

Making Root Beer

Ingredients:

¼ tsp. brewer's yeast
20 – 30 ml root beer extract
1 lb sugar
Warm water (98.6° F)

Materials:

1 gallon plastic container
4 plastic 2 liter bottles with caps
Bleach solution (2 Tbsp. bleach per gallon)
Wooden spoon
Funnel
Balance
Permanent marker
Balloons
Masking tape

Procedure:

1. Dissolve ¼ tsp. yeast in 1 cup warm water. Let mixture stand for 5 minutes or longer.
2. Mark plastic container with permanent marker at the 1 gallon level.
3. In the plastic container, combine sugar with ½ gallon of water and heat to 170 – 180° F. Add 20 – 30 ml root beer extract, depending on personal taste preference. Taste for flavor and add more sugar or extract to suit your taste.
4. Allow mixture to cool to room temperature.
5. Wash 2 liter bottles with detergent and hot water. Rinse with bleach solution to sanitize. Rinse several times with warm water.
6. Add the yeast mixture to the sugar, extract, and water mixture. Make sure the yeast is suspended completely before adding. Mix.
7. Add additional warm water to the plastic container to bring the level to 1 gallon of liquid.
8. Using a funnel, fill the bottles with the root beer formula, leaving 2 inches of open space from the neck of the bottle.
9. Place a balloon over one of the bottle's openings. Secure with masking tape. Securely cap remaining bottles.
10. Check bottles for leaks by laying bottles on their sides. Reseal any that show signs of leakage.
11. Store at room temperature for 3 – 4 days. Check bottles for firmness.
12. Move bottles to refrigerator. The total aging process should last 7-10 days.

NOTE: As natural carbonation takes place, a slight yeast deposit will form on the bottom of the bottle. When serving the root beer, pour carefully to leave most of the yeast deposit undisturbed. This deposit is not harmful, but it sometimes gives the drink an off-flavor.

Making Mozzarella Cheese

Ingredients:

- ½ gallon whole milk
- 1/3 cup white vinegar
- ¼ rennet tablet
- 2 Tbsp. water
- 1 tsp. salt

Materials:

- Stockpot or Dutch oven
- Wooden spoon
- Thermometer
- Measuring spoons
- Measuring cups
- Colander
- Cheesecloth
- Plastic wrap

Procedure:

1. Pour milk into stockpot or Dutch oven. Add vinegar to milk and stir.
2. Heat milk while stirring constantly to prevent scorching.
3. Crush rennet tablet in a custard cup with the back of a teaspoon. Mix with 2 tablespoons of water. Add to the milk mixture once it reaches 103° F.
4. Keep stirring slowly as the milk begins to coagulate. Remove from heat when curds separate from the yellowish-green whey. Do not overheat or the enzyme will be destroyed.
5. Drain curds in colander lined with cheesecloth. Squeeze to remove excess whey.
6. Place curds in a microwaveable bowl. Microwave on high for 30 seconds to 1 minute
7. Mash heated curds with a spoon and add salt
8. Heat again in microwave for 20 – 30 seconds and knead some more.
9. Repeat the heating and stretching 2-3 more times. It is ready when the cheese is shiny and smooth.
10. Shape and wrap in plastic wrap or place in a food storage container and seal. Will keep in the refrigerator up to one week.

Emulsions

Ingredients:

- 1 egg
- 6 tsp. vinegar
- 2 cups vegetable oil

Materials:

- Mixing bowl
- Custard cup
- Measuring cup
- Measuring spoons
- Hand mixer or whisk

Procedure:

No Emulsifier

1. Add 1 tsp. vinegar to a mixing bowl.
2. Add oil, 1 Tbsp. at a time, while continuously beating the mixture, until 1/3 cup has been added.
3. Add 1 tsp. of vinegar and continue to beat mixture.
4. Repeat steps 2 and 3 until all liquids have been added.

Emulsifier

1. Separate egg white from yolk, placing the white in a custard cup.
2. Add egg yolk and 1 tsp. vinegar to a mixing bowl.
3. Beat vigorously until slightly thick. (Use whisk or hand mixer)
4. Add oil, 1 Tbsp. at a time, while continuously beating the mixture, until 1/3 cup has been added.
5. Add 1 tsp. of vinegar and continue to beat mixture.
6. Repeat steps 2 and 3 until all liquids have been added.

Sensory Evaluation

Materials:

Wintergreen Lifesavers or chocolate

Procedure:

1. Plug your nose.
 2. Place a Wintergreen Lifesaver or piece of chocolate on your tongue. What do you taste? You should only taste “sweet.”
 3. Unplug your nose. What do you taste now? When you unplug your nose, you should experience the flavor of mint (or chocolate) as it rushes through the olfactory nerve.
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Hand Washing and Food Safety

Materials:

3 potatoes

Vegetable peeler

Soap

3 resealable plastic bags

Procedure:

1. Peel three potatoes. Wash all three for at least 20 seconds with soap and water after peeling them.
2. Potato 1 will be unhandled. Place in resealable plastic bag (slightly moist), label “control” and set aside.
3. Pass Potato 2 around room for all students to handle. Place in a resealable plastic bag (slightly moist), label bag “dirty” and set aside.
4. Have students wash their hands.
 - Run hands under very warm water
 - Lather with soap
 - Scrub nails with fingernail brush
 - Rub hands together for 20 seconds (sing “Happy Birthday” or “ABC” song)
 - Rinse under hot water
 - Dry hands with paper towel
5. Pass Potato 3 around room for all students to handle. Place in a resealable plastic bag (slightly moist), label “clean” and set aside.
6. Observe how each potato changes in appearance weekly over time.

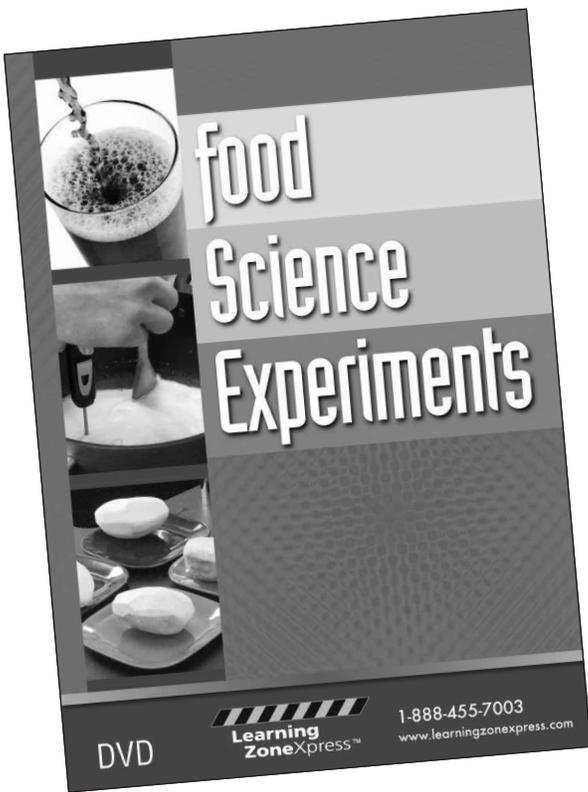
What Makes Popcorn Pop?

Materials:

Popcorn
3 custard cups
Masking tape
Marker or pen
Colander
Baking sheet
Air popcorn popper
3 medium size bowls
Ruler
Measuring cup

Procedure:

1. Prepare the three variations of popcorn kernels:
 - a. Count out 100 kernels from the package into a custard cup and label these “regular”.
 - b. Soak popcorn in bowl of water for one hour, drain popcorn in colander for 15 minutes, and count 100 kernels into a custard cup. Label these “hydrated”.
 - c. Place popcorn on baking sheet and leave in 200° F oven for 1 hour. Count 100 kernels and label these “dehydrated”.
2. Pop each set of popcorn kernels for 2 minutes. Place popped popcorn into 3 separate, labeled bowls.
3. Count the number of un-popped popcorn kernels in each bowl. Convert the numbers to percentages.
4. Line up 10 popped kernels from each batch. Measure the line in centimeters and divide by ten. This is the average size of each popped kernel.
5. Measure how much popcorn was made using a measuring cup.
6. Taste each of the variations of popcorn



Name: _____

Hour: _____

VIDEO WORKSHEET

Review

Directions: After watching “*Food Science Experiments*”, answer the following questions.

Making Root Beer

1. What are the two types of fermentation? What type of fermentation is involved in making root beer?
2. Warm water is used to suspend the yeast. What would happen if the water were too hot? What would happen if the water were too cold?
3. What is the purpose of sugar in the experiment?

Making Mozzarella Cheese

1. What is rennet?
2. What are the two groups of protein found in milk?
3. How do you think fat content in milk affects the cheese making?



Emulsions

1. What are some examples of foods that are emulsions?
2. What is a colloid?
3. What is added to oil and vinegar to make mayonnaise?

Sensory Evaluation

1. What are the five flavors our tongues can detect?

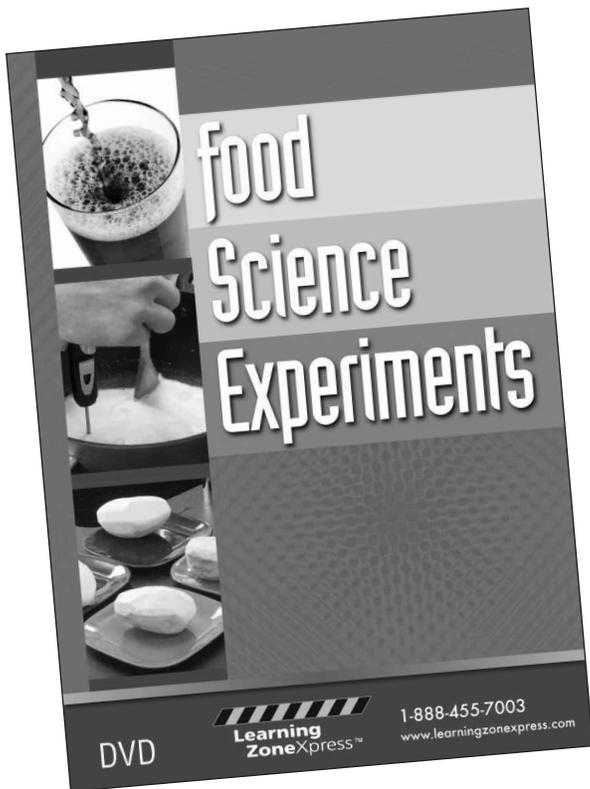
Hand Washing & Food Safety

1. What is the single most effective way to prevent the spread of disease?
2. Why might the potato touched with clean hands appear darker than the untouched control potato?

What Makes Popcorn Pop?

1. What causes popcorn to pop?
2. Describe popped popcorn that the kernels have been dehydrated.
3. Describe popped popcorn that the kernels were soaked in water.





Name: _____

Hour: _____

TEACHER'S KEY

Making Root Beer

1. What are the two types of fermentation? What type of fermentation is involved in making root beer?
Lactic acid fermentation (occurs in muscle cells when they are deprived of oxygen)
Alcoholic fermentation (involved in making food products, this is the type of fermentation taking place when making root beer)
2. Warm water is used to suspend the yeast. What would happen if the water were too hot? What would happen if the water were too cold?
If the water is too hot, the yeast cells will die. If the water is too cold, the yeast cells will not activate. In either situation, the yeast will not be able to produce carbon dioxide and no carbonation would be present in the root beer.
3. What is the purpose of sugar in the experiment?
Sugar is the food source for the yeast cells.

Making Mozzarella Cheese

1. What is rennet?
Rennet is the enzyme found in the 4th stomach of calves and is used to curdle the milk used in the cheese making process. The same enzyme can be found in a few plant sources and can be produced by certain bacteria, where it is called chymosin.
2. What are the two groups of protein found in milk?
Casein Whey
3. How do you think fat content in milk affects the cheese making?
Whole milk cheese will be white and soft, while non-fat skim milk will cause opaque, tough cheese. Fat influences both flavor and texture of the cheese.



Emulsions

1. What are some examples of foods that are emulsions?

Salad dressing, butter, ice cream, milk, mayonnaise

2. What is a colloid?

A colloid is a mixture with very tiny particles that are dispersed into another substance but do not settle out of that substance (emulsions are a type of colloid).

3. What is added to oil and vinegar to make mayonnaise?

An egg yolk (contains the phospholipid lecithin, which is attracted to both water and oil)

Sensory Evaluation

1. What are the five flavors our tongues can detect?

Sweet

Salty

Sour

Bitter

Umami (savory)

Hand Washing & Food Safety

1. What is the single most effective way to prevent the spread of disease?

Hand washing

2. Why might the potato touched with clean hands appear darker than the untouched control potato?

The potato touched with clean hands may be darker depending on any number of factors:

- ***How long the students washed their hands***
- ***How thorough the students washed***
- ***Did all the students use soap***
- ***Students may have touched something after washing their hands***

What Makes Popcorn Pop?

1. What causes popcorn to pop?

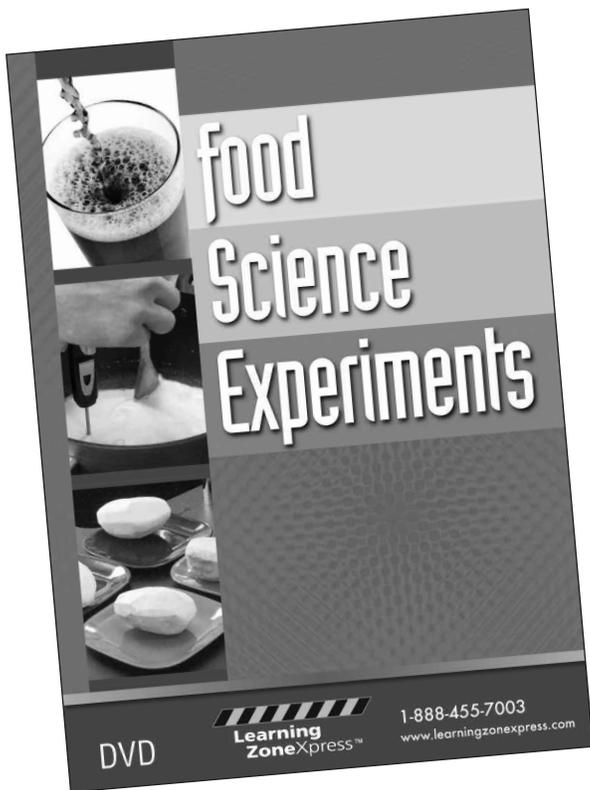
Each popcorn kernel has a small amount of water in it. When the kernel is heated, the water begins to expand. The water turns to steam and the pressure inside the kernel builds until the hull explodes creating popped popcorn.

2. Describe popped popcorn that the kernels have been dehydrated.

Dehydrated kernels will be smaller in size, fewer will pop and will taste flaky and burnt.

3. Describe popped popcorn that the kernels were soaked in water.

Hydrated kernels will be largest in size, create the most popcorn and will taste chewier and blander than regular popcorn.



Name: _____

Hour: _____

VIDEO WORKSHEET

Food Science Careers

The possibilities for careers in the field of food science are endless. Research one of the careers listed below and consider the following questions:

- Do you have some of these or would you work to achieve them?
- How would you perform in the job?
- What are some advantages or disadvantages of being employed in this line of work?
- Would you consider this a career option in your future?

Agricultural Engineer
Agricultural Inspector
Agronomist
Applied Statistician
Baking Technologist
Biochemist
Biological Technician
Certified Laboratory Assistant
Cheesemaker
Chemical Engineer
Chemical Technician
Customer Service Representative
Dietetic Technician
Farm Product Purchasing Agent
Food Processing Technician
Food Scientist
Foodservice Supervisor
Foodservice Worker
Food Stylist
Food Technologist

Fruit Tree Farmer
General Practitioner
Government Agency Administrator
Hydroponic Farmer
Microbiologist
Milk Sampler
Packaging Engineer
Patent Attorney
Plant Manager
Product Designer
Production Inspector
Public Health Sanitarian
Quality Control Technician
Registered Dietitian
Research Analyst
Research Chemist
Reporter
Restaurant Cook/Chef
Restaurant Manager
Taste Tester

