

## Instant Milk - Clues to a Chemical Change

### Title: Instant Milk

### Abstract:

A chemical change is demonstrated by the instant formation of a white precipitate when a 3% clear, colorless solution of silver nitrate is added to a 1% clear, colorless solution of sodium chloride. Students recognize the evidence for a chemical reaction by observing a change in color and the formation of new substance, the white precipitate.

### Key Concepts:

Products  
Reactants  
Precipitates

### Materials & Equipment

Apron or lab coat  
Three 250 ml Erlenmeyer flasks  
Two 30 ml beakers or equivalent sized paper cups  
Eye protection  
Gloves (disposable)  
Graduated cylinder (100 ml)  
Silver Nitrate (15 g - enough for 5 demonstrations in one day)  
Sodium Chloride (5 g - enough for 5 demonstrations in one day)  
Triple beam or digital balance  
Spatula  
Distilled water for dissolving the silver nitrate  
Ammonia Solution (10% aqueous Ammonium Hydroxide)

### Safety Precautions:

Use eye protection, gloves, and apron.

Disposal: Add ammonia solution to dissolve the resulting white silver chloride precipitate and dispose of it in a sink with running water. Wash out flasks.

### Procedure:

1. Mass 3 grams of silver nitrate into a 30 ml beaker on a balance and pour the white crystals into a 250 ml Erlenmeyer flask containing 100 ml of DISTILLED WATER (**DO NOT USE TAP WATER** - it contains chloride ions which will make the silver nitrate solution cloudy). Stir to allow all of the silver nitrate crystals to dissolve. The solution should be clear and colorless

- Mass 1 gram of sodium chloride into a 30 ml beaker on a balance and pour the white crystals into a 250 ml Erlenmeyer flask containing 100 ml of water. Stir to allow all of the sodium chloride crystals to dissolve. The solution should be clear and colorless
- Transfer the sodium chloride solution to a separate 250 ml Erlenmeyer flask.
- Pour the entire 100 ml solution of silver nitrate into the sodium chloride solution in the 250 ml flask.
- Have the class observe the instant formation of a white, milk-like mixture. The white precipitate of silver chloride will begin to settle out in clumps in a matter of minutes.
- After 5 minutes, decant the liquid carefully to show the class the white precipitate of silver chloride.
- Mixing two clear, colorless solutions to instantly produce a white precipitate shows clues to a chemical reaction: color change and precipitate formation.
- Show the reaction sequence on the board and have the students write this on their worksheet:



<b>Silver Nitrate</b>	<b>Sodium Chloride</b>	<b>Silver Chloride</b>	<b>Sodium Nitrate</b>
<b>(Colorless Solution)</b>	<b>(Colorless Solution)</b>	<b>(White Precipitate)</b>	<b>(Colorless Solution)</b>

Point out how the equation balances, conforming to the Law of Conservation of Mass: 1 Ag, 1 N, 3 O, 1 Na, and 1 Cl on the left side equal the same number on the right side.

- Add ammonia solution to dissolve the silver chloride and dispose of the mixture in a sink using lots of running water.

### Questions:

- The evidence for a chemical reaction is the formation of \_\_\_\_\_ . (new substance)

- What other evidence is there of a chemical reaction?

\_\_\_\_\_ (change in color)

\_\_\_\_\_ (formation of precipitate)