

Chemical and Physical Changes in Your Kitchen



Annotation

This lab helps students to understand the difference between chemical and physical changes. Students perform common household tasks like melting chocolate. They then have to determine what kind of change occurred during the task. Answers are not always as straight forward as those given in textbooks. Lab is geared toward Physical Science Students

Primary Learning Outcome:

Students will be able to identify the five indications that a chemical change has taken place.

Students will be able to determine the difference between a physical and a chemical change.

Additional Learning Outcomes:

Students will become familiar with using a hotplate

Students will create a data table

Assessed QCC:

Characteristics of Matter

Use of Scientific Tools

Habits of Mind

Total Duration:

45 minutes

Materials and Equipment:

1. Aluminum foil
2. 3 hotplates or Bunsen burners
3. Disposable wooden stirring sticks
4. Glass stirring rods
5. Chocolate bars or kisses (Students tend to eat more chocolate than anything else. So, buy extra.)
6. Marshmallows
7. Alka-Seltzer
8. Ice cubes
9. Salt
10. Erlenmeyer flasks
11. Plastic Cups
12. Salt
13. Water

Procedures:

Set up

Set up four stations around the room with the following supplies

Station 1

Marshmallows
Hotplate
Aluminum Foil
Disposable wooden stirring sticks

Station 2

Ice
Hotplate
Erlenmeyer flask
Glass stirring rod

Station 3

Salt
Water
2 plastic cups or Erlenmeyer flask
Glass stirring rod
Alka-Seltzer

Station 4

Chocolate
Hotplate
Aluminum Foil
Disposable wooden stirring sticks

Lesson Materials Attached at the end:

Directions for each station
Student instruction sheet
Data sheet
Sample grading key

Assessment:

Data sheet and definitions will be graded

A sample grading key is attached

Extension:

An additional station can be added for advanced students. This station involves changes which occur when popping popcorn. A bag of microwave popcorn should be pre-popped. Students can investigate the differences between popped and unpopped kernels. When popcorn is popped, liquid inside the kernel is changed to steam. Pressure from the steam builds up inside the kernel. When the pressure reached a critical stage the kernel pops turning itself inside out. This is a physical change.

Remediation:

A teacher can demonstrate the lab instead of having the students being responsible for completing each task.

Accommodation:

A teacher can demonstrate the lab instead of having the students being responsible for completing each task.

Chemical and Physical Changes in Your Kitchen

Rules of Engagement/Plan of Attack:

There are 5 stations. Each station may have more than one task. There are a total of 10 tasks. Visit each station during the lab period and complete all of the tasks. There are procedures for each station taped next to the object you will be looking at. Make sure you include **description, observations, and type of change for each task.**

Data Collection:

Visit each station and fill in the data table for each task.

Evidence of a Chemical Change

1. Unexpected color change
2. Change in odor
3. Unexpected temperature change
 - a. Endothermic - heat is absorbed. (feels cooler)
 - b. Exothermic - heat is released. (feels hotter)
4. Gas bubbles appear
5. Electricity is generated
6. Light is produced
7. Fire is produced
8. A solid forms when two liquids are mixed

Post-Lab:

On the back of your data table, write two sentences, one describing what a physical change is and one describing what a chemical change is.

- Station 1:
 - Eat a marshmallow. Place a few marshmallows in a cupcake foil. Heat and stir on hotplate until melting is complete. Write observations. When cooled, taste the marshmallow and note any other observations or comparisons.
 - Continue to heat the marshmallow over the hotplate until it gets good and crusty. Write observations. When cooled, taste and note any other observations and comparisons.
 - Rip a marshmallow in half. Put it back together. Write observations.

- Station 2:
 - Lick the ice cube and taste the water. Write observations.
 - Melt the ice cube until it begins to boil and evaporate. Write observations.

Station	Describe what was done to change the food at each task	Observed Affect	Physical or Chemical Change
Ex	Ex. Mash Cooked Potatoes	Ex. Smoother consistency, tastes the same	Ex. Physical
1	Melt marshmallow		
	Burn marshmallow		
	Rip marshmallow		
2	Melt ice		
	Boil water		
	Evaporate water		
3	Dissolve salt in water		
	Dissolve Alka-Seltzer in water		
4	Melt chocolate		
	Burn chocolate		

Grading sample

Station	Describe what was done to change the food at each task	Observed Affect	Physical or Chemical Change
Ex	Ex. Mash Cooked Potatoes	Ex. Smoother consistency, tastes the same	Ex. Physical
1	Melt marshmallow	Changed to a liquid, tastes the same	Physical
	Burn marshmallow	Became crusty, tastes different/burnt	Chemical
	Rip marshmallow	Change in size only	Physical
2	Melt ice	Changed from a liquid to a solid	Physical
	Boil water	Bubbles formed	Physical
	Evaporate water	Changed from a liquid to a gas	Physical
3	Dissolve salt in water	Salt disappeared, tasted salty	Physical
	Dissolve Alka-Seltzer in water	Bubbles formed without the application of heat	Chemical
4	Melt chocolate	Changed to a liquid, tastes the same	Physical
	Burn chocolate	Became hard and crusty, tastes different/burnt	Physical