

**Allison Investigates:
Does Chocolate Milk
Come from Brown
Cows?**

Written and Illustrated
by
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**Reinventing the
Wheel: Milk,
Microbes, and the
Fight for Real
Cheese**

by
Bronwen and Francis
Percival

NOI TAZI RUETS APCKYF
SHODREHEMLNTKHALOE
MDRSPKOFI AKWEVOIGR
DZAHJHACSEAEESQMUG
WB D P I C H E K O S S G L M R R Y
D Q D Z A U M Z W E K E H I G E T H
L P E K R R D D E W S P Q A P T G Y
R Z H N A G V U L T W O C Z D T S C
C E C P U P P N O S E G U S K U M X
T U D C H E E S E M A K I N G B S F
F M R D K P L N C R E A M E R Y S O
J T X D U U K T B Y N J T R U I O H

WORDS:
BUTTERMILK
CHEDDAR
CHEESE
CHEESEMAKING
CHURN
COW
CREAMERY
CURD
HERD
PARMESAN
PASTEURIZATION
UDDER
YOGURT

A Brief History of Dairy in Oregon

Cattle arrived in Oregon in the 1830s, including more than 600 head brought from California to the Willamette Valley in 1837. As settlers arrived along the Oregon Trail, cattle and dairy production became an important part of Oregon's growing agricultural industry. In the early 1850s, dairy cows were brought to the Tillamook Valley, where the mild climate and abundant grass created ideal conditions for dairy farming. But Tillamook had one major challenge: it was isolated and difficult to reach. Farmers turned to the water, using the Morning Star to transport dairy products like butter and cheese to Portland.

As Oregon's dairy industry grew, farmers began working together to process and market their products. In 1894, Canadian cheesemaker Peter McIntosh helped improve cheesemaking in Tillamook, and by the turn of the century, more than 30 cheese factories operated in the county. In 1909, ten of these factories joined together to form the Tillamook County Creamery Association, creating the farmer-owned cooperative that would become the Tillamook brand.

Dairy farming continued to expand throughout the Willamette Valley, southern Oregon, and the Oregon coast, while new technologies in breeding, nutrition, refrigeration, and milking helped farms become increasingly productive. Fun fact: Milk consistently ranks among Oregon's top 10 agricultural commodities by value! In 2025, Oregon's approximately 120,000 milk cows produced 2.5 billion pounds of milk, worth about \$548 million. Dairy may have started as small family farms producing milk, butter, and cheese for their communities, but today it remains a major part of Oregon's agricultural economy.

OAITC Dairy Resources

To learn more about Dairy Production in Oregon, use these QR codes!



**Virtual Field
Trip to a Dairy
Farm!**



**A Day Without
Dairy, Lesson
Plan!**



**Importance of
Oregon Dairy,
Learn More!**

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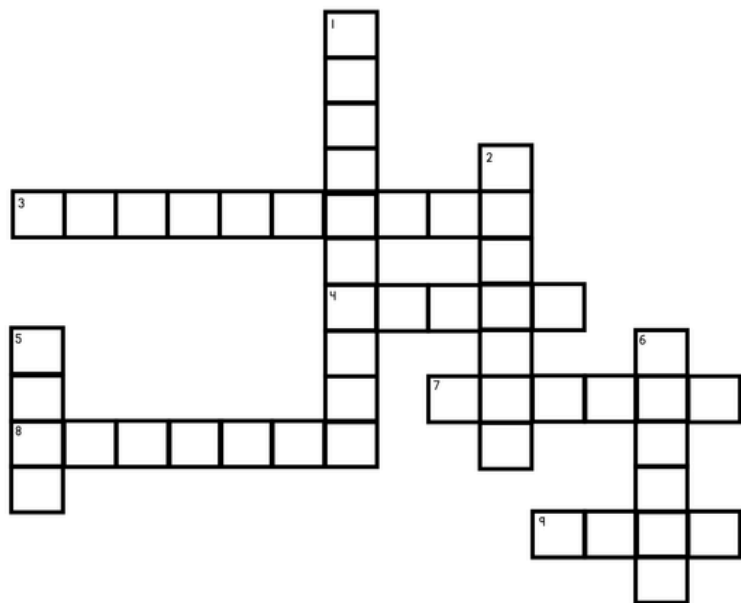
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Dairy To Be Read (TBR)*

Dairy Crossword



ACROSS

3. A stretchy cheese often found on pizza
4. A large farm where cattle may be raised
7. Made by churning cream
8. The natural sugar found in milk
9. The liquid left behind during cheese-making

DOWN

1. To heat milk to make it safer to drink
2. A mineral commonly associated with strong bones and milk
5. A young cow
6. A young female cow that has not yet had a calf

Answers:
1. Pasteurize, 2. Calcium, 3. Mozzarella,
4. Ranch, 5. Calf, 6. Heifer,
7. Butter, 8. Lactose, 9. Whey

I Spy, Dairy Edition

cow, cheese (swiss), cheese (brie), ice-cream cone, yogurt, milk,
milking machine, butter, milk truck.



Jersey Cows at the OSU Dairy



Calf at Hazenberg Dairy

pH is a measurement of how acidic or basic a substance is. As yogurt ferments, the bacteria produce lactic acid, causing the pH of the milk to decrease. If something is highly acidic, the pH will be low; if it is very basic, the pH will be high. Before fermentation, milk has a pH around the mid-6 range. During fermentation, the pH drops. Yogurt is typically fermented until it reaches approximately pH 4.6 or below.

You will need to purchase pH strips- you can find these on Amazon! Purchase enough for each student to measure the pH 3 separate times: once with the milk, once at 4 hours of fermentation, and again at 6 hours. **Ask yourself:** What was happening to the lactose? What were the bacteria producing? How did the change in pH affect the milk proteins?

Bonus Lesson: pH and Yogurt Making

Located outside the Portland Metro area, in St. Paul, Oregon, is the family-owned and operated Hazenberg Dairy. Since 1964, the Hazenbergs have been providing people in the Pacific Northwest with fresh, local dairy products. There is a sense of great care and impressive impact immediately upon your first step on the dairy. Whether it's from the big smile Farmer Brandon greets you with or the ferocious waving tail of his furry farming friend, Coal, Hazenberg Dairy radiates the kind of charm you would expect from a family-owned and operated farm. Due to their unique location, Hazenberg has grown quite a bit over the decades, showing by example that it is possible for food to be produced at a local level for a high-volume audience. "We have grown our farm over the years with the Portland Metro area. Each time more people move to the area and families grow, we produce more dairy products to help those families," Brandon explains. "When we see a new housing development, we see another family that we are helping nourish with healthy local products. That is a great feeling." The increasing population, and therefore demand for dairy products in Oregon, means running a tight ship with clear priorities and expectations. Caring for their cattle is the number one priority at Hazenberg Dairy, and having employees who care deeply for animals is fundamental for Brandon and his team. Brandon breaks down a day at the dairy, saying, "A daily look at our farm will reveal that everything we do is systematic and routine. What we mean by that is we do the same routines daily, some of them weekly. We feed bottles to around 400 babies twice every day. We milk almost 3,000 cows three times a day. We feed around 6,500 animals per day." He goes on to explain that because there are so many animals to care for, it's important to take your time and give attention to every task performed. "A good day on the farm is all of the employees doing their jobs at a slow pace and getting our eyes on our cattle." You can find Hazenberg milk in Oregon and Washington Safeway/Albertsons stores, in gallon milk jugs with the Lucerne brand label.



Meet the Expert Brandon Hazenberg on Dairy Production and Family Farming

What brings you the
most joy as a Dairy
Farmer?

"I love working
working with the
land, the people
and the cattle.

Seeing crops being
grown each year to
feed our animals,

watching a calf

grow into a full

grown cow and

understanding
that the whole

process is meant to
help provide food

and nutrition for
the world is an

awesome feeling!"

-Brandon Hazenberg

Yogurt is both a healthy snack and a pretty amazing science experiment! Today, you are going to take milk and, through a series of scientific steps, turn it into yogurt. Did you know that **yogurt is made with living microorganisms**? These microorganisms are bacteria, and they help transform milk into the thick, tangy yogurt we know and love. The bacteria in yogurt use **lactose (the sugar found in milk)** as food and produce **lactic acid** as they grow. This process is called fermentation. In yogurt, lactic acid makes the milk more acidic, causing the milk proteins to thicken and giving yogurt its taste and texture! For an extra challenge, secondary teachers can incorporate pH into the lesson, see the pH lesson under our *Meet the Expert* section.

- Ingredients (makes enough for about 30 tasting portions)**
- 1. 6 cups whole milk. **Suggestion:** Pick up a jug of Lucerne Whole Milk at your local Albertsons or Safeway; it is most likely from the Hazenberg Dairy! Why whole milk? Whole milk generally produces a creamier, thicker yogurt than lower-fat milk.
 - 3 tablespoons plain yogurt with live and active cultures. **Suggestion:** Nancy's Plain Whole Milk Yogurt is an Oregon-made option and works well as a starter. You will want to look for plain, unsweetened yogurt that contains live and active cultures.

Materials Needed:

- Crock-Pot, Instant Pot (you can also do this on the stovetop with a pot and lid)
- Food thermometer
- Measuring cups and spoons
- Small bowl
- Whisk or spoon
- Clean container with a lid
- Refrigerator
- Clean tasting spoons for students
- Optional: pH test strips or a digital pH meter for the secondary science activity

Directions

Classroom Suggestion: Start the yogurt at the beginning of the school day! Heat the milk and add the starter during the morning. Let the yogurt ferment throughout the school day. Students can observe the changes in the afternoon, then the yogurt can be refrigerated overnight. The next day, students can taste the finished yogurt and discuss what changed during fermentation!

1. Heat the milk: Heat 6 cups of milk to about 185 degrees F. Why? Heating the milk to a high temperature helps change the milk proteins so they can form a stronger structure during fermentation, resulting in a thicker yogurt. University Extension yogurt recipes commonly heat milk to approximately 185–200°F before cooling it.
2. Cool the milk: Once the milk reaches 185-200 degrees, cool it to 100-110. Why? The yogurt starter contains living bacteria. If the milk is too hot when you add the starter, the heat can damage or kill the bacteria we need for fermentation.
3. Add the yogurt culture: Place 3 tablespoons of plain yogurt with live and active cultures into a small bowl. Add a spoonful or two of the warm milk and whisk until the yogurt becomes smooth and slightly runny. Slowly pour this mixture back into the remaining warm milk, gently whisking to distribute the starter evenly. As the milk becomes more acidic, the milk proteins change and form the structure that gives yogurt its thickness and texture.
4. Fermentation: Keep mixture warm (100-110 degrees) and start checking at 4 hours (6 is suggested, but could take up to 12)
5. Check yogurt: After about 6 hours, check your yogurt! The mixture should be visibly thicker and be tangier in both smell and taste. (If doing the pH lesson, you can check pH here!)
6. Chilling the yogurt slows the activity of the bacteria and allows the yogurt to finish setting. Allow it to chill for several hours before tasting. Overnight is ideal for a classroom activity.

Making Yogurt in the Classroom: Let's Get Cultured!

Taste to Teach!