useful to restore nutrients to the soils of the South that had been depleted by cotton production. Legumes fix nitrogen in the soil. Some of the better known soybean products include soy meal, soy flour, soy milk, tofu, meat substitutes, tempeh, soy sauce, infant formula, biodiesel fuel and animal feed.

Soybeans are typically among Oklahoma's top 10 agricultural commodities in value. In 2015, the soybean farmers produced 11,625,000 bushels of soybeans.

## Materials Needed

- paper plate (head)
- gallon container of milk
- quart container of strawberries
- pint container of blueberries
- cup of soybeans
- yarn (hair)
- extra construction paper (hat)
- brown construction paper for gallon body\*
- red construction paper for quarts\*
- blue construction paper for pints\*
- yellow construction paper for cups\*
- \*Whole pieces of construction paper must be same size.



## Scarecrow Conversion Chart

(Activity adapted from Virginia Ag in the Classroom)

## Procedures

1. Provide each student with a paper plate, yarn and construction paper. Students will follow the directions below to make a Scarecrow Conversion Chart. (See photo above.)
  - Draw a face on your scarecrow. Use yarn for hair and the additional construction paper to make a hat.**GALLON:** Show students the gallon container of milk. Discuss and illustrate how much the container holds. Read and discuss the section about milk in the Background above. Demonstrate the following:
  - Use a whole piece of brown paper for the scarecrow's body. The body represents a gallon. Write the word "Gallon" in the middle of your scarecrow's body.
  - Attach the head to the top, short side of the brown paper.

QUART: Show students a quart container of strawberries. Discuss and illustrate how much it holds. Read and discuss the section about strawberries in the Background above. Demonstrate the following:

- Use the red paper to represent a quart. Fold the red paper into 4 equal pieces.
- Cut the pieces apart and write “Quart” in the middle of each one.
- Glue one piece to the top right and one to the top left side of the brown paper to form sleeves.
- Glue the remaining two pieces to the bottom of the brown paper to form pants.

PINT: Show students the pint container of blueberries. Discuss and illustrate how much it holds. Read and discuss the section about blueberries in the Background above. Demonstrate the following:

- Use the blue paper to represent a pint. Fold the blue paper into 8 equal pieces.
- Cut the eight pieces apart and write “Pint” on the middle of each one.
- Glue two of the pint pieces to each quart piece.



CUP: Show the measuring cup of soybeans. Discuss and illustrate how much the cup holds. Read and discuss the section about soybeans in the Background above. Demonstrate the following:

- Use the yellow paper to represent a cup. Fold the yellow paper into 16 equal pieces.
  - Cut the 16 pieces apart and write “Cup” on the middle of each one.
  - Glue two cup pieces to each pint piece.
2. Discuss the conversions from cup, to pint, to quart, to gallon. Illustrate using beans, water or other substances.
  3. Hand out copies of the measuring conversion worksheet included with this lesson. Students will use their scarecrows to answer the questions.

**EXTENSION:** Students will use their scarecrow heads to create glyphs, as follows:

**GLYPH KEY:**

**Scarecrow Head:**

- Brown Face=I like chocolate milk.
- Pink Face=I like strawberry milk.
- White Face=I like white milk.
- Orange Face=I prefer not to drink milk.

**Scarecrow Eyes:**

- Blue Eyes=I like blueberries
- Green Eyes=I do not like blueberries

**Scarecrow Mouth:**

- Red Smile=I like strawberries
- Red Frown=I do not like strawberries
- Draw an X on the mouth like a stitch for each year of your age

**Scarecrow Nose:**

- Circle=I like peaches
- Triangle=I do not like peaches

Students will draw a bar graph to analyze their scarecrow glyphs. How many students like each food mentioned? How many do not? Compare the ages of your students. How many more students like strawberries than peaches? How many fewer students like white milk than chocolate?

## Converting Measurements in Recipes

1. Hand out the recipes included with this lesson. Provide each group with quarts or pint containers of yogurt and the different kinds of fruit.
2. Students will work in groups to prepare Fresh Fruit Smoothies from the recipe included with this lesson.
3. Students will work in groups to increase the recipe so there will be enough for each student.
4. Students will use their “Scarecrow Conversion Charts” to determine how many servings they can get from each container of ingredients.

## Measurement Catcher

1. Divide your class into partners.
2. Each student will cut out and fold the included “Measurement Catcher” as a way to review conversion skills.
3. Use the included worksheet as a way to assess your students retention of the skills taught in this lesson.

## Writing Prompts

1. Students will give their scarecrows names and write stories about adventures the scarecrows might have had in the fields they are protecting. What crop is it protecting? What pests does it have to scare away?  
—Students will share their stories with the class.
2. Create a class cook book.  
—Each student will write a favorite recipe to share with the class.  
—Recipes should contain one or more of the ingredients included in the background (dairy, strawberries, blueberries, and/or soybeans) and should include the use of cups, pints, quarts and/or gallons.



## Measure Mania Punch

- 8 cups pineapple juice
- 4 pints vanilla ice cream
- 3 quarts lemon/lime soda pop
- 1 gallon grape juice

Mix juices and pop together in a punch bowl. Add ice cream. Serve cold. Discuss the conversion of cups, pints, quarts, and gallons as you make the punch.

## Extra Reading

Bial, Raymond, *The Super Soybean*, Albert, Whitman and Company, 2007.

Birmingham, Christian, *The Fight Against Microbes: Pasteur's Story (Science Stories)*, Matthew Price, 2006.

Brown, Ken, *The Scarecrow's Hat*, Peachtree, 2011.

Brown, Margaret Wise, *The Little Scarecrow Boy*, HarperCollins, 2005.

Gibbons, Gail, *The Berry Book*, Holiday House, 2002.

Henkes, Keven, *My Garden*, Greenwillow/HarperCollins, 2010.

Karapetkova, Holly, *Measuring: Pints, Quarts, and Gallons*. Teacher Created Resources, 2011

Macceca, Stephanie. *George Washington Carver*, Compass Point, 2010.

McClure, Nikki, *To Market, To Market*, Abrams, 2011.

Webster, Avril, *Off We Go to the Grocery Store*, Woodbine, 2011.

## Web Resource

"Cup, Pint, Quart, Gallon," WatchKnowLearn.org, <http://watchknowlearn.org/Category.aspx?CategoryID=2334>  
(A website full of videos and songs to help students remember the conversions)

## Vocabulary

**annual**— a plant that completes the life cycle in one growing season or single year

**bushel**— any of various units of dry capacity

**carbohydrate**— any of various compounds of carbon, hydrogen, and oxygen (as sugars, starches, or celluloses) most of which are formed by plants and are a major animal food

**calcium**— a silver-white soft metallic element that is found only in combination with other elements (as in limestone) and is one of the necessary elements making up the bodies of most plants and animals  
cholesterol

**cluster**— a number of similar things growing, collected, or grouped together

**condiment**— something used to give food a good taste; especially : a tangy seasoning

**convert**— to change from one unit to another

**crop**— a plant or animal or plant or animal product that can be grown and harvested

**cuisine**— style of cooking

**cultivation**—the act of to preparing land for the raising of crops

**density**— the mass of a substance per unit volume

**dietary fiber**— mostly indigestible material in food that stimulates the intestine to move its contents along

**edible**— fit or safe to be eaten

**farmer's market**— a market where individual farmers set up booths, tables or stands, outdoors or indoors, to sell produce, meat products, fruits and sometimes prepared foods and beverages

**homogenize**— to break up the fat of (milk) into very fine particles

**lactose**—a sugar present in milk that breaks down to give glucose and galactose and on fermentation gives especially lactic acid -- called also milk sugar

**legume**— any of a large family of herbs, shrubs, and trees that have fruits which are dry single-celled pods that split into two pieces when ripe, that bear nodules on the roots that contain nitrogen-fixing bacteria, and that include important food plants (as peas, beans, or clovers)

**manganese**— a grayish white usually hard and brittle metallic element that resembles iron but is not magnetic

**micronutrient**— essential elements needed by life in small quantities

**nitrogen**— a colorless tasteless odorless element that occurs as a gas which makes up 78 percent of the atmosphere and that forms a part of all living tissues

**nutrient**—a substance or ingredient that furnishes nourishment

**pasteurize**— the process of heating a liquid (as milk) to a temperature high enough and keeping it at that temperature long enough to kill many objectionable germs and then cooling it rapidly without causing a major change in its chemical composition

**potassium**— a silver-white soft light metallic element that has a low melting point and occurs abundantly in nature especially combined in minerals

**protein**— any of numerous substances that consist of chains of amino acids, contain the elements carbon, hydrogen, nitrogen, oxygen, and often sulfur, include many compounds essential for life, and are supplied by various foods

**unit**— a definite quantity (as of length, time, or value) used as a standard of measurement

**U-Pick operation**— a type of farm where customers are allowed to harvest their own produce

**vitamin**— any of various substances that are necessary in very small amounts to the nutrition of most animals and some plants, that are important to the control of growth and development by activating and assisting in the function of enzymes, and that are present naturally in many foods or in some cases are produced within the body

Name \_\_\_\_\_

# Milk by the Gallon, Strawberries by the Quart

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Use your scarecrow to answer the following questions.

How many quarts of strawberries are in a gallon? \_\_\_\_\_

How many pints of blueberries are in a gallon? \_\_\_\_\_

How many cups of soybeans are in a gallon? \_\_\_\_\_

Which is greater: a quart of milk or a pint? \_\_\_\_\_

How many cups of soybeans are in a pint? \_\_\_\_\_

Which is less: a cup of milk or a pint of milk? \_\_\_\_\_

How many cups of soybeans are in a quart? \_\_\_\_\_

How many pints of blueberries are in 2 quarts? \_\_\_\_\_

How many cups of milk are in 3 pints? \_\_\_\_\_

Which is greater: 8 cups of milk or 1 quart? \_\_\_\_\_

Which is less: 4 quarts of milk or one gallon? \_\_\_\_\_

You have 1 quart of milk. You need 8 cups, do you have enough? \_\_\_\_\_

You have 9 pints of berries. You need 1 gallon, is that enough? \_\_\_\_\_

You have 1 half gallon of milk. You need 1 gallon, is that enough? \_\_\_\_\_

Oklahoma Ag in the Classroom is a program of the Oklahoma Cooperative Extension Service, the Oklahoma Department of Agriculture, Food and Forestry and the Oklahoma State Department of Education.



## Milk by the Gallon, Strawberries by the Quart (Answers)

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Use your scarecrow to answer the following questions.

How many quarts of strawberries are in a gallon? 4 quarts

How many pints of blueberries are in a gallon? 8 pints

How many cups of soybeans are in a gallon? 16 cups

Which is greater: a quart of milk or a pint? quart

How many cups of soybeans are in a pint? 2 cups

Which is less: a cup of milk or a pint of milk? cup

How many cups of soybeans are in a quart? 4 cups

How many pints of blueberries are in 2 quarts? 4 pints

How many cups of milk are in 3 pints? 6 cups

Which is greater: 8 cups of milk or 1 quart? 8 cups

Which is less: 4 quarts of milk or one gallon? They are equal.

You have 1 quart of milk. You need 8 cups, do you have enough? No

You have 9 pints of berries. You need 1 gallon, is that enough? Yes

You have 1 half gallon of milk. You need 1 gallon, is that enough? No

Name \_\_\_\_\_

# Fresh Fruit Smoothie Delight

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(Makes 2 servings)

1/2 cup strawberries                      1/2 cup vanilla yogurt  
1/2 cup peaches                          1/2 cup blueberries  
1/2 cup of milk (can use soy milk if you prefer)

1. Place ingredients in a ziploc baggie.
2. Use your fingers to and puree, or smash the ingredients together.
3. Cut the corner and squeeze into a cup.

Ingredients may also be pureed in a blender.

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Before making your smoothies, answer the following questions:

1. For each of your ingredients, circle the size of the package you have been provided:

strawberries	gallon	quart	pint	cup
vanilla yogurt	gallon	quart	pint	cup
peach slices	gallon	quart	pint	cup
blueberries	gallon	quart	pint	cup

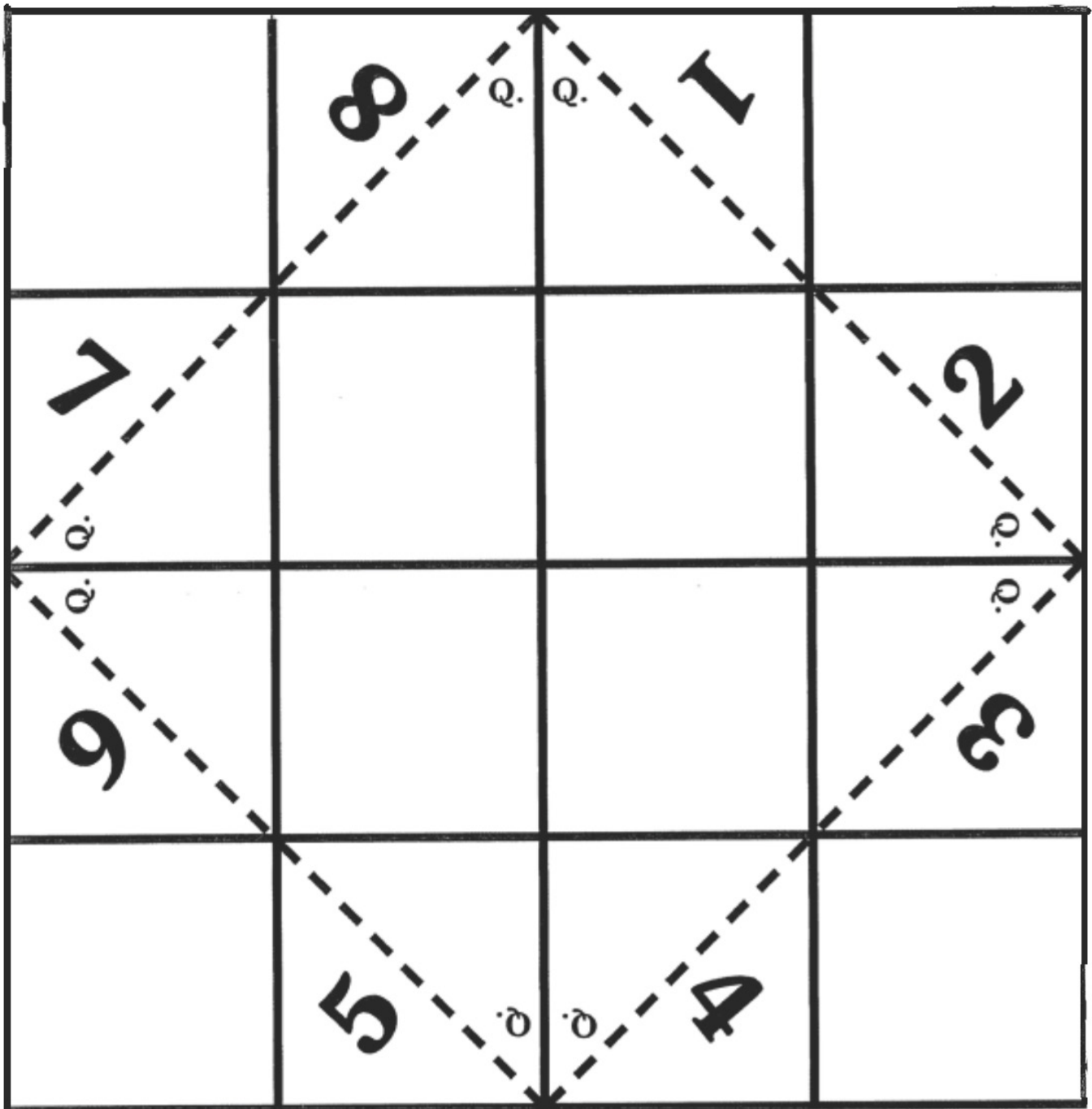
2, The recipe makes two servings. How much will you need to increase it to have enough for each person in your group? Rewrite the recipe on a separate piece of paper or the back of this paper.

3. Use your Scarecrow Conversion Chart to determine how many servings you can make from the ingredients you have available.

	amount available	amount needed per serving	number of servings possible
strawberries			
yogurt			
peach slices			
blueberries			

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# Measurement Catcher

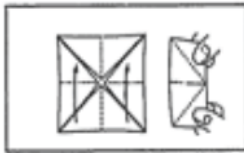
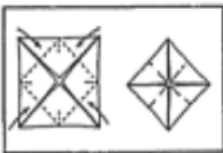
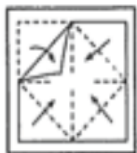


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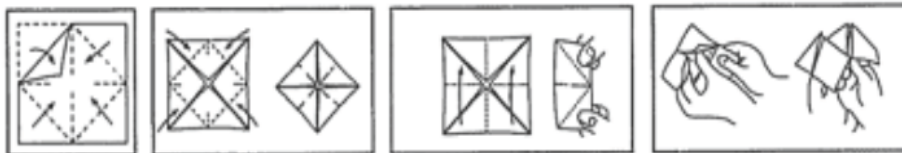
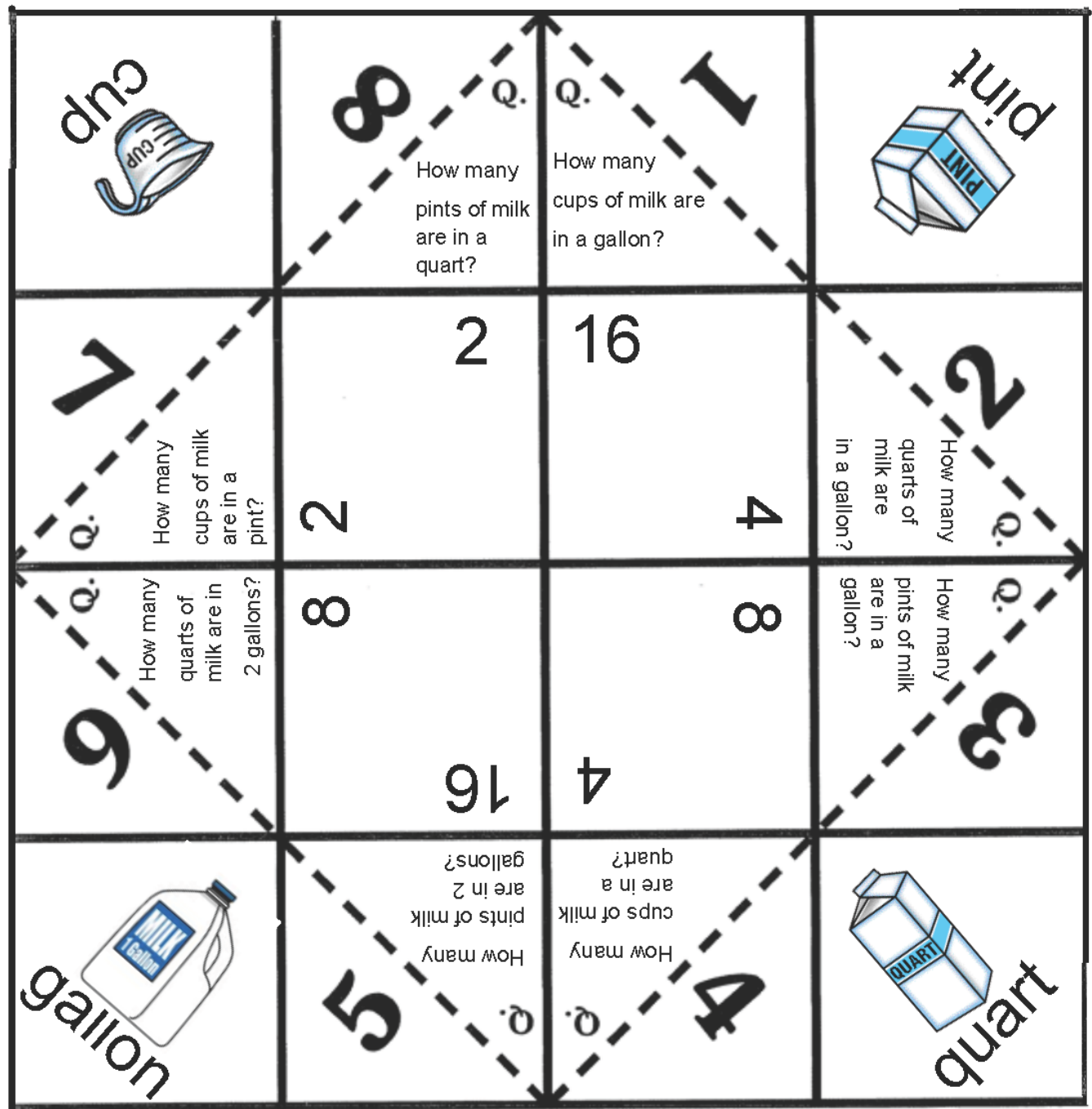


1. Start on plain side. Fold outside corners in to the middle.
2. Turn square over. Fold new outside corners in to the middle
3. Fold top edge to bottom edge. Crease along middle. Open back up. Fold one side to other side. Crease along middle. Open back up.
4. Turn square over. Put your thumbs and pointer fingers into the four pockets on back. Write numbers on the outside of the question flaps. Color, and then play the game.

## HOW TO PLAY

1. What is your partner's age?  
Open and close the pop-up that number of times.
2. Ask your partner to choose another number. Open and close the pop-up that number of times.
3. Open the number that number of times, and ask the question.

# Measurement Catcher



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