Name _____ Date _____ Period _____

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4.1 Introduction for Reactions

AP Chemistry

Back up every answer with evidence: name the new substance or describe a new property.

1. Classify each change as physical or chemical.

(a) dry ice, $CO_2(s)$, turning into $CO_2(g)$

(b) a match burning

(c) salt dissolving in water

(d) milk going sour and smelling different

(e) cutting copper wire into short pieces

2. A piece of magnesium ribbon is dropped into hydrochloric acid. The acid fizzes, the test tube gets warm, and the ribbon slowly disappears. Is this a physical or chemical change? Give two pieces of evidence and name the gas that forms.

3. A student heats a beaker of water until it boils. She sees bubbles and says, "Bubbles mean a gas formed, so boiling is a chemical change." Do you agree? Explain.

4. A clear, colorless solution of lead(II) nitrate is poured into a clear, colorless solution of potassium iodide. The mixture turns cloudy, and a bright yellow solid settles to the bottom.

(a) What is the yellow solid called?

(b) Is this a physical or chemical change? Explain.

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5. Predict one observation you would expect for each reaction before you mix anything.

(a) Zinc reacts with hydrochloric acid. One product is hydrogen gas.

(b) Silver nitrate solution is mixed with sodium chloride solution. One product is silver chloride, a solid that does not dissolve in water.

(c) Methane gas burns in a lab burner and releases energy.

6. Which diagram shows a chemical change? Justify your answer using the particles.

Diagram A

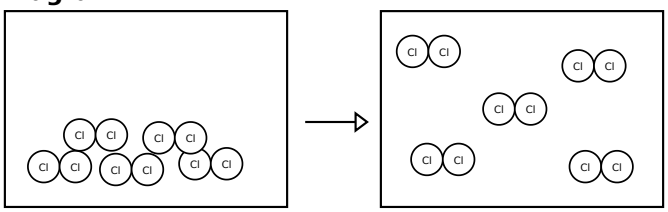
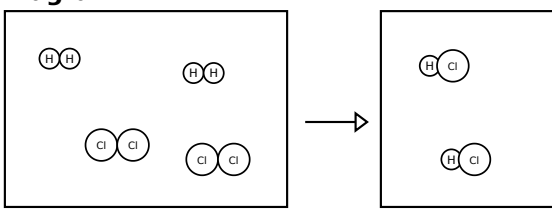


Diagram B



7. Sugar is stirred into water until it disappears. A second sample of sugar is heated in a pan until it turns black and smells burnt. Classify each change and explain how you know.

8. Two clear solutions, HCl(aq) and NaOH(aq), are mixed. The mixture stays clear and colorless, so a student concludes that no reaction happened. Describe a measurement the student could make to test this claim, and the result that would show a chemical change.

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