Say Cheese!

**Objective**
To create a chemical reaction that will make cheese.

**What You Need**
- 1/4 cup Milk (whole milk works best)
- 1 tablespoon vinegar
- Small jar with lid
- Coffee filter
- Another small container

**To Do and Observe**
1. Pour 1/4 cup milk into the jar.
2. Add one tablespoon of vinegar to the jar. (Instead of adding acid directly to milk, most cheese-makers add a bacteria which slowly releases acid as it grows).
3. Close the lid tightly! Shake the jar to mix well.
4. What does the mixture look like?
5. Position the coffee filter over the opening of the second container, and hold an edge of it with one hand (or ask someone to help) so the filter doesn't "fall in" while you complete step 6. Carefully pour your mixture over the filter. Be patient with this step! You might need to pour part of your mixture, wait while it filters, then pour the rest.

7. Carefully close the edges of the filter and squeeze the rest of the liquid through the filter.

8. You should be left with curds in the filter. You can squeeze these together and say cheese (but don't eat it)!

9. What is the texture of your cheese? What kind of cheese does it look like?

**What's Going On**

Casein is one molecule found in milk. Molecules and atoms are tiny particles that make up everything around us. Vinegar (acetic acid) contains loose hydrogen atoms. The molecules of the milk mix with the loose hydrogen atoms in the acid to create a chemical reaction. The casein molecules in the milk have a negative charge. The loose hydrogen atoms in the acid have a positive charge. Opposite charges attract, so the casein molecules and loose hydrogen atoms group together and make clumps that you can see. The clumps are called curds, and are used to make cheese. The liquid is called whey. Often, bacteria and mold are also added to give cheese more flavor.
Parent/Teacher Tips
Try this experiment with different types of milk (1%, 2%, heavy cream, etc.). What's different about the resulting cheese? Encourage your kids to investigate how cheese is made commercially? What’s the difference between different types of cheese? What makes Swiss different from Cheddar?