

# UNIT 3

## PRECIPITATION ACTIVITY



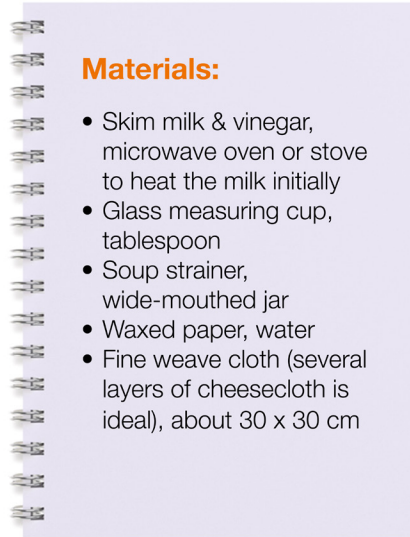
### PROCEDURES

Your teacher will heat 1 cup of skim milk in a microwave or on the stove. The milk should be very warm but not too hot. One tablespoon of vinegar will be added and stirred gently with the spoon. (Record observation again in the challenge.) The milk will curdle and separate into white blobs and a clear yellowish liquid. All of it will then be poured into a cloth-lined soup strainer in the sink or basin, with a wide-mouthed jar underneath. Your teacher will drop 3 or 4 teaspoons of water over the blobs that are in the cloth to wash the extra vinegar away. The corners of the cloth should gently be picked up and then someone should gently squeeze out the remaining liquid. It should then be unwrapped and the resulting lump should be placed on waxed paper.



### EXPLANATION OF ACTIVITY

Your class has just made the famous “curds and whey” of Little Miss Muffet. In modern form, the curds are a form of cottage cheese. Milk is composed of mostly water with calcium and other minerals, soluble and insoluble proteins, vitamins, varying amounts of butterfat, and lactose (a naturally occurring sugar). The vinegar (a weak acid) reacts with certain proteins in the milk to turn them solid (curds), leaving most of the water behind (whey).



### Materials:

- Skim milk & vinegar, microwave oven or stove to heat the milk initially
- Glass measuring cup, tablespoon
- Soup strainer, wide-mouthed jar
- Waxed paper, water
- Fine weave cloth (several layers of cheesecloth is ideal), about 30 x 30 cm



### ADDITIONAL INFORMATION

The lump of curds is mostly a product called casein. It is most of the insoluble protein that was in the milk, so you can see that milk is really a good source of protein. If you place the soft lump into a blender, add 2 or 3 tablespoons of water and a half teaspoon of baking soda, then blend to liquefy, you get a very simple form of glue or paste that can also be made into paint that can form a very tough coating when dry. If you dry the lump instead of liquefying it, it actually forms a ball of hard, almost plastic-like material. These properties come from the drying out of the long, interlocking protein molecules. After setting out for many hours, you can see the curds have turned into plastic. If shaped early and painted, you can create your own plastic toy!