How Far Does It Travel?

Objective

Students will read about the food distribution system and compare the distance food travels in the traditional system to food produced locally.

Background

The food we buy in the grocery store travels an average 1,300 miles from the farm to our tables. Most farmers and ranchers sell to collection points, such as grain or produce terminals or stockyards. The terminal or stockyard sells to processing companies, which process and package the products we buy in the grocery store—packages of hamburger meat, bags of wheat flour, boxes of cereal, hot dogs, frozen dinners, etc.

From the final processor, finished food products are moved by truck or rail to warehouses, which usually are located near a city. Most modern warehouses have storage areas for frozen and refrigerated food and are equipped to control temperature and humidity.

Warehouses can assemble full truckloads of products originating from many different suppliers for shipment to one large retailer or to many smaller outlets in a given region. This process reduces transportation costs when compared to shipping a small quantity of one item directly from the producer to the retailer. If the retail outlet is large enough to accept complete truckloads directly from the manufacturer, direct shipments from the factory are sometimes made.

Processors of perishable foods (dairies, ice cream manufacturers, wholesale bread bakeries, meat packers) usually maintain their own fleets of trucks for carrying fresh products directly to their retail customers.

Fresh produce is distributed through terminal markets, wholesalers or food cooperatives. A terminal market is a central market, generally located in a major city, where several brokers, wholesalers, distributors and/or jobbers are grouped together. Produce from several production regions is assembled and shipped to grocery stores, restaurants and chain store warehouses. The market may be owned by the state, city or private companies. Terminal markets for Oklahoma are in Dallas, Kansas City, Denver and Houston. The principal advantage of terminal markets is the ability to market large volumes of produce. Produce must be packaged in containers that are compatible with the handling and loading methods of the market. Use of terminal markets requires the grower to have enough produce available to transport efficiently.

A wholesaler is an individual or a business firm which buys large quantities of produce from a grower or another dealer for resale and distribution. The wholesaler may sell to a retail store, an institutional buyer or to another wholesaler. Wholesalers differ from brokers because they take deliveries and assume ownership of the produce.

A broker is an individual or firm which acts as an agent for the buyer

Oklahoma Academic Standards

GRADE 6

Geography: 1,2,3. People and Cultures: 2
Data & Probability: 1,2

GRADE 7

Geography: 1,2,3,4,5; Humans and Their Environment: 2
Data & Probability: 1

GRADE 8

Data & Probability: 1,2

HIGH SCHOOL

Economics: 1,2. Geography: 1,2,5

Materials Needed

US road atlas or internet access

Oklahoma road map (available free from the Oklahoma Department of Tourism)

various fruits and vegetables with country of origin labels

Conventional Sources for some Common Fruits and Vegtables

APPLES—WA, NY, MI, CA, VA, NEW ZEALAND

BANANAS—COSTA RICA, BRAZIL, BOLIVIA

CANTALOUPE—CA, AZ, TX, MEXICO

GRAPES—CA, AZ, CHILE, MEXICO

ORANGES—CA, FL, TX, AZ, MEXICO

PEACHES—CA, SC, GA, AR

STRAWBERRIES—CA, FL, OR, WA, MEXICO

BROCCOLI—CA, AZ

CARROTS—CA, TX, MEXICO

CUCUMBERS—GA, FL, MEXICO

LETTUCE—FL, AZ, CA

SWEET CORN—FL

SPINACH—CA, FL, GA

SQUASH—TX, AZ, CA, MEXICO

BELL PEPPERS—CA, FL, MEXICO

POTATOES—CA, ID, CO, ND, OR

TOMATOES—FL, CA, MEXICO

or seller in negotiating a contract. The broker does not assume title of the produce but facilitates agreements between buyers and sellers. In Oklahoma, watermelon growers sometimes rely upon brokers to find buyers for their product.

Cooperative and private packing facilities are organized by growers or other individuals to construct marketing facilities to achieve marketing efficiency through greater total volume. Cooperatives are often organized where there is a concentration of small to mid-sized growers of one or several related crops in one area.

Shipping food long distances burns large amounts of fossil fuels. Food shipped long distances also requires more elaborate packaging, much of which is manufactured using fossil fuels and ends up in local landfills.

Food produced and sold locally, such as that found in local farmer's markets does not require elaborate packaging and does not require long-distance shipping. However some studies indicate that local transportation of smaller quantities of produce may not save fossil fuel use when compared with shipping larger quantities long distances.

Some grocery stores sell locally-grown foods, both organic and conventionally-grown. Locally-grown food may also be purchased from pick-your-own operations, from food cooperatives, such as the Oklahoma Food Cooperative, or from roadside markets. In Oklahoma City there are also outlets for locally grown foods located in the old Farmers Market District near downtown.

Background Sources: "Food Industry," Grolier Electronic Publishing, 1993; Tilley, Daniel, Douglas Moesel and James R. Sleper, "Fresh Produce Marketing Alternatives for Oklahoma Fruit and Vegetable Growers," OSU Extension Fact Sheet No. 473.

Social Studies

1. Read and discuss background and vocabulary.
   —Students will use the background to develop a flow chart showing the movement of food from farm to table.
2. Brainstorm as a class to develop a list of favorite fruits and vegetables.
   —Students will hypothesize where each produce item may be grown.
   —As a homework assignment, each student will visit a grocery store and determine the source of each item by looking at labels on the produce. (As an alternative, see the list at left of possible sources for some common fruits and vegetables or invite students to bring samples of various fruits and vegetables with point of origin labels.)
   —Students will discuss the results of their homework assignment as a class.
   —Students will use road maps or online mapping programs to determine the distance each item traveled from its source to one of the

produce terminal locations listed in the background (Dallas, Houston, Denver, Kansas City) and then to your town.

3. Students will work in groups to complete the worksheet included with this lesson: "Source Distance Estimations for Produce."
   —For each group, provide an Oklahoma road map and copies of the worksheet and "Oklahoma Fruits and Vegetables: Some of the Farms that Produce Them" (also included with this lesson).
   —Students will work in groups to find the nearest Oklahoma farm source for each produce item listed in the worksheet.
   —Students will use the map scale to determine mileage between the nearest Oklahoma source and your town.
   —Students will write the mileage in the appropriate column.

Math

1. Students will review graphing methods. (See "Graphs" in the "Additional Resources" link on the website.)
   —Using the "Estimated Average Distance" worksheets provided with this lesson, students will create appropriate graphs to show the distance each produce item travels both from conventional sources and from local sources.
2. Students will create a comparison table that shows miles saved by buying each product locally.
   —Students call a local gas station to find out the price per gallon for diesel fuel. (Semi-trailer trucks that deliver food usually run on diesel fuel).
   —Students research online or contact an expert to find the average miles per gallon a semi-truck gets on the highway.
   —Students round the mileage to the tenths or hundredths.
   —Students add a column to their tables that shows how many gallons of fuel would be saved if each truckload of that product did not have to be shipped to your location.
   —Students justify and discuss reasoning with a partner, in a small group or as a class.
   —Students will calculate the mean, median and mode for the data and justify which measure of central tendency would provide the most descriptive information for the data.

Extra Reading

D'Amico, Joan, *The United States Cookbook: Fabulous Foods and Fascinating Facts From All 50 States,* Jossey-Bass, 2000.

Rendon, Marcie R., and Cheryl Walsh Bellville, *Farmer's Market: Families Working Together*, Carolrhoda, 2001.

Silverman, Buffy, *Follow That Food: Distribution of Resources,* Heinemann-Raintree, 2007.

Vocabulary

broker—a person who acts as an agent in the purchase and sale of property

chain store—any of a number of stores under the same ownership selling the same lines of goods

conventional—following, agreeing with, or based on a way of doing things that is widely accepted and followed

cooperative—an association owned by and operated for the benefit of those using its services

distributor—an agent or agency for marketing goods

fossil fuel—a fuel (as coal, oil, or natural gas) that is formed in the earth from plant or animal remains

jobber—a person who buys goods and then sells them to usually smaller dealers

outlet—a market for a product; an agency (as a store or dealer) through which a product is marketed

output—something produced

paradox—a statement that seems to go against common sense but may still be true

perishable—likely to spoil or decay

raw materials—materials that can be converted by manufacture, processing, or combination into a new and useful product

retailer—someone who sells in small amounts to people for their own use

stockyards—a yard in which livestock are kept temporarily for slaughter, market, or shipping

terminal market—a metropolitan market which handles all agricultural commodities

warehouse—a building for the storage of goods

wholesaler—someone who sells, usually in large amounts, for resale

Name_____

Estimated Average Distance Traveled by Produce

The table below shows the estimated average mileage certain fruits and vegetables travel from the place where they were grown to the average consumer.

1. Use the "Oklahoma Fruits and Vegetables and Farms That Grow Them" chart to find the nearest farm to purchase the following fruits and vegetables.
2. Locate the town where the farm is located on an Oklahoma map and write the name of the town in the correct column.
3. Determine the miles between that town and your town.
4. Write the mileage in the correct column.

Produce Type	Estimated average mileage from conventional source	Nearest local source	Estimated mileage from nearest source to your town
apples	1,555		
asparagus	1,671		
broccoli	2,095		
cabbage	754		
carrots	1,774		
cauliflower	2,118		
corn (sweet)			
grapes	2,143		
lettuce	2,040		
onions	1,675		
peaches	1,674		
peppers (bell)	1,261		
potatoes	1,239		
pumpkins	233		
spinach	2,086		
squash	781		
strawberries	1,093		
tomatoes	1,369		
watermelons	791		

The table was adapted from a table developed by researchers at the Leopold Center for Sustainable Agriculture at Iowa State University. Average distances were determined using a weighted average formula which included the average mileage from the various locations where each produce item is grown to a location in the center of the United States (Chicago). Source: Leopold Center for Sustainable Agriculture, http://www.leopold.iastate.edu/

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.

Oklahoma Fruits and Vegetables
Some of the Farms that Grow Them*

COUNTY	CITY	FARM NAME	FRUIT OR VEGETABLE GROWN
Adair	Westville	Paradise Valley Organics	broccoli, cabbage, carrots, cauliflower, corn, lettuce, onions, bell peppers, potatoes, pumpkins, spinach, squash, strawberries, tomatoes, watermelon
Atoka	Atoka	The Farm	broccoli, cabbage, carrots, cauliflower, lettuce, onions, bell peppers, potatoes
Atoka	Lane	Shiny C Farm	broccoli, cabbage, cauliflower, grapes, bell peppers, corn, tomatoes
Canadian	Calumet	Sand Hill Vineyards	grapes
Canadian	El Reno	Organic Gardens	broccoli, cabbage, carrots. lettuce, onions, bell peppers, potatoes, spinach, squash, tomatoes, watermelon
Canadian	Piedmont	Two Tomatoes Veggies	carrots, onions, tomatoes
Canadian	Yukon	Pizza Farm	broccoli, cabbage, carrots, cauliflower, corn, onions, pumpkins, bell peppers, spinach, squash, strawberries, tomatoes
Carter	Wilson	S-K Ranches	broccoli, lettuce, onions, bell peppers, potatoes, strawberries, tomatoes, watermelon
Cherokee	Tahlequah	Hatchet Bar H	apples, peaches
Cleveland	Noble	George's Apiary	tomatoes
Cleveland	Norman	Happy Lucky Chicken Farm	pumpkins
Cleveland	Norman	OEI Farm	grapes, lettuce, onions, bell peppers, spinach, squash, tomatoes
Cleveland	Norman	Rock Creek Vineyard	grapes
Cleveland	Norman	Sand Hill Farm	cabbage, carrots, cauliflower, lettuce, bell peppers, potatoes, pumpkins, squash, tomatoes, watermelon
Craig	Vinita	Honeysuckle Farms	apples, corn, strawberries
Creek	Bristow	Crestview Inc. Farms	broccoli
Creek	Bristow	Nuyaka Natural Farm	apples, broccoli, cabbage, carrots, cauliflower, corn, lettuce, onions, peaches, bell peppers, potatoes, pumpkins, spinach, squash, tomatoes, watermelon
Creek	Bristow	Nuyaka Creek Winery & Vineyard	asparagus, grapes, peaches, strawberries, tomatoes
Creek	Sand Springs	Pleasant Valley Farm	pumpkins, watermelon
Creek	Sapulpa	The Peppermint Dragon	asparagus, broccoli, cabbage, cauliflower, lettuce, onions, bell peppers, squash, strawberries, tomatoes
Delaware	Colcord	Cedar Acres Produce	broccoli, cabbage, carrots, onions, bell peppers
Ellis	Fargo	Jahay Farm	cabbage, carrots, lettuce, onions, bell peppers, potatoes, pumpkins, squash, tomatoes, watermelon
Garvin	Paoli	Daniel & Wynn Produce	onions, potatoes, squash, tomatoes, watermelon

*Produce listed is only that which applies to this lesson. Most of these farms grow other produce as well. Source: Kerr Center for Sustainable Agriculture, *The Oklahoma Food Connection 2006: A Directory of Agricultural Producers, Crops and Institutional Buyers*.

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Oklahoma Fruits and Vegetables

Some of the Farms that Grow Them*

COUNTY	CITY	FARM NAME	FRUIT OR VEGETABLE GROWN
Garvin	Pauls Valley	Pesterfeld Farm	corn
Garvin	Paoli	Daniel & Wynn Produce	onions, potatoes, squash, tomatoes, watermelon
Garvin	Stratford	Peach Crest Farm LLC	lettuce, peaches, bell peppers, watermelon, pumpkins, spinach, squash, tomatoes
Grady	Blanchard	Sunrise Acres	broccoli, cabbage, carrots, cauliflower, lettuce, onions, bell peppers, potatoes, spinach, sweet potatoes, tomatoes
Grady	Rush Springs	Bounds Farm	broccoli, cabbage, carrots, cauliflower, corn, lettuce, onions, potatoes, pumpkins, spinach, squash, tomatoes, watermelon
Hughes	Allen	Kelly Jay	broccoli, cabbage, carrots, cauliflower, corn, lettuce, onions, bell peppers, potatoes, pumpkins, spinach, squash, strawberries, tomatoes, watermelon,
Hughes	Calvin	Cronkhite Farms	asparagus, corn, grapes, onions, bell peppers, squash, potatoes, strawberries, tomatoes
Jackson	Altus	Circle W Farms	watermelon
Kay	Ponca City	Kyger Road Greenhouses & Market	tomatoes
Kingfisher	Kingfisher	S/C Farms	watermelon
LeFlore	Pocola	Wild Things Farm	asparagus, corn, pumpkins, spinach, squash, strawberries, tomatoes, watermelon
Logan	Coyle	Shekinah Springs Farm	broccoli, lettuce, onions, potatoes, spinach
Logan	Edmond	Kendall's Home Grown Veggies	apples, corn, grapes, peaches, bell peppers, tomatoes
Major	Ringwood	Indian Creek Village	grapes
Marshall	Madill	Motes Produce	asparagus, corn, lettuce, onions, bell peppers, potatoes, pumpkins, squash, tomatoes, watermelon
Mayes	Chelsea	Oklahoma Rose Vineyard	asparagus, corn, lettuce, spinach
Mcclain	Blanchard	Berry Creek Farm	apples, asparagus, broccoli, cabbage, carrots, cauliflower, grapes, lettuce, onions, bell peppers, spinach, strawberries, tomatoes
McClain	Newcastle	TG Farms	corn, grapes, peaches, peppers, potatoes, pumpkins, squash, tomatoes, watermelon
Mccurtain	Broken Bow	HoneyBear Ranch	broccoli, carrots, cauliflower, onions, peaches, bell peppers, potatoes, pumpkins, spinach, tomatoes
Mcintosh	Checotah	Headwater Hybridmaster	tomatoes
Mcintosh	Hanna	Hanna Garden Project	cabbage, bell peppers
Mcintosh	Porum	Mccawley Family Farm	lettuce
Murray	Davis	Bubba & Ma's Homegrown Veggies	cabbage, carrots, lettuce, onions, bell peppers, potatoes, squash, tomatoes
Muskogee	Muskogee	Mikelsons Orchard	apples, peaches
Oklahoma	Arcadia	Crestview Inc. Farms	apples, asparagus, broccoli, cabbage, cauliflower, grapes, lettuce, onions, bell peppers, potatoes, spinach, squash, strawberries, tomatoes
Okmulgee	Okmulgee	Deep Fork Farms	broccoli, cabbage, cauliflower, grapes, onions, bell peppers, potatoes, pumpkins, squash, tomatoes cabbage, carrots, lettuce, onions, bell peppers, potatoes, pumpkins, squash, tomatoes, watermelon

Oklahoma Fruits and Vegetables

Some of the Farms that Grow Them*

COUNTY	CITY	FARM NAME	FRUIT OR VEGETABLE GROWN
Payne	Glencoe	El Sueno Enterprises	broccoli, cabbage, cauliflower, corn, lettuce, onions, bell peppers, pumpkins, spinach, squash, tomatoes, watermelon
Payne	Stillwater	Woodward Park Vineyards	grapes
Pontotoc	Ada	Peach Tree Farms	peaches
Pottawatomie	Shawnee	Crows Vegetable Farm	asparagus, cabbage, corn, onions, bell peppers, potatoes, pumpkins, squash, strawberries, tomatoes
Pottawatomie	Shawnee	Tesch Farm	broccoli, cabbage, cauliflower, corn, onions, bell peppers, potatoes, pumpkins, spinach, squash, strawberries, tomatoes, watermelon
Pottawatomie	Tecumseh	Rolling Hills Farm	onions, pumpkins, squash, strawberries, tomatoes
Rogers	Claremore	One Tree Hill Farm	corn, onions, bell peppers, potatoes, pumpkins, squash, tomatoes, watermelon
Rogers	Collinsville	Windy Hill Farm	apples, broccoli, carrots, cauliflower, lettuce, onions, peaches, bell peppers, spinach, squash, tomatoes
Rogers	Oologah	Aunt Netties Farm	broccoli, cabbage, cauliflower, onions, peaches, bell peppers, potatoes, spinach, strawberries
Seminole	Okemah	PD&H Farms	lettuce, onions, squash, watermelon
Seminole	Wewoka	Holland Farm	corn, lettuce, onions, bell peppers, potatoes, tomatoes, watermelon
Tulsa	Collinsville	AK's Bloomers	carrots, grapes, lettuce, onions, peaches, bell peppers, pumpkins, spinach, squash, strawberries, tomatoes, watermelon
Tulsa	Tulsa	Earthly Goods Garden	broccoli, lettuce, bell peppers, spinach, squash, strawberries, tomatoes
Tulsa	Tulsa	Three Springs Farm	broccoli, cabbage, cauliflower, lettuce, onions, potatoes, pumpkins, spinach, squash, tomatoes, watermelon
Tulsa	Tulsa	Wheat's Haikey Creek Farm	apples, lettuce, onions, bell peppers, potatoes, spinach, squash, tomatoes
Wagoner	Broken Arrow	Mom's Menagerie Farm	spinach, squash, tomatoes
Wagoner	Haskell	MB Gardens	broccoli, cabbage, cauliflower, corn, onions, bell peppers, squash, tomatoes
Washita Colony	McLemore Pumpkin Farm	pumpkins	
Woodward	Sharon	Cornett	tomatoes
Woodward	Woodward	Anichini-Moore Ranch & Farm	apples, corn, grapes, peaches, bell peppers, pumpkins, strawberries, tomatoes, watermelon
Woodward	Woodward	Barnett Farm	apples, grapes, peaches, strawberries

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