

# MIXING ACIDS AND BASES

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Acids and bases are two different kinds of substances. They each produce different kinds of charged particles, called ions, when they dissolve. An acid produces positive hydrogen ions ( $H^+$ ) when it dissolves. A base produces negative hydroxide ions ( $OH^-$ ) when it dissolves. The concentration of the ions in an acid or a base determines how strong it is.

In chemistry, acids and bases have their own measuring scale. It's called the pH scale, and it stretches from 0-14. With this scale, 0 is the most acidic, 14 is the most basic, and 7 is neutral. Pure water is a 7. Acids and bases are used in chemistry, but they're found all over the place in everyday life, too. Battery acid is highly acidic. It's close to a 0 on the pH scale. Lemon juice is about a 2, and black coffee is about a 5. As far as bases, baking soda is around a 9, and hand soap is about a 10.

When you mix acids and bases, they put up a bit of a fight, as you might have guessed. It's like those two friends who you never hang out with at the same time. There's always some sort of argument. Well, that happens with acids and bases, too. The mixture is always trying to get to neutral in order to be stable, but the solution might have too much acid or too much base. Something has to happen to make it work. That something is a chemical reaction.

The reaction happens because mixing an acid and a base changes the concentration of ions, the charged particles. This process, called neutralization, produces water and salt. Depending on what's being mixed, the reactions can also produce carbon dioxide or other gases.

1. What happens when acids and bases are mixed?
2. What is a substance's "goal" after acids and bases have come together?

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**Question:** Can we make a "snowman" expand?

## Materials:

Plastic baggies  
Snow (or shaved ice)  
Permanent markers  
Alka-Seltzer tablets

## Procedures:

1. Draw a snowman face onto each baggie with a permanent marker.
2. Fill plastic baggies about half-way full of snow. If you don't have snow, you can use crushed ice or shaved ice. Shaved ice will produce better results than crushed ice.
3. Drop 3 Alka-Seltzer tablets into each bag and seal tightly.
4. Lay the bags flat on a table or other hard surface and watch as the bag slowly start to expand.

When the snow starts to melt, the bags will expand faster. Be careful- if there are too many tablets inside the bag the bag may explode open, spilling snow everywhere!

## The Science Behind Expanding Snowman

Alka-Seltzer tablets contain citric acid and baking soda. They are technically both an acid and a base. When the tablets are placed into melting snow, a chemical reaction occurs when the base and acid mix. This creates carbon dioxide gas, which expands the bag and makes the snowman look like it is growing.

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Using details from the passage and the demonstration information to answer each.

1. Explain the science that caused the "snowman" to expand?

2. Complete the table.

Type of Substance	Acid	Base	Neutral
Material from Demonstration			

3. What role did the water play in the demonstration?

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The reaction happens because mixing an acid and a base changes the concentration of ions, the charged particles. This process, called neutralization, produces water and salt. Depending on what's being mixed, the reactions can also produce carbon dioxide or other gases.

1. What happens when acids and bases are mixed?

**When acids and bases are mixed, a chemical reaction occurs as the mixtures neutralizes.**

2. What is a substance's "goal" after acids and bases have come together?

**A substance's "goal" after acids and bases mix is to become neutral.**

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Using details from the passage and the demonstration information to answer each.

1. Explain the science that caused the "snowman" to expand?

The water dissolves the tablet, causing it to release an acid and a base which react to produce carbon dioxide which expands the bag.

2. Complete the table.

Type of Substance	Acid	Base	Neutral
Material from Demonstration	Citric Acid from Alka-Seltzer Tablet	Baking Soda from Alka-Seltzer Tablet	Water

3. What role did the water play in the demonstration?

The water was a neutral element. The role it played was to dissolve the tablet and allow the acid and base to react.

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Jennifer Findley

