

Changes

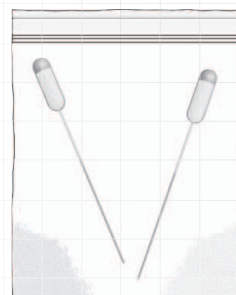
Explore/Explain 1

Investigate: Changes in a Bag

Part A

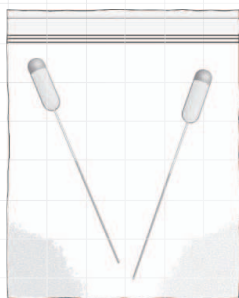
Safety

Study the MSDS for the chemicals used in Part A. Discuss safety precautions that must be used and list them in the space below.



1. Place 1.0 g of sodium bicarbonate into one corner of a plastic bag.
2. Place 1.5 g of calcium chloride into the other corner of the same bag.
3. Fill two disposable pipettes with water and place them in the plastic bag. Seal the plastic bag.
4. Observe the contents of the bag and record observations in the table below.
5. Carefully place the sealed bag in a plastic cup. Place the cup with its contents on a balance. Measure the mass of the system and record this mass in the table below.
6. Lift the bag and from the outside, gently squeeze the pipettes inside the closed bag. Spill the water into the sealed bag and place the bag onto a tabletop. Mix the substances in the bag by squeezing gently.
7. Observe all changes inside the plastic bag. Write down your observations.
8. Place the sealed bag in the same plastic cup and measure the mass of the system once again. Record this mass.
9. Clean up by disposing of the sealed plastic bag in the trash.
10. Proceed to Part B of the investigation.

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Observations

	Before addition of water	After addition of water
Sodium bicarbonate description		
Calcium chloride description		
Water description		
Mass of system		

Part B

Safety

Study the MSDS for the chemicals used in Part B. Discuss safety precautions that must be used and list them in the space below.

11. Place 1.0 g of sodium bicarbonate into one corner of a plastic bag.
12. Place 1.0 g of citric acid into the other corner of the same bag.
13. Fill two disposable pipettes with water and place them in the plastic bag. Seal the bag.
14. Carefully place the sealed bag in a plastic cup. Place the cup with its contents on a balance. Measure the mass of the system and record this mass in the table below.



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15. Lift the bag and from the outside, gently squeeze the pipettes inside the closed bag. Spill the water into the sealed bag and place the bag onto a tabletop. Mix the substances in the bag by squeezing gently.
16. Observe all changes inside the plastic bag. Write down your observations.
17. Place the sealed bag in the same plastic cup and measure the mass of the system once again. Record this mass.
18. Clean up by disposing of the sealed plastic bag.
19. Discuss the questions in your group and record responses in the analysis section.

Observations

	Before addition of water	After addition of water
Sodium bicarbonate description		
Citric acid description		
Water description		
Mass of system		

Analysis and Conclusions: Parts A and B

1. Was the change in Part A a physical or chemical change? How do you know?

2. Was the change in Part B a physical or chemical change? How do you know?



Changes

3. Define physical change and chemical change in your own words.
4. What are some indicators of a chemical change?
5. Were the changes endothermic or exothermic? How can you tell?
6. How did the mass before mixing of the contents in the bag compare with the mass after mixing?

