

Cheaper by the Dozen?



- Show students a 5-pound bag of wheat flour and a 5-pound bag of potatoes and ask them to guess how much each weighs. Have them write their estimates, then weigh the objects to see who comes closest to being correct.
- Show students a small plastic bag filled with wheat flour, a larger bag filled with wheat berries (available at health food stores) and an even larger bag filled with wheat flakes (wheat cereal). Ask which will weigh more, then weigh the three bags. Discuss why bigger doesn't always mean heavier.
- Discuss the difference between weight and volume. Have students discuss whether it is more economical to buy produce by the pound, by the piece or according to volume. Ask what the saying "cheaper by the dozen" means.
- Bring in an assortment of measuring tools — measuring cups, canning jars, a bushel basket. Ask students to determine why some tools are better for measuring liquid than solids. Allow students to use the tools for measuring flour and for measuring water. What can students find in the classroom that could be measured by the bushel?
- Bring a bathroom scale to class, and have students weigh themselves. Have each student write his/her weight on a piece of paper and drop it in a box. (No names, please.) Write all the weights on the chalkboard, and have students figure the average. Then have students figure out how many of them it would take to equal the weight of a 763-pound steer. How much would each student be worth at a market price of 87 cents per pound?

Math Concept: Measuring

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- Bring a pound of peanuts and a pound of peanut butter to class for students to compare.
- As a homework assignment, have students visit a grocery store and find five products sold by the pound, five sold by the piece and five sold according to volume.
- Have students compare the price of eggs by the half dozen, dozen and 1 1/2 dozen. Calculate the price per egg, and determine which is most economical. How many eggs can you buy for \$5?
- Bring a healthy treat to class. Have students measure or weigh it before eating.
- Have students compare the weights of different combinations of fruits or vegetables, using a balance scale. For example, how many grapes does it take to equal the weight of a peach? Do raisins and grapes weigh the same? Have students invent their own combinations, depending on the available produce and other materials.
- Bring an assortment of fresh produce to class along with a diet or kitchen scale and some grocery flyers. Have students work in groups to estimate the weight and cost of the produce. Then have them weigh the produce and calculate the cost, based on prices listed in the ads. (Chart available for this activity online with the lesson "By the Pound.")
- Have students estimate how many dozen grapes it would take to fill a 1-quart container then count off as they fill the container, keeping track of the dozens with tally marks.

For more measuring ideas, go to "Measure-mania" on the Web site at www.agclassroom.org/ok.

Hay is for Horses (and cows and sheep)



A cow weighs about 1,200 pounds.
A bull weighs about 2,200 pounds.
A horse weighs about 1,000 pounds.
A sheep weighs about 100 pounds.

A cow needs 15 pounds of hay each day and five pounds of grain.
A horse needs 10 pounds of hay each day and six pounds of grain.
A sheep needs 5 pounds of hay each day and 1 pound of grain.

A square bale weighs about 45 pounds and averages \$3 a bale.
A round bale weighs about 1,000 pounds and averages \$30 a bale.
It takes 6.5 pounds of hay and grain to get a gain of one pound in a cow.

Use the information above to answer the questions on the flip side of this card.



Answers are in parenthesis

1. What fraction of a ton is a cow's weight? ($3/5$) A bull's? ($1\ 1/10$) A horse's? ($1/2$) A sheep's? ($1/20$)
2. What is the ratio of the approximate weight of a cow to the approximate weight of a bull? ($6:11$) Write as a decimal ($.55$) and as a percent. (55 percent)
3. How many square bales of hay does a cow need each day? ($1/3$) How many square bales of hay would 5 cows need in a day? ($1\ 2/3$)
4. How many square bales of hay does a cow need each week? ($2\ 1/3$)
5. How much would a farmer spend each week for hay if he/she had a cow, a horse and a sheep? (\$14, rounded off)
6. How much hay and grain would a farmer have to feed a cow to get 20 pounds of weight gain? (130 pounds)
7. Would square bales or round bales be more economical to feed? Explain. (Round bales are 3 cents per pound; square bales are 6 cents per pound)
8. What percent of a cow's weight is 12 pounds of hay? (1 percent)
9. What percent of a bull's weight is 110 pounds of grain? (5 percent)
10. What percent of a horse's weight is 20 pounds of hay? (2 percent)

Math Concept: Number Operations and Computation, Algebraic Expression

Related lessons online: A Hundred Bales of Hay, A Handy Measure, Chew It Twice, A Mixed Bag

Hogs on a Diet



Materials: shoebox and an assortment of animal feed grains available from your school's ag teacher or a feed store – wheat, corn, soybeans, grain sorghum (Ask for samples from broken bags.)

1. Before class time, place a few grains of each type of feed in the shoe box. Place the shoe box on a table in the front of the room so students can see it, but don't let them move it or look inside.
2. Ask students what it means to “hog” something. Where did that saying come from? How do hogs eat? What do they eat?
3. Share the information on the flip side of this card.
4. Invite your students to guess what is in the box. Shake the box. Is there any sound? What does it sound like? Open the box, and allow the children to feel what is inside without seeing it. What does it feel like?
5. Show students the feed grains, and ask them to identify each one. Explain that hogs and other kinds of animals eat these kinds of grains and that, just like us, hogs need a variety of foods to help meet their nutritional needs.
6. Have students sort the grains and place them in piles, then graph the quantities.

Math Concept: Patterns (sorting), Data Analysis
More sorting lessons online: [Be a Bug Scout](#), [Sock Walk](#)



Female swine are called sows. Sows give birth to litters of pigs twice a year. Each litter usually has eight to 12 baby pigs. Baby pigs appear very greedy when they are competing for food from their mothers. For this reason the words “pig” and “hog” have come to be associated with greedy behavior. Despite their reputation, pigs will never overeat. Once a pig is full, it stops eating.

In the past, hogs were fed table scraps and had a reputation for eating just about anything. The meat from hogs fed that way was very high in fat. Today’s swine producers are more careful about what they feed their animals. Some of the foods fed to swine are corn, wheat and soybean meal. Vitamins and minerals are added to increase growth and improve health. Today’s hogs weigh more, but because producers plan their diets carefully, they grow more efficiently and produce more lean meat. Bacon, pork sausage, pork chops and ham all come from hogs. In addition, swine are used in the production of non-food products like fertilizer, glass, china, floor wax, chalk, crayons and heart valves.

Pork provides protein, B-vitamins and thiamin to our diets. Pork has three times as much thiamin as any other food. Thiamin changes carbohydrates into energy and promotes a healthy appetite.

Plenty of Popcorn



Materials (for each group of four or five)

Large clear container (holding at least two cups)

Masking tape

Marker

1/2 cup measure

Unpopped popcorn

1. Bring containers in different shapes to illustrate that different shapes can hold the same volume. Each group should place a piece of masking tape from top to bottom on one side of the large container. Then have each group fill the measuring cup (1/2 cup) with popcorn and answer the following questions: How many 1/2 cups do you think the container will hold? How many whole cups?
2. Have students pour the measured popcorn into the clear container and mark the level on the container by drawing a line on the tape and writing "1/2 cup" on the line.
3. Have students repeat Step # 2 until the container is full.
4. After the container is full, have students count the total number of 1/2 cup increments and compare it to the estimate. Try with other measures. Let students experiment to see that two 1/4-cup measures makes 1/2 cup; four 1/4-cup measures makes a whole cup, three 1/3-cup measures makes a whole cup, etc.
5. Pop 1/2 cup of popcorn, and have students measure the popped corn. Bring colored popcorn, and have students guess how many kernels will pop.

Math Skills: Measuring, Fractions

More measuring lessons online: "Working Watermelon", "Pumpkins by the Pound,"
"A Tough Nut to Crack."

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Americans munch over 7 billion quarts of popcorn every year. Popcorn is good for you. It is low in fat and calories and has no sugar. Popcorn can grow in parts of the world where other corns cannot. People in the Americas, China, Mexico and India have grown popcorn since before Columbus made his voyage to America.

The Iroquois Indians brought popcorn to the first Thanksgiving. They had a legend that each kernel of popcorn had a demon inside. The demon would remain quiet until his house was heated. Then he would get so mad he would blow his top. When the popcorn exploded, the demon would disappear with the steam. From that time on, there was a tradition of bringing popcorn as a token of good will during peace negotiations.

There are five different kinds of corn but only one kind that pops. Popcorn grows on a cob, just like the corn you eat in the summer. Popcorn farmers let the corn dry before they take it from the plant.

Popcorn kernels are dry outside, but they have water stored inside. When you heat popcorn, the water inside begins to boil. As it turns to steam, the water expands, or takes up more space. This causes the corn to swell until the steam shoots out, and the corn pops. Air rushes in and fills the space left by the escaped steam.

The popcorn you buy in the store is usually white or yellow, but popcorn kernels can be almost any color. Some of them are red, some are purple and some are black. No matter what color it is on the outside, all popcorn is white when popped.

Piece by Piece



In the early years of our country most people had to make their own clothing or hire someone else to do it. Most people even made their own homespun, a kind of cloth made from linen or wool grown right on the farm. Linen was made from a plant called flax, and wool was taken from sheep. Each had to be spun on a spinning wheel and woven into cloth on a loom.

Nothing was wasted. Small bits of fabric left over from making clothes went into a pile to be pieced together as quilts.

A quilt has three layers—the quilt top, the batting or filler, and the backing. The filler might be made of wool, but most people used dried grasses, wood shavings and corn husks. During the American Depression in the 1930s, some people filled their quilts with used newspaper.

Quilts could be found in all types of households, wealthy and poor. All women sewed. This was part of their daily routine.

Related lessons online: [“Covered in Quilts;”](#) [“Piece by Piece.”](#)

Math Skill: Geometry

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Materials: Two or three quilts for students to examine; construction paper in several colors; geometric shape patterns.

1. If possible, bring two or three quilts for students to examine. Bring quilt books so students can see a variety of quilt designs.
2. Explain to students that they will be designing their own quilt blocks. Provide construction paper in several colors. Instruct students to cut a 9-inch square from the color of their choice.
3. Draw a variety of geometric shapes on the board, or hand out geometric manipulative shapes which students may use as patterns.
4. Instruct students to choose the colors they wish to use in their quilts and cut them into the geometric shapes they prefer. Students may look at the quilt books to get ideas for designs.
5. Have students explain their blocks. Ask why they chose the colors they chose and how they arrived at their designs.



Seed Swap



1. Bring four number cubes and a variety of seeds — small (wheat berries, unpopped popcorn), medium (sunflower seeds, pumpkin seeds) and large (pecans, peanuts in the shell).
2. Divide students into groups. Provide each group with one number cube and three different sizes of seeds. Have the groups assign place values to each kind of seed. For example, if a popcorn kernel represents the ones place, 10 popcorn kernels would be equal to one sunflower seed, and 10 sunflower seeds would be equal to one pecan.
3. Have each group make a game sheet by drawing lines on a sheet of paper to form three columns. At the top of each column, have students glue the seed they have selected to represent the appropriate place value.
4. The first player should roll the number cube and place the indicated number of seeds in the left column on his or her game sheet. Each student should take a turn rolling the number cube. For the second round, the student places additional seeds on the game sheet according to the number that appears on the number cube. When the total number of seeds in the left column reaches 10 or more, the player must trade 10 of those for one of the seeds chosen to represent tens.
5. The game continues until one player has accumulated 100 points (50 for younger students), which he or she will trade for the winning seed (the seed chosen to represent hundreds).
6. After several games, allow each group to use two number cubes for a faster game, or raise the winning number of points to 1,000. When the game is over, hand out sunflower seeds, popped popcorn or peanuts for students to enjoy.

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A seed is a miniature plant. Most seeds have a built-in food supply that is rich in carbohydrates, fats and proteins. For that reason, seeds are a rich source of food for people and animals. Seeds are important to Oklahoma agriculture. Many of the crops grown on Oklahoma farms are harvested for their seeds. Pecans are seeds. Wheat kernels are seeds. Soybeans and corn are seeds.

Seeds come in an amazing number of shapes and sizes. In the fall you can find many different kinds of seeds lying on the ground. Sometimes you see them flying in the air. If you have maple or elm trees in your yard you have seen seeds with wings. That is one of the ways seeds travel. Dandelion and thistle seeds are very light so they can travel on the wind, sometimes as far as 1,000 miles away. Some kinds of seeds grab onto the fur of animals or your clothes to travel from place to place. Stickers are seeds that try to hitch rides on the bottoms of your shoes. The pods of some plants explode and shoot out their seeds. Pecans often grow along creeks, so their heavy seeds travel by water. Birds eat the berries of honeysuckle, hackberry, mulberry and other plants, then deposit them, sometimes hundreds of miles away. Acorns are the seeds of oak trees. Squirrels gather them and carry them away to hiding places. Some seeds even travel by coasting on the snow or ice.

More place value practice online: [The Grain Game](#), [Easy as Pumpkin Pie](#)
Math Concept: **Number Sense**

Counting Sheep



In ancient times people used tokens made from clay to keep count. If they wanted to remember how many sheep they had, they would gather as many of the tokens as they had sheep and place them in a safe place. Over time people began to keep count by making marks on the walls of caves to designate numbers.

In medieval England, counting sheep was very important, because each farm had rights for a certain number of animals to graze on common land. As flocks of sheep grew larger, people had to find different ways to keep count. Shepherds devised special methods that they passed down from one generation to the next. The most common method was to count 20 sheep and then pick up a stone. Sometimes they would count to 20 and then make a mark, called a “score,” on a stone or a stick. From this practice, the word “score” came to mean 20.

Counting is still a very important part of the farmer’s job. Farmers have to know how many acres to plant. They need to know how much seed and fertilizer they will need. They keep careful records so they can make sure they are earning enough money to pay their expenses. Those who raise animals need to know how many calves their cattle produce so they will know how much feed to buy and how many they can sell. They need to know how much money they can expect to make so they can plan for the coming year.

Problem: You are a shepherd who has just finished counting your sheep. You have 5 stones. Each stone represents 20 sheep. How many sheep do you have?

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1. Tell students they are going to be farmers and need to count their animals. Provide each group with a plate of animal crackers.
2. Show students how to use tally marks to keep count. Explain that this is similar to the way ancient people kept count by drawing pictures on the walls of caves.
3. Have students draw pictures of the different animal crackers across the top of a sheet of paper. Then have students draw lines between the pictures to make a separate column for each. Have students sort the animal crackers and use tally marks in the appropriate columns to count them.
4. Have students translate their tally marks into numbers and make oral “livestock reports.”
5. Draw a classroom chart on the chalkboard and record the data.

Lead your students in singing this song—to the tune of B-I-N-G-O

There was a farmer had a lamb, and Even was her name-o

O, 2, 4, 6, 8; 0, 2, 4, 6, 8; 0, 2, 4, 6, 8; and Even was her name-o

Repeat with a goat named “Odd”

Now give students 10 animal crackers each, call out numbers from one to 10, have students count that many out and “Baa” for even or “Bleat” for odd.

Related online activities: [Barnyard Math](#) (Under “Practice Sheets.”)

Math Skill: Number Sense, Patterns

The Snack Sack



1. Prepare three lunch-size paper bags, as follows:
 - Bag # 1 – Five peanuts, one whole wheat cracker, one kernel of popped popcorn
 - Bag # 2 – One peanut, five whole wheat crackers, one kernel of popped popcorn
 - Bag # 3 – Three peanuts, three whole wheat crackers, one kernel of popped popcorn.
2. Make three signs, printed with the following statements:
 - “You are more likely to draw a peanut from this bag than a whole wheat cracker.”
 - “You are more likely to draw a whole wheat cracker from this bag than a peanut.”
 - “You are just as likely to draw a peanut from this bag as a whole wheat cracker.”
3. Display the lunch bags. Explain that there are seven snack foods in each of the bags, but do not tell students what kind of snacks are in the bags.
4. Display the signs, and instruct students to read them silently. Tell students the signs have fallen off the bags and that they will have to figure out which sign goes with what bag.
5. Have a few students reach into Bag # 1 without looking, pull out a snack item, note what the snack is, and return it to the sack. Record the information on the chalkboard.
6. Challenge students to predict which sign matches Bag # 1. Ask students how they arrived at their predictions. Allow students to continue taking samples if they are uncertain about which sign matches Bag # 1.
7. Repeat the exercise for the other two bags.
8. Provide chart paper, and have students graph what they draw from the bags.

Math Concept: Probability

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Snacks aren't all bad. In fact, they should be an important part of your diet. Try eating a different snack every day from some of these foods grown in Oklahoma.

Day number one – Spread peanut butter on whole wheat crackers. Oklahoma ranks number 7 in the nation in the production of peanuts. Peanuts provide protein and Omega fatty acids that are good for your heart. Whole wheat crackers provide fiber and many of the nutrients your body needs.

Day number two – Try some fresh Oklahoma fruit, like watermelon, peaches, blueberries, blackberries or strawberries when they are in season. Canned peaches are delicious in the winter, and strawberries, blueberries, peaches and blackberries are always available frozen. Mix them with vanilla yogurt for a delicious treat.

Day number three – Pecans are a very nutritious snack that are actually native to our state. Try them roasted, or just crack them and eat them out of the shell.

Day number four – Beef jerky is another great snack. Beef is our number one agricultural commodity. Native tribes of the North American Plains had their own version of jerky. Pemican was made from bison meat pounded with wild berries and dried.

Day number five – Be adventurous. Try some soy nuts – soybeans that have been flavored and roasted.

Day number six – Whole wheat crackers with cheese. In 2003, milk production ranked six in the state of all agricultural commodities. Hard red winter wheat ranked number two.

Day number seven – Popcorn, of course. Corn ranked 11th in 2003 of all agricultural commodities grown in Oklahoma.

Related lessons online: [Pyramid Play](#); [Rooftop Sandwich](#), [A Mixed Bag](#)

Barnyard Math



1. $\frac{1}{9}$ wedge of strong-smelling cheese.

Cheese was discovered by a traveler who placed milk in a pouch made of a sheep's stomach. The combined action of the sun's heat and the enzymes in the lining of the stomach changed the milk into cheese.

2. 9 turkeys in a tree.

Wild turkeys spend the night in trees. They fly to their roosts around sunset.

3. 99 baseballs in a trash can.

An official major league baseball has a core made from four long strands of high quality wool wrapped around rubber or cork and covered with two pieces of white horse or cow hide. It is stitched together with exactly 216 stitches.

4. 999 busted watermelons.

Because watermelons are so fragile, they cannot be harvested by machine. Instead workers carefully toss them in a relay from field to truck.

5. 9,999 cold hamburgers.

Hamburger meat is not safe to eat until it has been cooked to an internal temperature of 160 degrees.

6. 99,999 bales of hay.

Oklahoma has excellent conditions for growing hay, which requires plenty of rain and then hot dry weather for harvest.

7. 999,999 wool socks.

Wool is a good choice for cold weather because it will not freeze when it gets cold like other fabrics will.

8. 9,999,999 bushels of wheat.

An acre will produce enough wheat for about 2,500 loaves of wheat bread.

9. 9,999,999 baby chicks

A chicken will lay bigger and stronger eggs if you change the lighting in a way to make her think a day is 28 hours long.

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Write a funny story problem about one of the answers on the flip side of this card. Each story should include at least three mathematical steps that result in the answer. Show your work. Use the sample below to get you started.

Answer: 99 baseballs in a trash can

A truck carrying boxes of baseballs was going through town. Each box contained 1,000 baseballs. As the truck was passing our school, a dog ran in front of it, causing the driver to slam on his brakes. When the driver hit the gas to go forward again, two boxes of baseballs fell out the back of the truck and broke open, sending the baseballs bouncing all over the neighborhood. Chad and Jeremy happened to be walking by and ran to help the truck driver pick them up. The boys gathered the baseballs in a trash can they borrowed from a house nearby. Within an hour, they had emptied 9 trash cans full of baseballs into the truck. After the truck driver counted all they had gathered, he was still missing 1,109 baseballs. If each trash can load held the same number of baseballs, how many baseballs did the boys carry in each trash can load.

$$2 \times 1,000 \text{ baseballs} = 2,000 \text{ baseballs spilled}$$

$$2,000 \text{ baseballs spilled} - 1,109 \text{ baseballs still missing} = 891 \text{ baseballs found}$$

$$891 \text{ baseballs found} / 9 \text{ trash cans full} = 99 \text{ baseballs in each trash can load}$$

Math Concept: Number Operations and Computation, Algebraic Expression

**More practice writing stories: [The Humble Beginnings of the Hamburger](#);
[How the Brahman Bull Got Its Hump](#)**

2003 Top Oklahoma Agricultural Commodities



Oklahoma Rank	National Rank	Commodity	2003 Cash Receipts (in millions)
1	5	Cattle & Calves	\$2,375
2	15	Poultry & Eggs	462
3	2	Winter Wheat	443
4	8	Hogs & Pigs	442
5	9	Forest Products	250
6	26	Milk Production	178
7	25	Greenhouse/Nursery	167
8	8	All Hay	156
9	13	Cotton Lint & Seed	63
10	24	Soybeans	41
11	27	Corn	36
12	7	Equine (Horses)	34
13	7	Grain Sorghum	23
14	39	Vegetables	20
15	7	Peanuts	19
16	1	Rye	6
17	11	Watermelons	6
18	8	Pecans	5
19	8	Sheep & Wool	4
20	5	All Goats	3
21	25	Peaches	2
22	26	Oats	1

Oklahoma Agricultural Commodities



1. Which two Oklahoma commodities earned between \$150 and 175 million in 2003?
2. Which Oklahoma commodity ranked number 1 in the nation but did not rank in the top 10 statewide?
3. Which two Oklahoma commodities earned the same amount in cash receipts in 2003?
4. Which 12 Oklahoma commodities ranked in the top 10 nationally?
5. Which Oklahoma commodity's state rank is closest to its national rank?
6. Which Oklahoma commodity's state rank is farthest from its national rank?
7. Find the difference in cash receipts between the top two Oklahoma commodities.
8. What were the total cash receipts for the top 22 Oklahoma commodities?
9. What were the total cash receipts for all the Oklahoma commodities from animals?
10. What was the total cash receipts for all the Oklahoma commodities from plants?

Math Concept: Data Analysis, Number Operations and Computation

More Data Analysis online: "Ag in the Outfield;"
"Beef is Good for You;" "Great Expectations."