Science Module

8th Grade


HOT STUFF

TAKS Objective 3 – **The student will demonstrate an understanding of the structures and properties of matter.**

- Complex interactions occur between matter and energy.

TEKS 8.10 (C)

The student knows that complex interactions occur between matter and energy. The student is expected to:

identify and demonstrate that loss or gain of heat energy occurs during exothermic and endothermic chemical reactions.

Learning Objectives

1. identify endothermic and exothermic reactions associated with chemical changes
2. Explain the loss or gain of heat during chemical reactions
3. Identify chemical and physical changes associated with endothermic and exothermic reactions

Background

Heat- transfer of energy

Exothermic- heat energy EXITS the system

- ex. Combustion, evaporation of water
- surroundings usually feel warmer

Salt

An example of an exothermic reaction is the mixture of sodium metal and chlorine gas which yields table salt.

$2Na(s) + Cl_2(g) \rightarrow 2NaCl(s) + energy$

Endothermic- heat energy ENTERS the system

- ex. Cold packs, melting ice
- surroundings usually feel cooler

How do cold packs work?

The outer pouch contains water. The inner pouch contains **ammonium-nitrate.**

When you "pop" the inner pouch, the chemical reaction absorbs heat energy from the surroundings. This is an endothermic reaction.

The temperature of the solution falls to about 35 F for 10 to 15 minutes.

Photosynthesis

During photosynthesis, plants absorb the energy from the sun to convert carbon dioxide and water into glucose and oxygen.

sunlight + $6CO_2(g)$ + $6H_2O(l)$ → $C_6H_{12}O_6(aq)$ + $6O_2(g)$

Physical change- change in size, shape or state of matter

Chemical Reaction - process in which one or more substances are changed into others. Chemical reactions are accompanied by a loss or gain of energy.

True or False

Chemical reactions always produce heat

Chemical reactions can release or absorb heat, but can also create light, sound or electricity!

True or False

Heat can be lost, destroyed
or just disappear

Heat energy is transferred from one object to another, or is transferred to another form of energy, but never disappears.

Law of Conservation of Energy

True or False

Color change is always a physical property

Color is a physical property.

Color change can be the result of a chemical change.