

Activity Instructions

Changing Cream into Butter

The following items will be needed for this activity:

- microwave or hot water bath
- sink
- 10 small mason jars
- cream (35% fat)
- cheesecloth
- strainer
- aluminum foil
- salt (optional, for taste)

Step 1

Add cream to each mason jar so that the jars are filled to about a third of their volume. If using salt for flavour, add a pinch to each jar. Screw the lids on the jars tightly.

Step 2

Ask a few students to begin shaking the jars (**Figure 1**). Have the students pass the jars to their right every minute or so. After approximately 15-25 minutes of shaking, the cream will start separating into butter and buttermilk. Continue shaking the jars for an additional three minutes to ensure that the butter fully separates.



Figure 1

Step 3

To illustrate a reversible change, the butter and buttermilk can be turned back into cream. Melt the butter in the jars using a microwave or hot water bath. Mix the melted butter and buttermilk into cream by shaking gently. Shaking the jar for approximately 20 more minutes will result in the cream separating once more into butter and buttermilk.

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Step 4

Over a sink, open the jars and pour their contents into the strainer. Put the butter back in the jars, rinse with water and again pour the contents into the strainer. Repeat until the water poured from the jars is clear.

Step 5

Place the butter on the cheesecloth (**Figure 2**). Dry the butter by pressing and rolling it around. It can be used immediately or wrapped in aluminum foil and placed in the fridge.



Figure 2

Changing Milk into Glue

The following items will be needed for this activity:

per class:

- powdered non-fat milk
- water
- vinegar
- baking soda
- plastic wrap
- spoon
- electric kettle
- measuring cup

per group:

- 2 disposable cups
- 1 measuring spoon
- 1 coffee filter

Step 1

Measure 1/4 cup of hot water into a disposable cup. This step should be done by the instructor.

Step 2

Add 2 tablespoons of powdered milk to the cup. Stir well.

Step 3

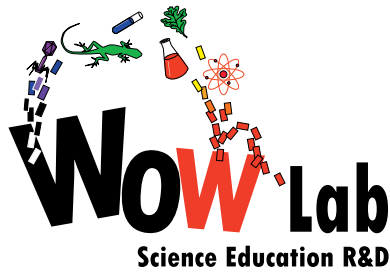
Add 1 tablespoon of vinegar to the cup. Stir until the milk is separated into curds and whey.

Step 4

Line another disposable cup with a coffee filter. Slowly pour the curds and whey mixture onto the filter (**Figure 3**). The whey should gradually filter through, leaving only the curds. Pick up the filter and squeeze the curds to drain them further.



Figure 3



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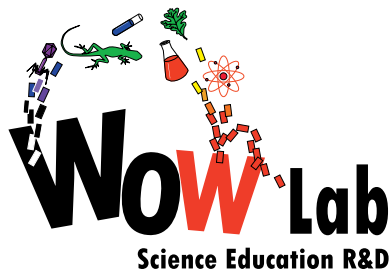
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Step 5

Rinse the first cup and place the curds inside. Use the spoon to chop the curds into small pieces. Smaller pieces will result in a better glue.

Step 6

Add 1 tablespoon of hot water and 1/4 tablespoon of baking soda. Stir until the mixture is smooth. The glue can be used right away or it can be covered with plastic wrap for future use. Its consistency will continue to improve over the next few days. Dispose of the glue if it begins to harden or smell.



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Milk Medley - Activity Instructions

Changing Milk into Cheese

The following items will be needed for this activity:

- sink
- whole milk
- vinegar
- cheesecloth
- hot plate or camping stove
- paper towels
- pot
- thermometer
- strainer or 500 mL container
- measuring cup
- measuring spoon

Step 1

Plug in the hot plate or camping stove and turn it on to its highest setting. It must be capable of reaching temperatures that can boil water.

Step 2

Pour 2 cups of milk into the pot. Place the pot on the hot plate or camping stove. Stir continuously to ensure that the milk is heated evenly.

Step 3

Place a thermometer in the pot. When the temperature reaches approximately 90 °C, add 5 1/2 tablespoons of vinegar. The mixture should begin to separate into curds and whey. Stir for five minutes to ensure the mixture separates completely.

Step 4

If using a container instead of a strainer, place the cheesecloth over the top of the container. If using a strainer, place the strainer in a sink and lay the cheesecloth in the strainer so it covers the inside surface.

Step 5

Pour the curds and whey onto the cheesecloth. Press the curds using the cheesecloth and paper towels to drain any remaining moisture.

Step 6

Once dry, shape the cheese before it begins to harden. Refrigerate for a few hours before eating.