

A Market for Goats

Grades 6-8

Social Studies, Agriscience, Science, Visual Arts



Objectives

Students will read about goat production in Oklahoma and learn about the market for goats among various ethnic groups. Students will research ethnic groups and holidays in which goat meat is an important part. Students will look at several works of art related to goats and make a timeline of the paintings to show the role of goats in history. Students will research to find the origins of the paintings and locate the countries on a map of the world. Students will make goat cheese and learn about the science involved in cheese making

Vocabulary

agile— able to move quickly and easily

capital—any form of wealth employed or capable of being employed in the production of more wealth

caprine—of, relating to or being a goat

containment—restricting territorial movement

cud— food brought up into the mouth by some animals from the rumen to be chewed again

ethnic—of or relating to groups of people with common traits and customs and a sense of shared identity

halal—permitted or lawful under Islamic dietary laws

immigrant— a person who comes to a country to live there

Inconsistent— not staying the same throughout

kosher— accepted by Jewish law, especially ritually fit for use

niche market— concentrating on a small but specific and well defined segment of the population by identifying needs, wants, and requirements that are being addressed poorly or not at all by other sources.

predator— an animal that lives by killing and eating other animals

ruminant— a cud-chewing mammal

savory— having a spicy or salty quality without being sweet

staple— something in widespread and constant use or demand

tradition—a long-established or inherited way of thinking or acting

variable—likely to change

Background

Goats were among the first animals to be tamed by humans and were being herded as long as 10,000 years ago. They are part of the **caprine** family and are descended from the Bezoar, a wild goat native to Asia and eastern Europe. Like cattle, they are **ruminants**, or **cud**-chewing animals.

In 2020 Oklahoma ranked in the top five in meat goat production in the US, along with Texas, Tennessee, California and Georgia. Oklahoma meat goat producers had 84,000 meat and 7,000 milk goats in 2020. Most of the recent growth in the goat industry has occurred in Hawaii, Oklahoma, Louisiana, New Mexico and Idaho. After doubling in production in Oklahoma between 1997 and 2007, meat goat inventory has declined since 2009.

A Market for Goats (continued)

Goat is a **staple** in Africa, Asia and South/Central America, and a delicacy in a few European cuisines. The cuisines best known for their use of goat include African cuisine, Middle Eastern, North African, Indian, Nepali, Pakistani, Mexican, and Caribbean. Cabrito, or baby goat, is the typical food of Monterrey, Nuevo León, Mexico; in Italy it is called capretto. Meat from more mature goats is chevron.

Goat has historically been less commonplace in American, Canadian and Northern European cuisines but has become more popular in some **niche markets**, including those that serve **immigrants** from Asia and Africa who prefer goat to other meat. For Jewish and Islamic **ethnic** groups, goats are a source of **kosher** or **halal** meat. Although ritual sacrifice of animals is less common today, for specific holidays meat must be suitable for sacrifice under their food laws. Goat meat is a **traditional** part of several religious and cultural celebrations. Goat has also gained popularity among those looking for alternative sources of protein. Goat meat is low in fat and cholesterol and leaner than poultry, beef, pork or lamb.

While in the past goat meat in the West was confined to ethnic markets, it can now be found in a few upscale restaurants and shops, especially in cities such as New York and San Francisco. Goat meat is rarely found in mainstream grocery stores because of limited, **variable** and **inconsistent** supplies. It is more expensive than poultry and other red meats.

Goat meat is **savory** and less sweet than beef but slightly sweeter than lamb. It can be prepared in a variety of ways—stewed, curried, baked, grilled, barbecued, minced, canned, fried, or made into sausage or jerky.

Goats are easy to handle and inexpensive to maintain. For this reason they are popular as show animals. They require less land and start-up **capital** than large livestock such as cattle. Because goats are curious, smart and more **agile** than larger livestock, the biggest expense is adequate fencing for **containment** and protection from **predators**.

The most popular breed of meat goat in Oklahoma is the Boer goat. Boer is an Afrikaans word meaning farmer. The Boer goat was developed in South Africa and first introduced in Texas in 1993. Other breeds used for meat include Nubian, Pygmy and Spanish goats. There are over 210 breeds of goat. Of the 450 million goats in the world, 6 to 8 percent of them are in North America. The largest part of the world goat population can be found in the Middle East and Asia.

Goats are also raised for their wool (mohair, pashmina, cashmere) and milk. Goat milk has many uses, including cheese, ice cream, and baby formula. Goat milk is used as a replacement for cow's milk for babies who are allergic to cow's milk. It has a more easily digestible fat and protein content than cow milk. The high fat content makes it a useful ingredient in soaps and lotions. Goat milk is also high in vitamins and minerals that are good for the skin. Cheese made from goat milk is considered a gourmet delicacy.

A Market for Goats (continued)

Additional Reading

Bregoli, Jane, *The Goat Lady*, Tilbury, 2008.

Hurst, Janet, *The Whole Goat Handbook: Recipes, Cheese, Soap, Crafts & More*, Voyageur, 2013

Lochhead, Christopher and Heather Clancy, *Niche Down: How to Become Legendary by Being Different*, Self Published, 2018

My Incredible World, *Goats: A My Incredible World Picture Book for Children*, Create Space, 2018

Singer, Isaac Bashevis, and Maurice Sendak, *Zlateh the Goat and Other Stories*, Harper Collins, 2001.

Weaver, Sue, *The Goat: A Natural and Cultural History*, Princeton University Press, 2020

Websites

http://www.oklahomafarmreport.com/wire/news/2021/03/01896_MeatGoats03312021_094340.php#.YIreC5BKIM8

<https://www.thebalancesmb.com/niche-market-definition-for-business-2947188>

https://www.nass.usda.gov/Publications/Todays_Reports/reports/shep0120.pdf

<https://goats.extension.org/goat-industry-outlook/>

<https://www.washingtonpost.com/business/2019/04/23/americas-new-pastime-milking-goats/>

<https://extension.psu.edu/meat-goat-production>

<https://extension.okstate.edu/programs/meat-goat-production/index.html?Forwarded=meatgoat.okstate.edu/>

<https://extension.psu.edu/marketing-lamb-and-goat-for-holidays>

<https://drinc.ucdavis.edu/goat-dairy-foods/dairy-goat-milk-composition>

A Market for Goats

Activity 1

Grades 6-8 Teacher Resources and Standards

Activity 1: Niche Markets, (Social Studies, Agriscience) 1-2 50 minute class period

Students will learn about niche markets and how demographic change in the US have created a niche market for goat meat and other goat-related products. Students will make goat milk soap and create a marketing plan.

Oklahoma Academic Standards

Activity 1: Niche Markets (Social Studies, Agriscience)

- | | |
|---------------|--|
| SS.6.4.1 | Describe the commercial agriculture and industrial regions that support human development. |
| SS.7.3.3 | Evaluate the impact of a region's major religions, including geographic hearths, major beliefs, customs, and the significance of religion in contemporary societies; explain how religion can both unify or divide people. |
| SS.7.4.3 | Explain the differences among subsistence, cash crop and commercial agriculture, including the impact on economic development |
| SS.7.5.2 | Describe how cultural diffusion, both voluntary and forced, impacts society. |
| CS.02.02.01.b | Discover the different cultures that exist in one's community. <ul style="list-style-type: none">• food customs of major world populations |

Materials:

- Activity 1 Reading Page 1 “What is a Niche Market?”
- Activity 1 Reading Page 2 “A Niche Market for Goats”
- Activity 1 Worksheet 1 “Niche Markets”
- Activity 1 Recipe Page 1 “Goat Milk Soap”
- Activity 1 Worksheet 2 “Ethnic Goat Dishes”
- Activity 1 Reference Sheet 1 “World Map”
- Microwave oven
- Goat milk melt-and-pour soap base (2 lbs.)
- Microwave safe bowl
- Rubber spatula
- Scented essential oil
- Spray bottle filled with rubbing alcohol
- Soap mold or ice cube trays
- Waxed paper

A Market for Goats

Activity 1- Continued

Grades 6-8 Teacher Resources and Standards

Procedures:

1. Read and discuss background and vocabulary.
2. On a map of the US, students will locate the top five producers of meat goats—Texas, Tennessee, Georgia, California and Oklahoma.
3. Use Activity 1 Reading Page 1 **“What is a Niche Market?”** to introduce the concept of specialized or targeted markets.
4. Provide copies of Activity 1 Reading Page 2 **“A Niche Market for Goats”**.
 - Students will read the information as a class.
 - As a class, discuss supply and demand and the development of new markets driven by the immigration of people from different religions and ethnic groups into the US.
5. Have students complete Activity 1 Worksheet 1 **“Niche Markets”** to check understanding of reading material and discussion.
6. Discuss the meaning of niche marketing. Besides goat meat, another successful niche market related to goats is goat milk soaps and lotions. Because of its high fat content, goat milk makes an excellent base for those products.
 - Divide students into groups of four or five.
 - Students will follow the directions in Activity 1 Recipe Page 1 **“Goat Milk Soap”**
 - Students will work in groups to develop a plan for marketing the soap, including name, advertising plan, budget, etc.
 - Students will present their ideas in a PowerPoint presentation, poster, skit or other creative format.
7. Divide students into groups of three or four and assign each group one of the ethnic groups discussed in the reading.
 - Students will use online or library resources to research the assigned ethnic groups, important holidays, dietary laws or taboos and additional food preferences.
 - Working in their groups, students will creatively present information in ways that conveys a grasp of concepts (group poster, Powerpoint presentation, or oral and written presentation of ideas, video, etc.) Students should cite factual sources.
 - Students will discuss how the culture is like and how it is different from their own.
8. Hand out Activity 1 Worksheet 2 **“Ethnic Goat Dishes”**. Students will use online or print resources to identify the country where each of the dishes is popular. Students will find the country on a world map or use Activity 1 Reference Sheet 1 **“World Map”** and name the continent and region where it is located.
9. Discuss the movement of immigrant groups in the past that introduced new foods into the US (Irish stew, Italian pizza, Chinese noodles, Mexican tacos, etc.) Students will list Americanized foods with ethnic origins. Discuss how different students’ own diets would be without the addition of ethnic foods such as tacos and pizza.

A niche market is a part of a larger market that has its own demands and preferences. Niche markets can cater to specific consumer needs and wants. Catering to the unique demands that larger companies don't address can result in loyal customers and increased sales.

The key to establishing a niche market is research. By researching unique consumer demands, a business can find the unique segments that already exist, and explore where new ones could be successfully developed.

You can define a niche based on many factors, but some common ways are:

- Values
- Interests and hobbies
- Geography
- Price
- Income
- Quality



There are several benefits to targeting a niche market:

- Reduced competition
- Focused business efforts
- Providing specific expertise
- Establishing brand loyalty

The more specialized the products or services you offer, the less competition there will be, which gives businesses a chance to take advantage of a larger market share and less price competition. Targeting a narrower audience also allows businesses to focus their efforts on catering to specific customer needs.

Some goat producers have found niche markets by targeting individuals who have moved to the US from other countries. Many people from Africa, Asia and Central/South America use goat meat as a dietary staple or for religious celebrations. Because it's smaller fat particles and lower lactose content makes goat milk easier for some people to digest, there is also a niche market for goat based dairy products. Some varieties of goat cheese are considered gourmet delicacies.

There are dangers in focusing only on niche markets. Without other sources of income, a business becomes vulnerable to market changes. If demand for a product, like goat meat, increases, there will likely be increased competition, which usually results in lower prices for the producer as the market becomes saturated.

Key Takeaways

- A niche market is a segment of a broader market with its own needs and preferences.
- Finding a niche market requires learning about consumers' preferences, competitors, and potential market changes.
- Niche markets can be defined based on values, hobbies, location, or quality.

A marketing niche is a small segment of a larger market that targets a very specific group of committed buyers. Rather than try to capture a share of the entire market, the niche business targets a very specific slice. The market for goat meat is a good example. Goat producers can't compete with beef, pork or chicken producers in the US because those are well-established markets that cater to the tastes of most Americans.

But goat meat is a traditional part of the diet for many of our growing immigrant populations. Goats are the principle source of animal protein in many North African and Middle Eastern nations. Goat is also important in the Caribbean, in Southeast Asia, and in developing tropical countries. Goat meat is a traditional part of the diet for many Asians and Latinos.

Goat meat also works well in a niche market because getting started is less costly than it is for other kinds of meat production. Goats are easy to handle and inexpensive to maintain. They require less land and start-up capital than large livestock. The biggest expense is adequate fencing because goats are curious, smart and more agile than larger livestock.

Probably the most important requirement for getting started in a niche market is to know as much as possible about the potential customers. To meet the demand for goat meat among target groups the goat producer needs to understand the kinds of goats required for each ethnic group and in particular for the different holidays where goat meat is a traditional part of the celebration.

An important consideration when marketing goats for ethnic markets is the weight and sex of the animal and the method in which the meat is harvested such as Halal (Islamic) or Kosher (Jewish). Halal refers to foods that are considered permitted or lawful in the Muslim Qu'ran. These foods, and in this case animals, must be treated with respect and be well cared for. When the animal is harvested, the jugular vein is cut and the blood from the animal is allowed to drain. (Muslims are not allowed to consume blood or blood byproducts.) The animal is also blessed at the time of slaughter.

Christian Holidays

EASTER is a Christian feast commemorating the Resurrection of Jesus after his crucifixion. The exact date of the celebration is different for Western and Eastern Christians. While most Christians in the US use the Western date, some families of Greek, Russian, Egyptian and Eastern European descent may use the Eastern Orthodox date which is about two weeks later.

Customers are looking for milk-fed kids between 20 and 40 pounds, with a weight of 30 pounds considered ideal. Kids weighing less than 20 lbs are generally disappointing to buyers due to low meat to bone ratios and high carcass drying losses. There generally is a slight price (per lb of live weight) penalty for kids weighing over 40 lbs. Eastern Orthodox Christians prefer a slightly larger milk-fed kid (i.e. around 35 pounds).



Roast Goat Saddle

CHRISTMAS is a Christian holiday celebrating the birth of Jesus Christ. The Christmas market is for milk-fed kids under 50 pounds. Young kids are rare during the Christmas season because the does must breed out of season (in May) to give birth in October. Some goat breeds, such as Boers can breed year round. Producers who breed for fall-born kids can get a premium price during winter.

EPIPHANY is a prime Christian feast, celebrated January 6, called also Twelfth Day or Little Christmas. Its eve is Twelfth Night. It commemorates three events—the baptism of Jesus, the visit of the Wise Men to Bethlehem, and the miracle at Cana.

Jewish Holidays



Spiced Braised Leg of Goat

PASSOVER is a holiday beginning on the 14th of Nisan (first month of the religious calendar, corresponding to March–April) and traditionally continuing for eight days, commemorating the exodus of the Hebrews from Egypt. Also called Pesach. It is considered a time of family gatherings and lavish meals, called Seders.

ROSH HASHANAH is the Jewish New Year. Rosh Hashanah begins the 10 day period known as the High Holy Days.

CHANUKKAH is the Jewish festival of rededication, also known as the festival of lights. It is an eight day festival beginning on the 25th day of the Jewish month of Kislev. Milk-fed kids are preferred for Jewish holidays, but these are hard to get because it requires out of season breeding. Quality control is not as important as it is with Easter.

Islamic Holidays

RAMADAN is the ninth month of the Muslim calendar. During this month Muslims observe a month long fast.

EID UL-FITR marks the end of Ramadan. Male and female kids with all their milk teeth (not older than at 12 months) are required for Ramadan. Males can be whole or castrated. Overly fat kids are less desirable. Optimum live weight is about 60 lbs, but weaned kids from 45 - 120 lbs. are accepted by different buyers.



Braised Goat and Root Vegetables

EID UL-ADHA is second in the series of Eid festivals that Muslims celebrate. Eid ul-Adha is celebrated as a commemoration of Prophet Ibrahim's willingness to sacrifice his son Ismail for Allah. On this day Muslims sacrifice animals which have been deemed Halaal, or fit for sacrifice. They not only eat the meat themselves but distribute it amongst their neighbours, relatives and the poor and hungry. Yearlings (animals with one set of adult teeth) that are blemish free are preferred for Eid Ul-Adha. Animals with broken horns, open wounds, torn ears or physical unsoundnesses generally do not meet the criteria. In some cases, castrated animals or lambs with docked tails are frowned upon.

Hindu Holidays

NAVADURGARA OR NAVRATRA DASHARA OR DASSAI is a Hindu holiday honoring the goddess Durga. Goats are generally slaughtered from the 7th to the 10th day of the holiday after which families meet together and celebrate with curried goat while receiving family blessings. Female goats are not acceptable for this holiday. Relatively tender male goats are generally used. Size of carcass depends on number of people expected to be fed.

DIWALI is a five day festival which occurs on the 15th day of Kartika. Diwali means “rows of lighted lamps,” and the celebration is often referred to as the Festival of Lights.

Other Holidays



Goats for JULY 4TH WEEKEND are animals suitable for barbecue, generally cabrito kids or young bucks, does, and wethers with one or no sets of adult teeth.

Many CARIBBEAN HOLIDAYS such as carnival and Jamaican Independence Day use goat meat for celebratory feasts. Optimal goats for the Caribbean holidays are young 60 lb bucks. However, older animals of all sexes are often in demand, and customers may prefer to buy them rather than pay the extra price for prime young bucks.

The HISPANIC MARKET for goat is for 20- to 35-lb live weight milk-fed kids for cabrito and larger animals for seco de chivo and can be especially strong in some regions during Cinco de Mayo (May 5th), Mexico's Independence Day.

Source: Penn State Extension <http://extension.psu.edu/animals/goats/marketing/ethnic-holiday-calendar>



Indian Goat Curry

A Market for Goats

Activity 1 Worksheet 1: Niche Markets



Name: _____ Date: _____

Use information from Activity 1 Reading Page 1 **“What is a Niche Market?”** and Activity 1 Reading Page 2 **“A Niche Market for Goats”** to answer the questions below:

1. What is the first step in developing a niche market?

2. List demographic changes in the United States that have helped create a niche market for goats.

3. Name at least three ways to define a niche market.

4. List at least two benefits to targeting a niche market.

5. List three reasons goat meat, milk and cheese is a good option for someone trying to start an agricultural business.

6. What is one of the dangers of having a very specialized niche market?

7. Why is it difficult for goat producers to have an animal the correct weight and age for winter holidays like Christmas and Chanukah?

A Market for Goats

Activity 1 Worksheet 1: Niche Markets

ANSWER KEY



Name: _____ Date: _____

Use information from Activity 1 Reading Page 1 “What is a Niche Market?” and Activity 1 Reading Page 2 “A Niche Market for Goats” to answer the questions below:

1. What is the first step in developing a niche market?

Research or knowing as much as possible about potential customers.

2. List demographic changes in the United States that have helped create a niche market for goats.

For many people who have moved to the US from Africa, Asia and Central/South America, goat

Is a dietary staple and important food for religious celebrations.

3. Name at least three ways to define a niche market.

Answers may include: values, interests and hobbies, geography, price, income or quality

4. List at least two benefits to targeting a niche market.

Answers may include: Reduced competition, focused business efforts, providing specific

expertise or establishing brand loyalty

5. List three reasons goat meat, milk and cheese is a good option for someone trying to start an agricultural business.

Getting started is less costly than other kinds of meat production, goats are easy to handle and

inexpensive to maintain, they require less land than other species.

6. What is one of the dangers of having a very specialized niche market?

Without other sources of income, a business or producer is vulnerable to changes in the

market such as decreased demand or increased competition which drive prices down.

7. Why is it difficult for goat producers to have an animal the correct weight and age for winter holidays like Christmas and Chanukah?

To have goats born in the fall, goats must breed in April or May. This is outside the normal

breeding season for most goat species. Boers can be bred all year. Producers with fall born

kids can get a premium price during the winter holidays.

For goat producers, homemade soap and lotion can be another niche market. Goat milk soap is a gentle cleanser that is rich in fatty acids that help keep skin nourished and moisturized. It's high lactic acid content can exfoliate dead skin cells, which can be helpful to people with acne.

Traditional goat milk soap is made using sodium hydroxide or lye, several types of fat/oil and goat milk. It can take up to 6 weeks to cure and be ready to use. Lye is a strong base and can cause burns.

A safer alternative for beginning soap makers is to use a melt and pour soap base. The lye has already been added to the other ingredients and the soap base is ready to heat and add other ingredients like essential oils (for fragrance), herbs, flowers, oats, etc.

Follow the instructions on the package or use the recipe below. There are also many recipes that can be found online.

Goat Milk Soap

- goat milk melt-and-pour soap base (2lbs)
 - rubber spatula
 - essential oil (fragrance of your choice)
 - spray bottle filled with rubbing alcohol
 - soap mold or ice cube trays
1. Cut the soap base into chunks and place in microwave safe dish. Heat in 30-second increments, stirring with the spatula after each heating. Continue until soap base is evenly melted. Do not allow the soap to boil.
 2. Add a few drops of essential oil and stir. If bubbles start to form on the surface, spray lightly with the alcohol.
 3. Pour into molds or ice cube trays. Spray surface with alcohol if bubbles form.
 4. Place in a cool area such as the refrigerator until soap is fully set. Remove from molds or tray and wrap soaps individually in waxed paper.

Once your soap is completed, create a marketing plan to sell your product.

A Market for Goats

Activity 1 Worksheet 2: Ethnic Goat Dishes



Name: _____ Date: _____

Use online or print resources to identify the country where each dish is popular.
Use the World Map or online resources to locate the continent and/or region.

Dish	Country or Countries	Continent or Region
barbacoa de cabrito		
birria de chivo		
goat curry		
goat roti		
san yang kai tai		
biryani		
kosha mangsho		
sukuti		
yagihashi		
cabrito		
roast goat		
goat moilee		
masala gosht		

A Market for Goats

Activity 1 Worksheet 2: Ethnic Goat Dishes

ANSWER KEY



Name: _____ Date: _____

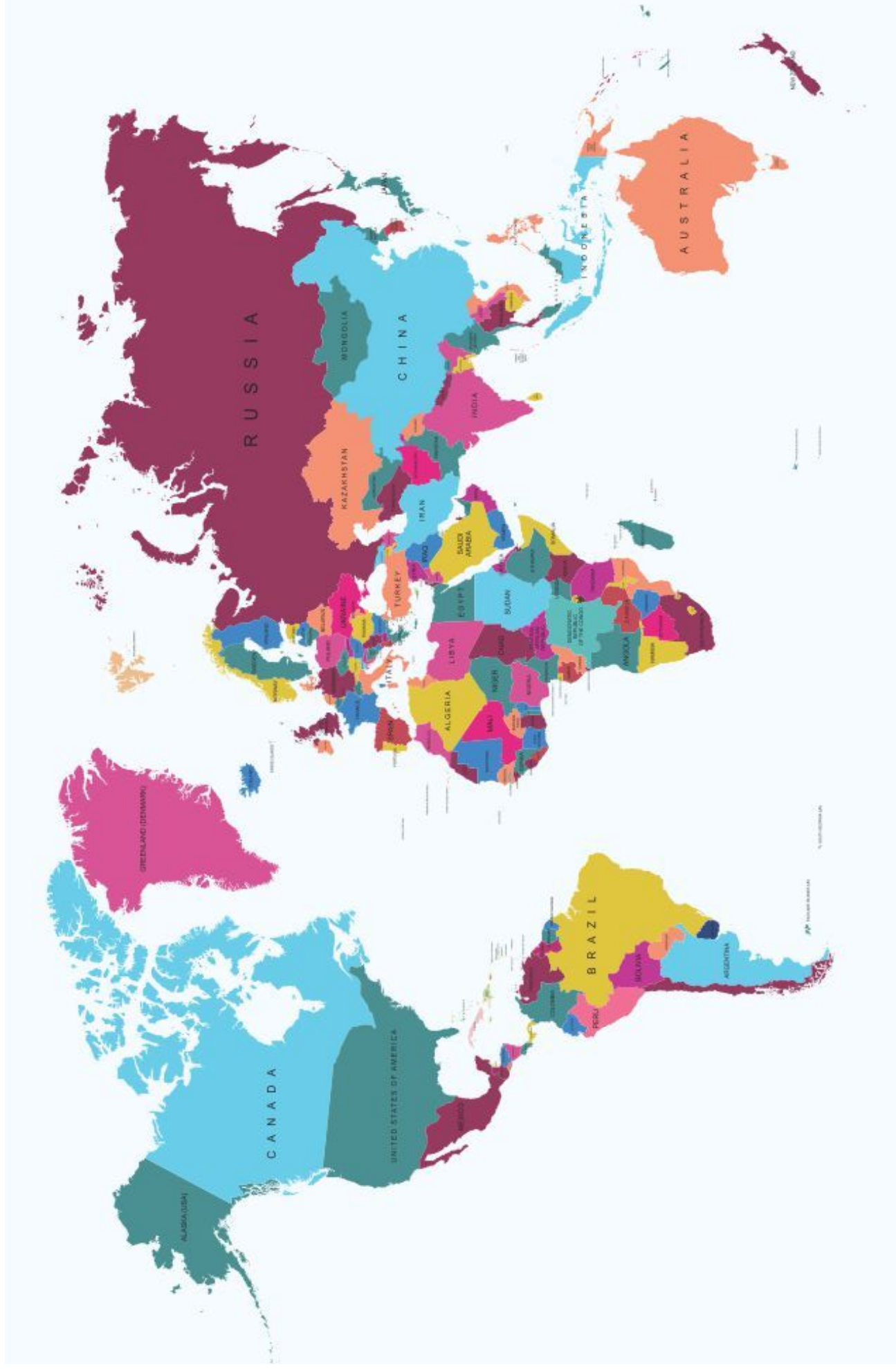
Use online or print resources to identify the country where each dish is popular.
Use a World Map or online resources to locate the continent and/or region.

Dish	Country or Countries	Continent or Region
barbacoa de cabrito	Jamaica	North America/Caribbean Sea
birria de chivo	Mexico	North America
goat curry	Jamaica	North America/Caribbean Sea
goat roti	Jamaica, Trinidad	North America/Caribbean Sea
san yang kai tai	China	Asia
biryani	India	Asia
kosha mangsho	Bengal	Asia
sukuti	Nepal	Asia
yagihashi	Japan	East Asia
cabrito	Mexico, Peru, Brazil, Argentina	North America and South America
roast goat	Southern Italy and Greece	Europe
goat moilee	South India	Asia
masala gosht	India	Asia

A Market for Goats Reference Sheet 1

World Map

Use this map to help complete Activity 1, Worksheet 2 “Ethnic Goat Dishes”



A Market for Goats

Activity 2

Grades 6-8 Teacher Resources and Standards

Activity 2: Goats in Art, (Visual Arts)

1-2 50 minute class periods

Students will study and research works of art with goats as the subject matter. They will determine the elements of art illustrated by each picture and put the pictures on a timeline to compare the changes in techniques used over time. Students will compare abstract representations to more classical representations.

Oklahoma Academic Standards

Activity 2: Goats in Art (Visual Arts)

- | | |
|--------------|---|
| 6.VA.CHP.1.1 | Analyze how art reflects changing times, traditions, resources, and cultural uses. |
| 7.VA.CHP.1.1 | Explore different ways art is used to represent, establish, reinforce, and reflect |
| 8.VA.CHP.1.1 | cultural identity. |
| 6.VA.CHP.1.2 | Explore how artists and cultures used media (materials) to express themselves. |
| 7.VA.CHP.1.2 | Explore connections between art production and imagery relative to social and |
| 8.VA.CHP.1.2 | political climates. |
| 6.VA.CHP.1.3 | Place works of art from a global perspective on a timeline to represent specific |
| | movements, historical periods, and cultures. |
| 7.VA.CHP.1.3 | Explore works of art and artists in relation to specific movements, historical periods, |
| 8.VA.CHP.1.3 | and cultures. |
| 6.ARCM.1.2 | Make connections between visual art and other domains of learning. |
| 7.ARCM.1.2 | |
| 8.ARCM.1.2 | |

Materials:

- Activity 2 PowerPoint Presentation “**Goats in Art**”
- Activity 2 Reading Page 1 “**Elements of Art**”
- Activity 2 Reading Page 2 “**Abstract Art Background**”
- Activity 2 Worksheet 1 “**Abstract Art - Sunny Goat**”
- Activity 2 Worksheet 2 “**Abstract Art - Goat**”
- Activity 2 Worksheet 2 “**What Makes Art Abstract?**”

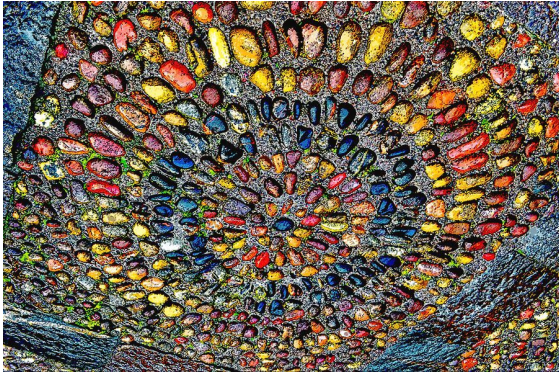
A Market for Goats

Activity 2- Continued

Grades 6-8 Teacher Resources and Standards

Procedures:

1. One indication of the importance of goats around the world and throughout history is the large number of goats represented in works of art from many time periods and from different parts of the world. Use the PowerPoint presentation, **“Goats in Art”** to show students examples of how artists depicted goats through the years. The pictures can also be found at the “Ag in Art” link on the OAITC website (Click on “Additional Resources”) and find all the paintings of goats in the “Farm Animals” section (listed at right).
 - Students will make a timeline of the paintings related to goats and research to find their countries of origins.
 - Students will locate the countries on a world map.
 - Students will each select one of the works of art and write a narrative describing what is happening in the piece.
2. Distribute Activity 2 Reading Page 1 **“Elements of Art”**. Have students read and discuss the characteristics they will be looking for in the following works of art.
3. Pass out Activity 2 Worksheet 1 **“Abstract Art - Sunny Goat”**. The image is also in the PowerPoint presentation **“Goats in Art”**. Students will discuss the painting as a group and then complete the questions on the worksheet.
 - Students will discuss the painting, based on the following guiding questions:
 - What is the center of interest?
 - Describe the artist’s use of movement in the piece.
 - Describe the artist’s use of balance.
 - Identify the different uses of shape, color and value within the piece.
 - Locate and discuss the objects within the foreground, middleground, and background.
 - What sort of meaning do you think the artist is attempting to convey?
4. The painting “Sunny Goat” is an example of abstract art. Abstract art uses elements of form (as color, line or texture) with little or no attempt at creating a realistic picture. Distribute Activity 2 Reading Page 2 **“Abstract Art Background”** and discuss the gradual acceptance of abstract art.
 - Students will compare Afremov’s painting with Arthur Dove’s “Goat” on Activity 2 Worksheet 2 **“Abstract Art - Goat”**. The image is also in the PowerPoint presentation **“Goats in Art”**.
5. Students will find other examples of abstract art represented in the goat paintings in the PowerPoint presentation **“Goats in Art”** or on the OAITC website.
 - Using Activity 2 Reading Page 1 **“Elements of Art”** and Activity 2 Reading Page 2 **“Abstract Art Background”**, students will choose one work of art and use Activity 2 Worksheet 3 **“What Makes Art Abstract?”** to list elements of the painting that make it abstract and not realistic.
6. Students will create their own representations of goats, based on what they have seen in the paintings and using a variety of media (painting, drawing, collage, clay sculpture, etc.)



TEXTURE is what you would be able to feel with your sense of touch if the work of art were real. Textures can be rough or smooth; soft or hard. Textures do not always feel the way they look; for example; a picture of a porcupine may look prickly, but if you touch the drawing, the paper is still smooth.

FORM is the element of a work of art that makes it look three-dimensional, showing the subject's height, width and depth. Some examples of form are: balls, cylinders, boxes and pyramids.

SPACE is the area between and around objects. It includes the background, foreground and middle ground. It is the distances or areas around, between or within components of a work of art. There are two types of space: positive and negative space. Positive space is the space representing the subject matter. Negative space refers to the space around and between the subject matter. Space can also refer to the feeling or illusion of depth in a work of art..

SHAPE—Shapes in a work of art can be geometric (e.g.: square, circle, triangle, hexagon, etc.) or organic (such as the shape of a puddle, blob, leaf, boomerang, etc.).

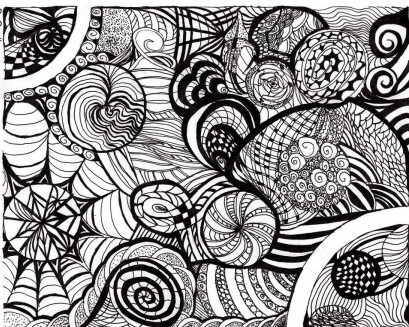
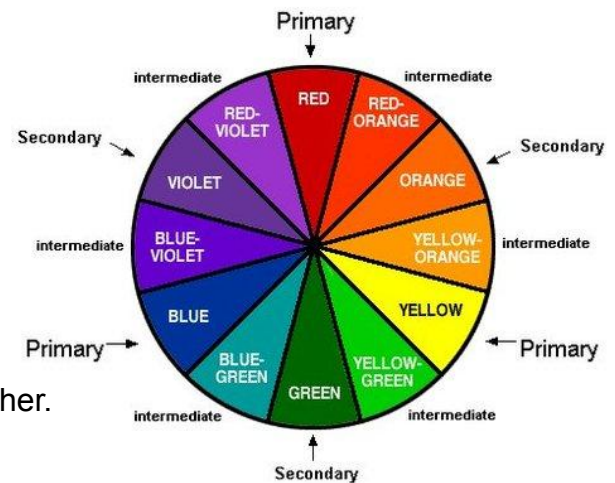
COLOR—is light reflected off of surfaces. Color has three main characteristics:

Hue - the name of the color (red, green, blue, etc.)

Value - how light or dark the color is

Intensity - how bright or dull the color is

- White is pure light. Black is the absence of light
- Primary Colors (red, blue and yellow) are the only true colors. All other colors are a mixture of primary colors
- Secondary Colors (green, orange and violet) are two primary colors mixed together
- Intermediate Colors, sometimes called tertiary colors are made by mixing primary and secondary colors together. Some examples are blue green, yellow green and blue violet.
- Complementary colors are located directly across from each other on the color wheel. These colors contrast because they share no common colors. When complementary colors are mixed together, they neutralize each other to make brown.



TONE (VALUE)—Value, or tone, refers to the use of light and dark, shade and highlights, in an artwork.

LINE—Line is a mark with greater length than width. Lines can be horizontal, vertical, or diagonal; straight or curved; thick or thin. Implied line is the path that the viewer's eye takes as it follows shapes, colors, and form along a path.

"Straight lines and circles are not only beautiful...but eternally and absolutely beautiful."

-Plato



The term 'abstract art' is an umbrella term for any painting or sculpture which does not portray recognizable objects or scenes. However, there is no clear consensus on the definition, types or aesthetic significance of abstract art. The first examples of abstract art were found in South Africa. The two pieces of rock engraved with geometric patterns are estimated to be 70,000 years old. As archeologists study prehistoric art, abstract symbols outnumber representations of people or animals by two to one.

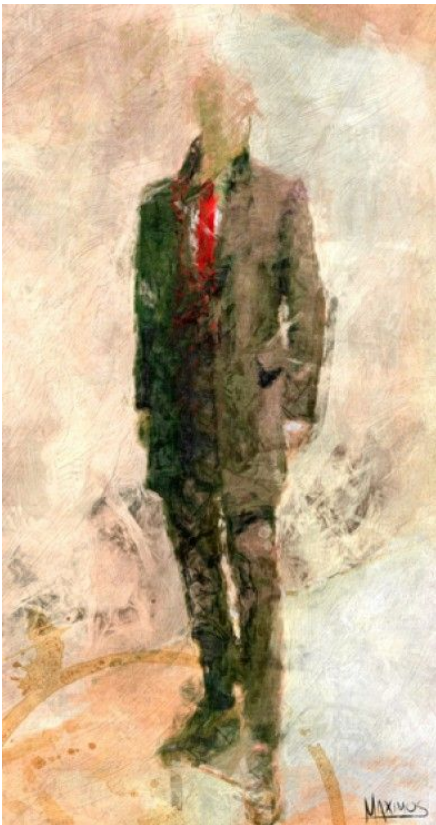
In more recent times, until the late 1800's, most paintings and sculptures followed the principles of "Classical Realism" which encouraged artists to create a recognizable scene or object.

The basic premise of abstraction is that the formal qualities of a painting (or sculpture) are just as important (if not more so) than its representational qualities.

"Abstract art has been with us in one form or another for almost a century now and has proved to be not only a long-standing crux of cultural debate but a self-renewing, vital tradition of creativity. We know that it works, even if we're still not sure why that's so, or exactly what to make of that fact."

Pictures of Nothing: Abstract Art Since Pollock

-Kirk Varnedoe 2006



Let's start with a simple illustration. A picture may contain a bad drawing of a man, but if its colors are beautiful, it may still be considered a beautiful picture. This shows how a formal quality (color) can override a representational one (drawing).

On the other hand, a realistic painting of a house may be technically perfect, but the subject matter, color scheme and general composition may be boring.



From the 1950's to present day, abstract has been an accepted approach within European and American painting and sculpture.

A Market for Goats

Activity 2 Worksheet 1: Abstract Art - Sunny Goat



Name: _____ Date: _____

Sunny Goat Leonid Afremov



Using information from Activity 2, Reading Page 1 “**Elements of Art**”, answer the following questions about Leonid Afremov’s abstract painting, “*Sunny Goat*”.

1. What is the center of interest?

2. Describe the artist’s use of movement in the piece.

A Market for Goats

Activity 2 Worksheet 1: Abstract Art - Sunny Goat page 2



Name: _____ Date: _____

3. Describe the artist's use of balance.

4. Identify the different uses of shape, color and value within the piece.

5. Locate and discuss the objects within the foreground, middleground, and background.

6. • What sort of meaning do you think the artist is attempting to convey?

A Market for Goats

Activity 2 Worksheet 2: Abstract Art - Goat



Name: _____ Date: _____

Goat - 1935
Arthur Dove



In the space below, compare Arthur Dove's "Goat" with Leonid Afremov's "Sunny Goat"

A Market for Goats

Activity 2 Worksheet 3: What Makes Art Abstract?



Name: _____ Date: _____

There are several works of art from the PowerPoint presentation or the OAITC website that would be considered “abstract” in terms of how the subject(s) are drawn or painted. Choose one work of art and tell why you believe it is abstract.

Name of artwork _____

Discuss why this work of art is not realistic.

Using Activity 2 Reading Page 1 “**Elements of Art**”, identify specific elements that make the image abstract art.

A Market for Goats

Activity 3

Grades 6-8 Teacher Resources and Standards

Activity 3: Goat Cheese, (Science, Agriscience)

1-2 50 minute class periods

Students will separate fat and protein from liquids in goat milk to make cheese. They will compare this process to commercial cheese production.

Oklahoma Academic Standards

Activity 3: Goat Cheese (Science, Agriscience)

- | | |
|----------------|---|
| 6.PS1.4 | Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed |
| 7.PS1.2 | Analyze and interpret patterns of data related to the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. |
| PS.PS1.5 | Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. |
| FPP.04.02.01.a | Identify and describe foods derived from meat, egg, poultry, fish and dairy products. |

Materials:

- Activity 3 Reading Page 1 “**The Art and Science of Cheese**”
- Activity 3 Recipe Sheet “**Goat Cheese**”
- Activity 3 Worksheet 1 “**Cheese Science**”
- A 1 gallon milk jug and a 1 quart milk jug, or 5 quart size jars
- 1 pound block of aged cheese, like cheddar or colby
- Cheese cubes for sampling (mild and sharp or extra sharp cheddar)
- Goat cheese (if available in your area)
- Pasteurized goat's milk (not ultra-pasteurized)
- White vinegar or lemon juice
- Non-iodized salt
- Optional: Fresh or dried herbs (dill, rosemary, chives, etc.)
- A 2-3 quart heavy stainless steel saucepan (do not use aluminum, cast iron or other reactive metal or a pan with a non-stick coating)
- instant-read food thermometer
- Cheesecloth
- Strainer or colander
- Wood or stainless-steel spoon with a long handle
- Hot plate
- Pitcher or tall jar
- Small bowl
- Plastic wrap
- Food scale

A Market for Goats

Activity 3- Continued

Grades 6-8 Teacher Resources and Standards

Procedures:

1. Before class (1-2 hours) prepare a recipe of goat cheese from Activity 3 Recipe Page 1 “**Goat Cheese**” so the curds can drain and be ready for seasoning and shaping during class.
2. Use the milk jugs or canning jars to illustrate the amount of milk that goes into a one-pound block of cheese.
 - Fill jugs or jar with water
 - Have one or two students lift the jugs or jars - explain that 5 quarts of milk weighs about 10 pounds. Milk is slightly heavier than water.
 - Now have the same students lift the 1 pound block of cheese. Explain that milk is about 87 percent water and making cheese starts by removing as much water as possible.
3. Distribute copies of Activity 3 Reading Page 1 “**The Art and Science of Cheese**”.
 - Have students read and discuss the information. Ask if anyone has visited one of the specialty cheese manufacturers in Oklahoma.
 - Have students search the internet for cheese manufacturers in your part of Oklahoma.
 - Have the look specifically for those that produce goat cheese.
4. Prepare cheese cubes ahead of time. Have students taste mild and sharp/extra sharp Cheddar.
 - Have students describe the difference in flavor.
 - Explain that as cheese ages, lactose continues to break down into lactic acid. This gives the sharp cheese a stronger, more acidic taste than a milder cheese.
5. If you can find goat cheese have some of it to sample as well to compare the flavor to cheese made from cow's' milk. In larger areas, it can sometimes be found at Farmers' Markets. Specialty grocery stores often have one or two varieties of goat cheese.
6. Following the instructions on Activity 3 Recipe Page 1 “**Goat Cheese**”.
 - Before starting, use a food scale to weigh the quart of goat milk. A quart of milk should weigh about two pounds. Be sure to “zero” the scale by weighing the container first.
 - Demonstrate the steps or divide class into groups and let each group make a recipe of cheese.
 - Bring out the curds that have drained. Explain that the curds that are draining now will not be ready to shape by the time class is over.
 - Weigh the drained curds on a food scale (be sure to weigh the plate or bowl first to “zero” the scale”
 - Weigh the liquids. If possible, use the same container that was used to weigh the milk (“zero” the scale first)
 - Add the weights together. The total weight of the solids and the liquid should be less than the weight of the milk. Some of the loss is due to evaporation as milk is heated and as the curds drain and other loss is due to liquid that remains in the cheesecloth after draining.
 - Have students add salt and seasonings, shape the cheese and refrigerate to sample the next day.
 - Explain that salt adds flavor and in commercial cheese production it inhibits mold growth as cheese ages.
7. Have students complete Activity 3 Worksheet 1 “**Cheese Science**”.
 - Discuss their answers.



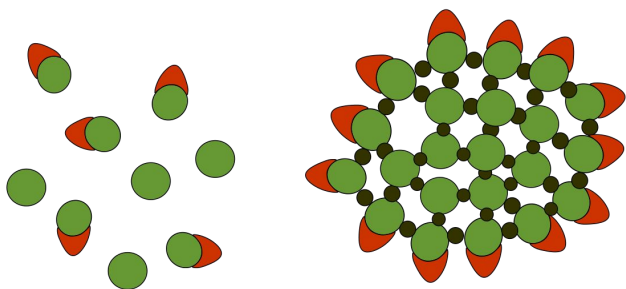
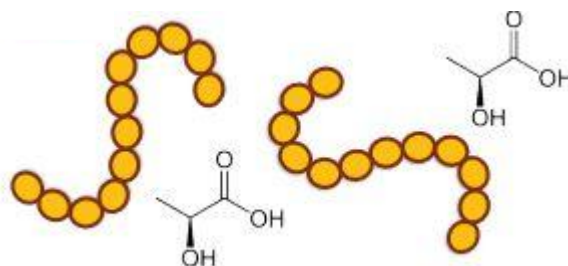
All cheese begins as milk from cows, goats and even sheep or buffalo. Making cheese is both an art and a science.

Milk is an emulsion of milkfat globules suspended liquid. The watery part of milk contains lactose (milk sugar), protein (casein and whey), minerals and vitamins. At its most basic, cheese

making separates the water from milk and concentrates the fat and protein. It takes about 10 pounds (about 5 quarts) of milk to make one pound of cheese.

The first step in making cheese is acidification.

In commercial cheese production, a starter Culture is added that ferments the lactose in milk into lactic acid. If you make cheese at home, you might add vinegar, lemon juice or citric acid to lower the pH. Adding an acid to milk quickly lowers the pH while a starter culture slowly acidifies the milk as the enzyme breaks the lactose into lactic acid. The milk is often heated to speed up the acidification process.



When the pH is between 5.2 and 5.9, the protein, fat and calcium in milk begin to coagulate or form curds. When an acid like vinegar or lemon juice is added to warm milk, curds begin to form almost immediately. Commercial cheese cultures take longer to acidify as the lactose gradually converts to lactic acid.

With a small batch of cheese made at home, the curds might be drained, salted and shaped or pressed. Herbs or flavorings could be added at this point. Fresh cheese should be eaten within a week.

Commercially, after coagulation curds may be cut into smaller pieces and there may be further cooking (for aged cheeses) before curds are drained. Curds are salted and formed into the final shape and then pressed to help the curds stick together into a solid piece of cheese. Salt enhances the flavor of cheese and helps inhibit mold and bacterial growth that could cause spoilage as the cheese ripens. Salt also draws moisture out of the cheese and can affect texture by altering protein structure. Some unripened cheese, like Ricotta, Neufchatel, or Cream Cheese, is ready to eat almost immediately. Other aged cheese like Cheddar, Colby, Swiss, Parmesan or Gouda is aged or ripened for months or sometimes years to develop the desired flavor and texture.

Source: https://www.cheesescience.org/cheesemaking_steps.html

Ingredients

- 1-quart pasteurized goat's milk (not ultra-pasteurized)
- 1/4 cup white vinegar or lemon juice
- ¼ to ½ teaspoon non-iodized salt
- Optional: Fresh or dried herbs (dill, rosemary, chives, etc.)

Tools

- A 2-3 quart heavy stainless steel saucepan (do not use aluminum, cast iron or other reactive metal or a pan with a non-stick coating)
- instant-read food thermometer
- Cheesecloth
- Strainer or collander
- Wood or stainless-steel spoon with a long handle
- Hot plate
- Pitcher or tall jar
- Small bowl
- Plastic wrap



Steps

1. Slowly heat milk over medium-low or low heat to a temperature of 185°F. The surface may look foamy, but the milk should not boil
2. Turn off the heat and add vinegar. Quickly stir vinegar into milk and let stand for 10 minutes
3. Place several layers of cheesecloth over a strainer. The cloth needs to be big enough so you can pull up the sides around the curds
4. After 10 minutes, pour the curdled milk into the lined strainer. The cheesecloth will catch the curds and the whey (leftover liquid). Drain over the sink or a large bowl if you want to save the whey. There will be about 3 cups of liquid.
5. Pull the sides of the cheesecloth up and around the curds, forming a pouch. Hang the pouch from the spoon handle by tying it to the handle or secure it with a rubber band. Balance the handle over a tall jar or pitcher and let the curds hang for 1-2 hours. Give the pouch a gentle squeeze, then scrape the curds into a small bowl.
6. Mix in salt with your hands, squeezing and kneading. Begin with ¼ teaspoon, then taste and add more if needed. If you want to add fresh or dried herbs, do so at this point.
7. Shape the curds into a ball, then flatten slightly and wrap in plastic wrap and refrigerate.
8. Serve with crackers.



A Market for Goats

Activity 3 Worksheet 1: Cheese Science



Name: _____ Date: _____

Using Activity 3 Reading Page 1 “**The Art and Science of Cheese**” and Activity 3 Recipe Page 1 “**Goat Cheese**”, answer the questions below in your own words.

1. Name two ways milk can be acidified to make cheese?

2. When curds form during cheese making, is this a chemical or physical reaction?

3. Why do you think milk needs to be warm when it is acidified?

4. Name two reasons salt is used when making cheese.

5. If it takes 10 pounds (5 quarts) of milk to make 1 pound (16 oz.) of cheese, how much cheese should you get from 1 quart of milk?

6. Give two reasons why the total weight of the curds and the whey (leftover liquid) might be less than the weight of the milk before making cheese.

A Market for Goats

Activity 3 Worksheet 1: Cheese Science

ANSWER KEY



Name: _____ Date: _____

Using Activity 3 Reading Page 1 “**The Art and Science of Cheese**” and Activity 3 Recipe Page 1 “**Goat Cheese**”, answer the questions below in your own words.

1. Name two ways milk can be acidified to make cheese?

Add an acid like vinegar or lemon juice or a bacterial starter culture

2. When curds form during cheese making, is this a chemical or physical reaction?

Chemical reaction, because once curds form, it cannot be reversed

3. Why do you think milk needs to be warm when it is acidified?

Heat speeds up and enhances the chemical reaction. In commercial cheese

making, the solution must be at the proper temperature for the culture to work.

4. Name two reasons salt is used when making cheese.

Salt gives the cheese flavor and inhibits mold and bacterial growth that could cause spoilage. Salt also helps draw moisture out of the cheese and affects texture by altering the protein structure in aged cheeses.

5. If it takes 10 pounds (5 quarts) of milk to make 1 pound (16 oz.) of cheese, how much cheese should you get from 1 quart of milk?

One quart of milk weighs 2 pounds ($\frac{1}{5}$ of 10 pounds). $\frac{1}{5} = 20\%$

20% of 16 ounces is 3.2 ounces ($.2 \times 16 = 3.2$ ounces)

6. Give two reasons why the total weight of the curds and the whey (leftover liquid) might be less than the weight of the milk before making cheese.

There is some evaporation as the milk is heated and as the liquid drains from the

curds. There is also a small amount of liquid that remains in the cheesecloth and

cannot be recovered when the curds are removed to be shaped.
