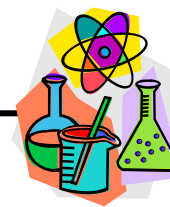


# Science 20-4 Unit A: Applications of Matter and Chemical Change



## Chemical Reactions

1. People use chemical compounds every day. Using a periodic table and other resources, identify the common names of the following compounds. Add at least three more examples to this list.

Compound	Common Name
NaCl	
NH <sub>3</sub>	
CO <sub>2</sub>	
C <sub>n</sub> H <sub>2n+1</sub> OH	

2. Using the ingredients labels of various household products (e.g., foods, cleaners), identify the chemical compounds they contain. Choose several of these compounds and figure out their chemical formulas. For example:

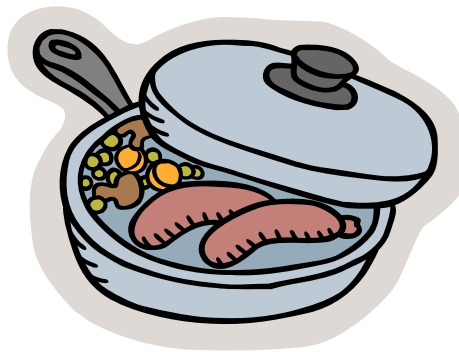


Toothpaste contains **sodium fluoride** (chemical formula = **NaF**).

Chemical changes happen all the time.

Everyday chemical changes include:

- digesting food
- burning wood
- cooking food
- rusting metals
- using solvents to clean up in the workplace.



3. Identify and list other chemical changes that occur in the home, school, workplace or community.



Using your list for ideas, discuss what evidence chemical changes produce, e.g., colour change, odour, change of phase, appearance, energy such as heat or light.

4. Investigate the chemical reactions and products created during fossil fuel combustion and rusting reactions. Explain the following equations in detail.

### Rusting Reaction

Word equation: iron + oxygen  $\longrightarrow$  rust (iron oxide)

Chemical equation:  $4\text{Fe} + 3\text{O}_2 \longrightarrow 2\text{Fe}_2\text{O}_3$

### Fossil Fuel Combustion Reaction

Word equation: hydrocarbon + oxygen  $\longrightarrow$  heat + water + carbon dioxide

Chemical equation:  $\text{C}_1\text{H}_2 + \text{O}_2 \longrightarrow \text{heat} + \text{H}_2\text{O} + \text{CO}_2$

5. Use a [scientific inquiry](#) process to investigate one or more of the following common chemical reactions. Consider questions like those below. Share your findings with the class.

- When baking soda and vinegar are combined, the reaction causes the solution to bubble. Many people pour baking soda and vinegar down their drains to clean them in an environmentally friendly way.



- What evidence is there of the chemical reaction?
- Which chemical would you need to increase to make it bubble more?
- How would that improve the solution's ability to clean a drain?

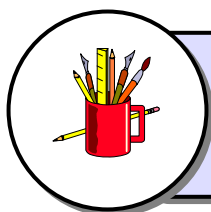
- Acetone is a chemical found in most nail polish removers. Nail polish is usually removed by soaking a cotton ball in an acetone solution and then wiping the finger nails. It is important to dispose of used cotton balls carefully because acetone can “eat through” many substances.



- What do you think would happen if acetone came into contact with styrofoam, plastic, tile, wood or coins?
- What evidence is there of the chemical reactions?

- Egg shells are made mostly of calcium and are fragile.

- How do you think acidic solutions, e.g., vinegar, lemon juice, cola, would affect egg shells?
- What evidence is there of the chemical reactions?
- What environmental issues does this knowledge bring up?

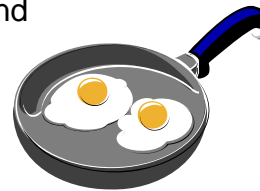


Use Tools [Planning an Experiment](#), [Experiment/Investigation Template II](#) and [Analyzing and Interpreting Experiment Results](#).

Heat is created or absorbed during chemical reactions.

**Endothermic reactions:** need to absorb heat for the reaction to take place. All cooking and baking is endothermic.

Example: when baking bannock, heat is absorbed and the dough changes to bread.



**Exothermic reactions:** create heat during the chemical reaction.

Example: burning wood.

6. Brainstorm endothermic and exothermic reactions that take place in the home, community and workplace, e.g., the reactions that start and burn gasoline in cars and other vehicles. Share your findings with the class.



7. Investigate and describe in your own words “composition” and “decomposition” reactions. Provide examples for each.

**composition reaction:**

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**decomposition reaction:**

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8. Identify examples of the following types of chemical reactions. Include a **word** and **formula** description of each example.

Type of Reaction	Example Description
composition	
decomposition	
neutralization	
combustion	