**How to use these lesson plans:**

The Wisconsin Farm Bureau- Ag in the Classroom Program worked cooperatively with the World Dairy Expo to develop lesson plans that complement the 4th grade classroom tours to World Dairy Expo. The lessons offer a short lesson that can be used on the bus ride back to school or in the next day’s class. The career lesson should be done at World Dairy Expo and offers students the opportunity to interact with the exhibitors, producers and showman at the event. The rest of the lessons use the **“Welcome to World Dairy Expo”** educational packet that is offered by World Dairy Expo.

**Changes in “Welcome to World Dairy Expo”**

Each year the educational packet is updated by World Dairy Expo staff with attendance, breed and show numbers. Some of the lessons may change due to the contents of the educational packet.

**Wisconsin Model Academic Standards**

This set of lesson plans has been correlated to Wisconsin Model Academic Standards for core areas for fourth grade. You can find out more information about standards at [www.dpi.state.wi.us/standards](http://www.dpi.state.wi.us/standards)

**Learn more about agriculture!**

The Ag in the Classroom provides resources to teachers to help students K-12 to explain the importance of agriculture. The program is coordinated by the Wisconsin Farm Bureau Federation with funding from the Wisconsin Farm Bureau Foundation, other agricultural groups, and a grant from the Wisconsin Department of Agriculture, Trade, and Consumer Protection. Learn more at [www.wisgclassroom.org](http://www.wisgclassroom.org/).

**Educational Standards**

**Show me the Numbers!**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| English | A.4.1 | A.4.4 |  |  |
| Math | A.4.1 | A.4.2 | A.4.4 | A.4.5 |
|  | B.4.1 | B.4.5 | E.4.1 | E.4.2 |
| Social Studies | A.4.2 |  |  |  |

**Milk and Cow Facts**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| English | A.4.1 | A.4.3 | A.4.4 |  |
| Science | B.4.1 | C.4.1 | C.4.5 | F.4.1 |
| Math | A.4.1 | A.4.2 | A.4.5 | B.4.1 |
|  | B.4.5 | D.4.1 | F.4.5 |  |

**Milking Equipment and Parlors**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| English | A.4.1 | A.4.4 | D.4.1 | F.4.1 |  |
| Science | B.4.1 | C.4.2 | C.4.5 | C.4.7 | F.4.3 |
| Math | D.4.1 | D.4.3 |  |  |  |

**Cow Food and Digestion**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| English | A.4.1 | A.4.4 | C.4.2 | C.4.3 |  |
| Science | B.4.1 | B.4.3 | C.4.1 | C.4.2 | C.4.3 |
|  | F.4.1 | F.4.2 | G.4.1 | G.4.5 |  |

**Facts Challenge**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| English | A.4.1 | A.4.2 | A.4.3 | A.4.4 | B.4.3 |
|  | C.4.3 | D.4.1 |  |  |  |
| Science | C.4.1 | C.4.2 |  |  |  |

**Breeds of Cattle**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| English | A.4.1 | A.4.2 | A.4.4 | B.4.1 | B.4.2 |
|  | B.4.3 | D.4.1 | D.4.2 | F.4.1 |  |

**Careers in Agriculture**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| English | A.4.4 | C.4.2 | C.4.3 | F.4.1 | D.4.3 |
|  | D.4.4 | D.4.5 | D.4.6 | D.4.7 | E.4.10 |
| Science | G.4.1 | G.4.2 | G.4.3 | G.4.4 | G.4.5 |

**Follow Up Exercise**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| English | C.4.1 | C.4.2 | C.4.3 | D.4.2 |  |
| Science | G.4.1 | G.4.2 | G.4.3 |  |  |

**Breeds of Cattle**

Source: Page 11 of the Welcome to World Dairy Expo Guide

Match the colored pictures of the breeds to the correct descriptions. Note: the Holstein will have two pictures. Students can also write a short story about one of the breeds.

**Holstein**

Originating in The Netherlands and Northern Germany, they are the largest dairy cows in size, weighing approximately 1400 pounds. They give an average of 6.4 gallons or 55 pound of milk per day. Holsteins are primarily black and white, but sometimes red and white in color (Referred to as Red & Whites).

**Jersey**

They weigh about 900 pounds. They mature earlier than other breeds and are honey-brown in color, ranging from light to dark, occasionally having white spots. Their milk is rich and creamy and they give about 4.5 gallons or 39 pounds of milk per day. They originated from the British Channel Island of Jersey.

**Guernsey**

Guernsey cows are an orange-red breed often having white legs and white areas on the body (cream-and-brown breed). They weigh about 1100 pounds. They are noted for their rich golden milk due to carotene or Vitamin A, as part of their diet. This breed is from the Isle of Guernsey in the English Channel. They give about 4.6 gallons or 39 pound of milk per day.

**Brown Swiss**

Brown Swiss cows vary in color from silver to dark brown. They are known for their strength and ruggedness and weigh about 1300 pounds. Their milk is excellent for cheese production and they give about 5.3 gallons or 46 pounds of milk per day. They come from the slopes of the Alps of Switzerland as the name implies.

**Ayrshire**

Ayrshire cows are a rusty-red and white. They weigh about 1200 pounds. They originated from the County of Ayr in Scotland and were known as the "aristocrat of dairy breeds" due mainly to their large size. They yield about 5 gallons or 43 pounds of milk per day.

**Milking Shorthorn**

Originated in Britain in the valley of the Tees River, Milking Shorthorn are an averaged sized breed. They weigh about 1300 pounds. Their coloring is all red, red with white markings, all white or roan. And they produce about 4.8 gallons or 41 pounds of milk per day. The Milking Shorthorn was not even declared a dairy breed until 1969.

To learn more about the breeds, you can visit the breed websites at:

<http://www.ansi.okstate.edu/breeds/cattle/> [www.holsteinusa.com](http://www.holsteinusa.com)

[www.usguernsey.com](http://www.usguernsey.com) [www.brownswissusa.com](http://www.brownswissusa.com)

[www.usayrshire.com](http://www.usayrshire.com) [www.milkingshorthorn.com](http://www.milkingshorthorn.com)



**Careers in Agriculture**

Activity- For students to complete while at WDE

Students will be asking the following questions to various vendors, exhibitors and others while visiting World Dairy Expo. A listing of all the exhibitors can be found in the World Dairy Expo visitor’s guide available at the entry gates or at information centers.

**Questions for each category:**

1. Job Title
2. Education completed (i.e. high school, technical school, college or university)
3. What do they do (i.e. daily, general description)
4. Is there travel involved?
5. How do they use math in their job?
6. How do they use Science in their job?
7. How do they use writing skills in their job?
8. What is the best thing about their job?

Farmers and Showman

1. Job Title
2. Education completed (i.e. high school, technical school, college or university)
3. What do they do (i.e. daily, general description)
4. Is there travel involved?
5. How do they use math in their job?
6. How do they use Science in their job?
7. How do they use writing skills in their job?
8. What is the best thing about their job?

Nutrition Related

1. Job Title
2. Education completed (i.e. high school, technical school, college or university)
3. What do they do (i.e. daily, general description)
4. Is there travel involved?
5. How do they use math in their job?
6. How do they use Science in their job?
7. How do they use writing skills in their job?
8. What is the best thing about their job?

Machinery and Equipment Related

1. Job Title
2. Education completed (i.e. high school, technical school, college or university)
3. What do they do (i.e. daily, general description)
4. Is there travel involved?
5. How do they use math in their job?
6. How do they use Science in their job?
7. How do they use writing skills in their job?
8. What is the best thing about their job?

Veterinarian and Medical Related

1. Job Title
2. Education completed (i.e. high school, technical school, college or university)
3. What do they do (i.e. daily, general description)
4. Is there travel involved?
5. How do they use math in their job?
6. How do they use Science in their job?
7. How do they use writing skills in their job?
8. What is the best thing about their job?

Housing and Building Related

1. Job Title
2. Education completed (i.e. high school, technical school, college or university)
3. What do they do (i.e. daily, general description)
4. Is there travel involved?
5. How do they use math in their job?
6. How do they use Science in their job?
7. How do they use writing skills in their job?
8. What is the best thing about their job?

Other (i.e. Media, Farm Organizations, Breed Associations, Supplies)

1. Job Title
2. Education completed (i.e. high school, technical school, college or university)
3. What do they do (i.e. daily, general description)
4. Is there travel involved?
5. How do they use math in their job?
6. How do they use Science in their job?
7. How do they use writing skills in their job?
8. What is the best thing about their job?

**Careers in Agriculture**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  Category | FarmersAnd Showman | Nutriton Related Careers | Machinery andEquipment Related Careers  | VeterinarianAnd Medical Related Careers | Housing and Building Related Careers | Other: Media, Farm and Breed Organizations, Supplies |
| Job Title |  |  |  |  |  |  |
| Education Completed |  |  |  |  |  |  |
| What do they do? |  |  |  |  |  |  |
|  Category | FarmersAnd Showman | Nutriton Related Careers | Machinery andEquipment Related Careers  | VeterinarianAnd Medical Related Careers | Housing and Building Related Careers | Other: Media, Farm and Breed Organizations, Supplies |
| How do they use math in their job? |  |  |  |  |  |  |
| How do they use Science in their job? |  |  |  |  |  |  |
| How do they use writing skills in their job? |  |  |  |  |  |  |
|  What is the best thing about their job? |  |  |  |  |  |  |

**Facts Challenge**

Source: Page 3 of the Welcome to World Dairy Expo Guide

Supplies needed:

* Page 3 of World Dairy Expo Guide
* Shoebox or some box that can be used as a dice
* Note cards

Instructions:

* 1. Each student will find six facts on page 11 they want to use.
	2. They will need to develop questions related to each of the six facts. The questions might be true/false, fill in the blanks, question and answer, or some other type.
	3. Each student will need a box.
	4. They will write their questions on the note cards and glue or tape each card on a side of the box- creating a dice covered with questions.
	5. The student will develop their answer key.
	6. Divide the students into groups of two. They will “roll” the box like a dice. The question that is on top will be asked of their partner. Then the other student will roll the partner’s dice and answer questions.

**Milk and Cow Facts**

Source: Pages 3 and 4 of the Welcome to World Dairy Expo Guide

Using the information given on pages 3 and 4 of the guide, complete the following questions:

1. It takes 12 pounds of milk to make 1 gallon of ice cream. Your class has 25 students in it and can eat 3 gallons of ice cream for their snack. How many pounds of milk will it take to make 3 gallons of ice cream?

How many squirts of milk would it take to produce the ice cream? Use the following information to help you calculate the answer:

 \_\_\_ number of gallons of milk to produce one gallon of ice cream

 \_\_\_ number of squirts of milk in a gallon of milk

1. It takes 10 pounds of milk to make one pound of cheese. If you wanted to have one pound each of Cheddar, Edam, Baby Swiss, Farmers, and Colby on your cheese platters for an event, how many pounds of milk would it take to produce the cheese?
2. A cow needs to drink \_\_\_ gallons of water to produce one gallon of milk. If a cow produced about 68 pounds of milk that day, how much water would it need to drink? Use this information to help you calculate the answer:

1 gallon of milk weighs about 8.5 pounds

1. If there are four quarts in a gallon, how many quarts are there in 8 gallons?
2. Complete the chart:

**State Number of Cows Number of People**

California \_\_\_\_\_\_\_\_\_\_\_\_ 37,253,956

Wisconsin 1,275,000 \_\_\_\_\_\_\_\_\_\_

New York 625,000 \_\_\_\_\_\_\_\_\_\_

Idaho \_\_\_\_\_\_\_\_\_\_\_\_ 1,567,582

Pennsylvania 525,000 \_\_\_\_\_\_\_\_\_\_

Rank the states by population of people (#1 having the most people)

 #1-

 #2-

 #3-

 #4-

 #5-

Complete the matching exercise:

1. Builds strong bones and teeth A. Calcium
2. Helps build red blood cells B. Riboflavin
3. Same benefits as whole milk but less milkfat and calories C. Protein
4. Nonfat milk. Has less than ½ gram of fat per serving D. 1% lowfat milk
5. Reducing the milkfat content even more than 2% with fortified skim milk E. Whole milk
6. Made by adding certain organisms to sweet milk F. 2% lowfat milk
7. 3.5% milkfat with a rich, creamy texture G. Vitamin D
8. Promotes the absorption of calcium and optimizes bone mineralization H. Buttermilk
9. Helps strengthen bones and generates energy in a body’s cells I. Vitamin B-12
10. Helps convert food into energy J. Skim milk
11. Maintains and repairs muscles K. Phosphorus

**Milking Equipment and Parlors**

Source: Pages 5 and 6 of the Welcome to World Dairy Expo Guide

1. A 60 degree herringbone parlor has the cows stand at 60 degrees. Draw a 60 degree angle:
2. Cows are milked either \_\_\_\_ or \_\_\_\_ times per day.
3. Make three comparisons between a 60 degree Milking Parlor Type Herringbone to a Rotary Milking Parlor

1 –

2 –

3 –

1. A cow must do this before she can start producing milk? Hint: Until she does this, she is called a heifer!
2. Milk is what temperature when it leaves the cow’s body? \_\_\_\_\_\_\_\_\_\_\_\_
3. If you had to milk cows, what type of milking parlor or barn would you like to use? Why?
4. Do you remember what type of parlor was used at World Dairy Expo? How many cows could be milked at one time?

**Show Me the Numbers!**

Source: Page 1 of the Welcome to World Dairy Expo Guide

Using the figures and statistics given on page one of the guide, complete the following questions:

1. World Dairy Expo started in what year? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. There were \_\_\_\_ people from \_\_\_\_ different foreign countries attending last years World Dairy Expo. Can you find the top five countries visitors were from on a map or globe?

If we wanted to find the average number from each country, we would compute it:

 \_\_\_\_\_ / \_\_\_\_ = \_\_\_\_\_\_\_\_\_ (hint: number of foreign visitors/number of countries)

How many Americans attended the WDE?

 \_\_\_\_\_\_ – \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_ (hint: total visitors-number of foreign visitors)

1. Create a chart showing the number of the visitors from the top five countries:
2. There were \_\_\_\_ dairy cattle exhibitors from \_\_\_ states and \_\_\_ provinces last year at World .

What is the average number of exhibitors from a state or province?

 \_\_\_\_\_ / \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_

1. There are \_\_\_\_ (number of breeds) competing for the Supreme Champion Cow.
2. The number of animals exhibited in each breed:

\_\_\_\_ Holstein

\_\_\_\_ Jersey

\_\_\_\_ Brown Swiss

\_\_\_\_ Red and White

\_\_\_\_ Ayrshire

\_\_\_\_ Milking Shorthorn

\_\_\_\_ Guernsey

\_\_\_\_ Total number of Dairy Cattle

7. What percentage of cattle were Holsteins?

\_\_\_\_ / \_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_

8. What percentage of cattle were Ayrshires?

\_\_\_\_ / \_\_\_\_ = \_\_\_\_\_\_\_\_\_

9. If you added the number of Jersey and Ayrshire cattle, would the sum be greater or less than the number of Holsteins?

 \_\_\_ + \_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

10. If the number of Brown Swiss cattle increased next year by 25%, how many would be exhibited at the World Dairy Expo?

 \_\_\_\_ \* .25 = \_\_\_\_\_ . Add \_\_\_\_ to \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_

11. Is the number of cattle exhibited greater or less than the number of visitors from foreign countries?

 \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_\_

**Cow Food and Digestion**

Source: Pages 7 -10 of the Welcome to World Dairy Expo Guide

Ruminant Relay Races:

Make copies of the three sets of four cards. You will need one set for each group of 3 students. Cut out the cards. If you laminate the cards and put Velcro on the back, you can have the students hang them up on a board. Another option is to have them just lay out the cards in the correct order. Divide the students into teams of 3.

1st player – run down and put the numbers in the correct order

2nd player - run down and put the stomach compartments in correct order

3rd player – run down and put the correct descriptions in order

|  |  |
| --- | --- |
| Rumen | Reticulum |
| Omasum | Abomasum |
| Large pouch the food passes into when the cow swallows | Where food moves to and rolls into balls which the cow coughs up- cud |
| Does more digesting | Finishes the digestion |
| 1 | 2 |
| 3 | 4 |

**True or False**

\_\_\_ 1. Cows nibble their grass and horses pull it from the ground.

\_\_\_ 2. Cows have teeth on the top and bottom.

\_\_\_ 3. Cows chew food about 30 times/minute.

\_\_\_ 4. You can tell the age of a cow by their teeth.

\_\_\_ 5. Cows have 14 teeth.

\_\_\_ 6. Some of the digested food enters the bloodstream and travels to the udder.

\_\_\_ 7. Cows will drink about a bathtub full of water each day.

\_\_\_ 8. Cows will eat about 10 pounds of feed and hay and 70 pounds of silage each day.

\_\_\_ 9. Goats and deer are ruminants but not giraffes.

\_\_\_10. Unchewed food that is coughed up is called cud.

**Dairy Farmer or Feed Specialist Visit:**

Have a dairy farmer or feed specialist visit your classroom. If possible, have them bring in various types of feed samples of those listed on pages 9 and 10 of the guide. Have the feeds put in ice cream pails. Cut out the following feed types and descriptions and have students place them by the correct buckets.

Have the guest speaker discuss how they determine how much feed cattle should receive and how they “balance” their diets just like humans need to eat a balanced diet. They could also show equipment and harvesting methods so students understand how these feeds are obtained.

**Hay**

Grass, clover, alfalfa, etc., cut and dried for use as forage.

**Haylage**

Silage of about 40 to 50 percent moisture made from forage stored in a silo.

**Grain**

Small, hard seed of a food plant such as wheat, corn, rye, oats, rice, or millet.

**Silage**

Coarse food for livestock, composed of entire plants, including leaves, stalks, and grain, of such forages as corn and sorghum preserved through fermentation in a silo; ensilage.

**Beet Pulp**

Beet pulp is the residue from manufacturing sugar from sugar beets. It is a very palatable and bulky feedstuff, containing about 85% of the energy value of corn. The higher level of fiber is helpful in maintaining milk fat percent in cows on low roughage rations.

**Citrus Pulp**

Citrus pulp is a mixture of peel, inside portions, and cull fruits of the citrus family (orange, grapefruit, etc.) which have been dried to produce a coarse, flaky product. It is relatively high in energy, calcium, digestible fiber and low in protein and is similar to beet pulp in feeding value.

**Bakery By-products**

Bakery by-products is a term used to refer to a variety of products containing about 11% crude protein and 80% TDN (total digestible nutrients). The products contain various combinations of bread, crackers, cookies, doughnuts, cakes, and so forth, which are usually dried and ground together.

**Cane Molasses**

Cane molasses is the most common liquid supplement fed to dairy cattle. More recently a variety of molasses products are available to livestock feeders. Among them are cane molasses, citrus molasses, beet molasses, masonex and a number of products resulting from the production of alcohol.

**Whey**

Whey is the residue from cheese production and consists primarily of lactose, minerals and water. It can be fed dry or as a liquid. The liquid is termed sweet whey and acid whey. Sweet whey comes from the manufacture of cheddar and mozzarella cheese and acid whey results from the production of cottage cheese and is less palatable than sweet whey. Lacto Whey is similar in appearance to molasses but has a higher viscosity.

**Hominy Feed**

Hominy feed is a by-product from the manufacture of pearl hominy, hominy grits or table meal from corn. It is similar in appearance to ground corn, has slightly more energy and protein, and has similar feeding characteristics.

**Peanut Skins**

Peanut skins consist of skins from processed peanuts, broken nuts and nuts that may have been rejected during the preparation of peanuts for human consumption.

**Rice Bran**

Rice bran is composed of the bran layer and germ of the rice which are removed in milling rice for human consumption.

**Soybean Hulls**

Soybean hulls are a by-product of soybean processing for oil and meal production. Since soybean hulls have urease activity, a problem may develop in rations containing urea. Heat treatment destroys the urease activity. Soybean mill run is heat treated soybean hulls.

**Wheat Millfeeds**

The wheat millfeeds (bran, millrun, middlings, shorts, red dog) are by-products produced during the milling of wheat for flour. They consist of varying amounts of bran, germ, and flour. Wheat middlings (also called midds) are a common ingredient in cattle feeds.

**Rice mill By-Products**

Rice mill by-product is a low-energy, high-fiber (28%) feedstuff that consists of rice hulls, rice bran, rice polishings and broken rice grains. In contrast to soybean hulls, the fiber content is low in digestible energy.

**What did we learn?**

For teachers to use in an informal setting such as on the bus on the way back to school or in the classroom upon return to the school.

1. What impressed them the most about WDE?
2. Which breed was
	1. Black and white?
	2. In the show ring when they watched
3. How many different countries did they see people from?
4. What was their favorite dairy related food they ate?
5. What was their favorite “cow related” item for sale that they saw in the shops or booths?
6. Did they meet anyone that had a job that they would be interested in doing?
7. Did they see the showman preparing cattle for the show ring? If so, what preparations were they doing?
8. If they could spend one hour in any part of WDE, where would they spend it?
9. What was one fact they learned?
10. If their family comes to visit WDE, what are two areas they would definitely take them to?