

Physical and chemical changes lab Answer Key

Data Table

Station #	Observation	Physical or chemical change	Why? What evidence did you see that supports your answer?
1 Vinegar and milk	Milk Separates and becomes chunky. Smell/odor given off.	Chemical	Odor and precipitate forms when the vinegar reacts with the milk. Chunky separation that forms is called Casein. Casein is a very long molecule that bends like plastic – that's why the lumps of milk are pliable and bendy
2 Baking soda and vinegar	Bubbles/ fizzes	Chemical	Baking soda and vinegar react with each other because of an acid-base reaction. Baking soda is bicarbonate (NaHCO_3) and vinegar is an acetic acid (HCH_3COO). One of the products this reaction creates is carbon dioxide. This forms the bubbles.
3 Water and salt	Dissolves	Physical	Can reverse the reaction, by boiling the water off the salt crystals will remain. STRESS dissolving and mixing as physical property.
4 Sugar and heat	Burns	Chemical	Heat is added to the sugar. Heat energy from the flame provides the energy, which causes atoms in the sugar molecule to vibrate faster and eventually break apart. The sugar is then chemically changed when these free atoms rearrange themselves, react with oxygen in the air and come back together to create new substances. New substance is Caramelized sugar (browning of sugar).
5 A Food coloring and water	Water changed from clear to blue	Physical	Physical change as the food coloring can be removed. It is still water just a different color.

Station #	Observation	Physical or chemical?	Why? What evidence did you see that supports your answer?
5 B Food coloring, water and bleach	Blue water returned to clear color	Chemical	Bleach contains sodium hypochlorite, which is an oxidizer. It oxidizes or reacts with the color molecules in food coloring. Although the pigment molecule remains, its shape changes so that it can't absorb/reflect light the same way, so it loses its color as a result of the chemical reaction.
6 Hydrogen peroxide and yeast	Temperature goes up, brown mixture appears	Chemical	Exothermic reaction – heat is given off so temperature goes up. The vinegar reacts with the yeast, forming carbon dioxide bubbles causing the yeast to “grow”
7 Magic paper			
8 Foam and acetone	Foam disappeared	Chemical	A new substance is formed, as a goo like substance is left behind.
9 Steel wool and vinegar	Steel wool changed brown color	Chemical	Vinegar is reacting with steel wool causing it to rust. Rusting (or oxidation) is a chemical reaction between iron and oxygen, this chemical reaction creates heat energy which increases the temperature inside the beaker. This experiment is an example of an exothermic reaction, a chemical reaction that releases energy in the form of heat.
10 Potato and iodide	Potato turned dark blue	Chemical	The reason why it turns dark blue is because the iodine combines with the starch in the potato.
11 Glow stick	Glows	Chemical	The reaction between the different compounds in a light stick causes a release of energy and the stick glows.
12 Kool-Aid and water	Changes color	Physical	Mixing Kool-Aid is a physical change since you are just dissolving the components in water. If you could evaporate all of the water, you would be left with the same stuff you started with.

Explain/Evaluate

Answer the following questions:

1. In which of the experiments were new substances formed?

2. How were you able to tell the difference between physical and chemical changes?

3. It maybe confusing to recognize the difference between physical and chemical changes.
Give two examples.

4. Does the mass of the ingredients change during physical changes? What about during chemical changes?

5. In one of today's experiments, you made a mixture where the ingredients kept their physical properties. Which experiment was it?

6. If you wanted to learn more about all the physical changes possible for water, what three states of matter would you study?

Evidence - What is the proof?

(Go back to data table and give three examples of evidence of chemical changes.)
