

## Creating New Substances

When elements combine to make compounds they are making new substances. When iron (Fe) combines with oxygen (O) to make rust, the rust ( $\text{Fe}_2\text{O}_3$ ) is a new substance. When new substances are created we have a chemical change.

Compounds can also combine to make new substances. When we mix the compound baking soda ( $\text{NaHCO}_3$ ) with the compound vinegar ( $\text{CH}_3\text{COOH}$ ), we get several new substances – water, salt and carbon dioxide in the bubbles.

There are several clues that can indicate a new substance has been made and a chemical change has happened. A color change is evidence that a something new has formed. The formation of a gas indicated by the presence of bubbles is another clue. When two substances are mixed and a temperature change occurs, this is another clue that a new substance has formed. The last clue happens when two liquids are mixed together. If these two liquids make a solid then you have evidence that a new substance has formed. The solid sometimes goes to the bottom of the container and sometimes stays mixed in the solution making it cloudy.

**Materials:** Beaker, vinegar, piece of steel wool, tongs,

### **What To Do:**

1. Your teacher will show you some dry steel wool.  
Steel wool is long, thin strips of iron (Fe).
2. Your teacher will place one piece of the steel wool in the vinegar and stir it around for about 1 minute.
3. Your teacher will take the steel wool out of the vinegar and allow the wet steel wool to dry on a paper towel for at least 30 minutes so that the iron can mix with the oxygen in the air.

## Chemical Change #1

**Materials:** baking soda, vinegar, Chem-plate, scoop

### **What To Do:**

1. Place 2 scoops of baking soda in the chem.-plate
2. Place 10 drops of vinegar on the baking soda.
3. Observe what happens.

## Chemical Change #2

**Materials:** ammonia, Chem-plate, grape juice

### **What To Do:**

1. Use a different well on the Chem-plate and put 10 drops of grape juice in it.
2. Place 10 drops of ammonia into the well. Observe what happens.

## Chemical Change #3

**Materials:** beaker, water, Damp Rid ( $\text{CaCl}_2$ ), spoon, thermometer, graduated cylinder

### **What To Do:**

1. Measure 30 mL of water into a graduated cylinder and then pour it into the beaker.
2. Take the temperature of the water. \_\_\_\_\_
3. Place a small spoonful of Damp Rid in the water and stir.
4. Take the temperature of the solution after 1 minute. \_\_\_\_\_

## Chemical Change #4 Teacher Demo

**Materials:** baking soda, Damp Rid, 2 beakers with 50 mL of water, small spoon

### **What To Do:**

1. Mix 2 small spoonfuls of baking soda in one of the beakers of water. – Note color. \_\_\_\_\_
2. Mix 2 small spoonfuls of Damp Rid in the other beaker of water. – Note color. \_\_\_\_\_
3. Pour the solution of baking soda into the solution of Damp Rid. Note color. \_\_\_\_\_



**Questions:**

1. What did you observe when the vinegar and baking soda mixed? \_\_\_\_\_
2. What did you observe when the ammonia and grape juice mixed? \_\_\_\_\_
3. What did you observe when the Damp Rid was placed in the water? \_\_\_\_\_
4. What did you observe when the baking soda solution was mixed with the Damp Rid solution? \_\_\_\_\_
5. When the baking soda and vinegar mixed, which clue tells you that there was a chemical change? \_\_\_\_\_
6. When the ammonia was placed in the grape juice, which clue tells you that there was a chemical change? \_\_\_\_\_
7. When the Damp Rid was placed in the water which clue tells you that there was a chemical change?  
\_\_\_\_\_
8. When the baking soda solution was mixed with the Damp Rid solution, which clues tell you there was a chemical change? \_\_\_\_\_
9. Observe the steel wool. You should see some rust on the iron. Be sure to smell the rusted steel wool, too.

**Question:**

1. What two clues tell you that a new substance was formed by the steel wool and oxygen?  
\_\_\_\_\_

To help remember the clues for a chemical change we should remember the sentence:

**City Girls Love Their Cell Phones On**

Make a foldable with this information on the next page.

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Name \_\_\_\_\_ period \_\_\_\_\_

## EXIT TICKET

Creating New Substances

**Directions:** Circle the clues that tell us a new substance has been made.

**Color Change**

**Invisibility**

**Snap, Crackle, Pop sounds**

**Formation of a Gas**

**Temperature goes up**

**Music plays**

**A solid forms**

**Conclusion:** (gas, chemical, solid, new, clues)

When elements or compounds combine they create a \_\_\_\_\_ substance. There are several \_\_\_\_\_ that tells us a new substance has been made. When the baking soda was mixed with the vinegar the new substance was the formation of a \_\_\_\_\_ in the form of bubbles. When two liquids mix together and make a \_\_\_\_\_ it is an example of a \_\_\_\_\_ change.



Name \_\_\_\_\_ period \_\_\_\_\_

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