Chemical Changes

A. Fill in the Blanks

Complete each sentence with the correct term from the word bank.

1. The starting materials in a chemical reaction are called the _____.

2. Burning wood is a rapid chemical change known as _____.

3. When two clear liquids are mixed and a cloudy solid forms, that solid is called a _____.

4. A process where atoms are rearranged to form new substances is called a _____.

5. Most chemical changes, like baking a cake, are _____, meaning you cannot easily change them back.

B. Match the Following;

Match the term or example in Column A with the best description in Column B. Write the letter of the correct description in the blank.

Column A	Column B
1. Reactant	A. A chemical change that releases energy as heat and light.
2. Product	B. A slow chemical reaction between a substance and oxygen.
3. Combustion	C. The new substance formed as a result of a chemical reaction.
4. Oxidation	D. A solid that forms and settles out of a liquid mixture.
5. Precipitate	E. A substance that takes part in and undergoes change during a reaction.

C. Practice Problems

For each of the following, identify it as a Physical Change (P) or a Chemical Change (C). Briefly explain your reasoning.

1. Burning a piece of paper: ___ Reasoning:

2. An iron bicycle frame rusting: ___ Reasoning:

3. Slicing a loaf of bread: ___ Reasoning:

4. Milk going sour: ___ Reasoning:

5. Mixing baking soda and vinegar to create bubbles: ___ Reasoning:

6. Water boiling in a kettle: ___ Reasoning:

7. A firework exploding: ___ Reasoning:

8. Making a fruit salad from various fruits: ___ Reasoning:

9. A silver spoon tarnishing (turning dark): ___ Reasoning:

10. An ice cube melting into water: ___ Reasoning:

D. Warm-up Questions

Answer the following introductory questions.

1. In your own words, what is a chemical change?

2. Give one common example of a chemical change you might see in a kitchen.

3. Is dissolving salt in water a chemical change? Why or why not?

4. List two signs that a chemical change has likely occurred.

5. What is the name for the new substance that is formed during a chemical change?

E. Challenge Questions

Think critically to answer these more difficult questions.

1. Photosynthesis is the process where plants use sunlight, water, and carbon dioxide to create their own food (glucose/sugar) and release oxygen. Explain why photosynthesis is a crucial chemical change for life on Earth.

2. When you drop an Alka-Seltzer tablet into water, it fizzes and dissolves. Is this a physical change, a chemical change, or both? Explain your answer.

3. When a log burns, it turns into a small pile of ash that weighs much less than the original log. Does this violate the law of conservation of mass (which states that mass is not created or destroyed)? Explain where the "missing" mass went.

4. Compare and contrast the rusting of iron and the burning of a candle. What is one key chemical element that is required for both of these chemical changes to occur? _____-

5. Are all chemical changes permanent and irreversible? Give an example to support your reasoning.

F. Word Problems & Application

Read the scenarios and answer the questions based on your knowledge of chemical changes.

1. Breakfast Time: You are making breakfast. You toast a slice of bread, which turns brown. You also melt some butter in a pan to cook an egg. The egg white turns from clear to white. Identify one chemical change and one physical change from this scenario and explain your choices.

2. First Aid: An instant cold pack gets cold when you squeeze it, mixing the water and ammonium nitrate inside. Is the process that makes the pack cold a chemical or physical change? What is the primary evidence?

3. Car Trouble: An old car has been left outside for years. Its red paint has faded in the sun, and in several places, the metal body has turned into a flaky, reddish-brown substance. Describe the chemical change happening to the metal.

4. Digestion: When you eat a cracker, your saliva begins to break down the complex starches in the cracker into simpler sugars. Why is this first step of digestion considered a chemical change?

5. Cleaning: You use a bathroom cleaner to remove soap scum. The cleaner fizzes slightly and the white, chalky scum disappears. What evidence suggests a chemical change has occurred?

G. True or False

1. Tearing a piece of paper is a good example of a chemical change. _____
2. A change in color is always a sign of a chemical change. _____
3. In a chemical change, the atoms themselves are destroyed and new atoms are created. _____
4. Rust is a new substance called iron oxide, formed when iron reacts with oxygen. _____
5. A change of state, like water freezing into ice, is a chemical change. _____