



## Activity 13: Physical and Chemical Changes

How can you tell a chemical change has occurred?

### Hypothesis

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Are the following changes physical or chemical?

Change	Physical or Chemical?
A. Cutting up paper	
B. Burning paper	
C. Adding food colouring to water	
D. Breaking a glow stick	
E. Mixing salt with water	
F. Boiling water	
G. Mixing baking soda with vinegar	
H. Adding Epsom salt to water	
I. Mixing Epsom salt solution with laundry detergent solution	

## Need a Hint?

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Ask yourself:

- Will it change colour?
- Will it produce gas? (shown by bubbles or fizzing)
- Will it produce a precipitate?
- Will it produce heat or light?
- Is it reversible?
- Will it make a new substance?

## Materials

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- paper
- scissors
- lighter and/or matches (Warning: This step must be performed with adult assistance and supervision.)
- food colouring
- glass or small bowl
- glow stick
- balloon
- plastic water bottle (with small opening)
- kettle
- salt
- baking soda
- vinegar
- Epsom salts
- laundry detergent
- lime juice
- measuring cup
- measuring spoons
- funnel

- **ADLC Digital Lesson: Physical and Chemical Changes**

<https://www.youtube.com/watch?v=-CBEWlyup08>

## Procedure

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### A. Cutting up paper

1. With scissors, cut a sheet of paper into smaller pieces.
2. On the *Observations Table*, check any observations you made and indicate if it was a chemical or physical change.

## B. Burning paper

Safety Warning: You must perform this step with adult assistance. If an adult is not present to help you, watch the video that demonstrates this step. Do not do this step without an adult with you!)

1. Perform this activity over a sink.
2. With adult assistance, light a small strip of paper carefully with a lighter or a match.
3. Check any observations you made on the *Observations Table*, and indicate if the change was chemical or physical.

## C. Adding food colouring to water

1. Fill a small bowl or glass halfway with water.
2. Add a few drops of food colouring and stir gently.
3. Check any observations you made on the *Observations Table*, and indicate if the change was chemical or physical.

## D. Breaking a glow stick

1. Bend the glow stick gently until you hear it crack.
2. Check any observations you made on the *Observations Table*, and indicate if the change was chemical or physical.

## E. Mixing salt with water

1. Fill a small or glass halfway with water.
2. Add a teaspoon of salt and stir gently.
3. Check any observations you made on the *Observations Table*, and indicate if the change was chemical or physical.

## F. Boiling water

1. Fill a kettle with about a cup of water and heat it until it boils.
2. Check any observations you made on the *Observations Table*, and indicate if the change was chemical or physical.

## G. Mixing baking soda with vinegar

1. Fill a clear container with one cup of vinegar.
2. Add 1 Tbsp of baking soda to the vinegar and stir.
3. Notice the bubbling as the two ingredients mix. What gas is being released?

4. Let's test for the presence of carbon dioxide with a candle.
5. Carbon dioxide is denser than air therefore if it is present it would remain at the bottom of the container.
6. Light a candle and carefully pour the gas out of the container (do not pour out the liquid) onto the candle.
7. If carbon dioxide is present it will blow out the flame.
8. Check any observations you made on the *Observations Table*, and indicate if the change was chemical or physical.

## H. Adding Epsom salt to water

1. Add two Tbsps. of warm water to a glass.
2. Keep one hand on the glass while you add one Tbsp. of Epsom salt and stir until no more Epsom salt will dissolve. Do not dump this solution because you will be using it for the next experiment (Part I).
3. Notice any temperature change to the glass when you add the Epsom salt.
4. Check any observations you made on the *Observations Table*, and indicate if the change was chemical or physical.

## I. Mixing Epsom salt solution with laundry detergent solution

1. Take 1/2 cup of water in a clear glass and add one teaspoon of powdered laundry detergent. Stir until no more detergent will dissolve.
2. Add a few drops of food colouring to the Epsom salt solution you made in Part H (this makes it easier to see the change).
3. Take a dropper and fill it with the Epsom salt solution.
4. Add a few drops of the Epsom salt solution to the laundry detergent solution.
5. Check any observations you made on the *Observations Table*, and indicate if the change was chemical or physical.

<b>Change</b>	<b>Colour Change</b>	<b>Gas Produced</b>	<b>Precipitate Formed</b>	<b>Heat and/or Light Produced</b>	<b>Irreversible</b>	<b>NEW Substance Formed</b>	<b>Physical or Chemical?</b>
<b>A. Cutting up paper</b>							
<b>B. Burning Paper</b>							
<b>C. Adding food colouring to water</b>							
<b>D. Breaking a glow stick</b>							
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**Conclusion**

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Compare your observations with your hypothesis.

- Which of your hypotheses were incorrect?

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- Which physical changes have some signs of being a chemical reaction but did not produce a new substance?

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- Based on your observations, answer your Explore Question: How can you tell a chemical change has occurred?

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Check your answers on pp. 67-68.