ACTIVITY 4

CHEMISTRY AT HOME

MAKE A KEYRING FROM MILK!

●●○ MEDIUM | 6-12 | 1 HOUR

1. Discover that a new substance is made when milk and vinegar, which have different properties to the reactants, are mixed.
2. Learn that once the reaction takes place you cannot get the milk and vinegar back in their original form.
3. Discover that when these chemical changes happen a new substance must be made.

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MAKE A KEYRING FROM MILK!

You will need

250ml Milk

1.5 tablespoons white vinegar

Wooden spoon

Bowl

Sieve

Hob and pan or microwave and heat proof bowl

Food colouring *Optional*

Cookie cutter *Optional*

Metal key ring or string

Pencil

Did you know you can transform milk into a rubbery material that can be moulded into shapes?

You've probably seen what happens when milk goes off or turns sour. It smells a bit funny, gets lumpy and tastes acidic. This activity speeds up the spoiling of milk by adding vinegar to make it more acidic. The vinegar reacts with the milk to form curds **a solid** and whey **a liquid**. The curds can be squished together to form milk plastic!

Instructions

1. Heat the milk on a hob or in a microwave *ask an adult to help*. Take the milk off the heat before it boils.
2. If you want to make a coloured keyring add a couple of drops of food colouring now.
3. Add the vinegar to the milk and stir gently until white lumps form in the milk.
4. Carefully pour the lumpy mixture through the sieve over the bowl. The white lumps left behind are the curds and the watery liquid is called 'whey'.
5. Squeeze as much liquid as you can out of the curds using your hands and mould into the shape you want.
6. Once you're happy with the shape leave it to dry for about 24 hours.

Activity 1
Make a keyring

- For this challenge you need to mould the curds into a keyring shape.
- This could be a pencil or a shape made with a cookie cutter. Use a pencil to make a hole in your shape at the top, big enough to fit a keyring or some string through.
- Leave to dry for about 24 hours.
- Once the shape is completely dry, thread the keyring through the hole.

Activity 2
Make a multicoloured shape

- Can you find a way to make a multicoloured shape with the milk curds? You could make two different colour curds and mix them together, or even create a rainbow!

Safety

Take care with hot liquids and acids. Vinegar can sting eyes and skin.

This activity should be supervised at all times.

Challenge

Sariq has lost a button from his shirt and needs to make a new one quickly.

Can you investigate to find the fastest way to make enough plastic milk to form a button?

Top tip: Try adding vinegar to cold milk and then to the same amount of warm milk. Does the vinegar react in the same way?

Things to keep the same

- Amount of milk
- Amount of vinegar

Things to change

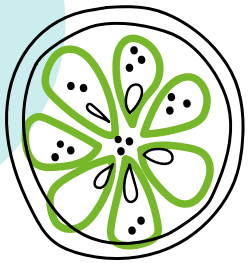
- Temperature of the milk

What to measure

- How long it takes for the milk to split into curds and whey.

Extra challenges

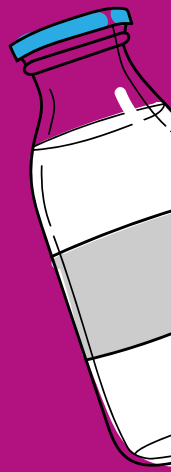
Experiment with different acids such as lemon or lime juice. Do these acids have the same effect on the milk as vinegar?



What's happening?

In fresh milk the protein molecules are spread evenly through the liquid. If the pH of the milk drops (it becomes more acidic) the protein molecules stick together forming the lumps you see.

When milk is left to turn sour naturally, the acids produced by the bacteria in the milk increase its overall acidity. We keep milk in the fridge to slow down the growth of bacteria and in turn the production of acid.



Did you know?

Milk is curdled intentionally to make foods such as cheese and yoghurt?

Did you know?

You can make your own buttermilk by adding a little vinegar to fresh milk.