

Lesson 6: Physical vs. Chemical Changes

Objective: Students will be able to analyze a change to determine evidence present to classify changes as either physical or chemical.

Learning goal: Physical changes do not change the substance, only change appearance. Chemical changes result in the formation of a new substance with different properties (due to the rearranging of atoms).

Vocabulary: physical change, chemical change, reactant, product, chemical equation

Engage:

1. Students research (use textbook/internet) definitions of physical and chemical changes and an example of each. Teacher can give more examples if necessary.
2. Students are then given a handout with examples of both type of changes (written out and pictures) and asked to classify each as either a physical change or chemical change, and give a reason for their choice (i.e. what is the evidence a new substance is produced)
3. Student answers can be gone over, but will be revisited and revised later

Explain/Explore:

4. Teacher demonstrates the burning of a candle and explains the reaction using the terms: reactant, product, chemical reaction
5. Students are asked to identify the reactants and products in this reaction (handout)
6. Students are shown how atoms are rearranged in the combustion reaction of methane:
http://www.middleschoolchemistry.com/multimedia/chapter6/lesson1#chemical_reaction_methane
Students are asked, “Where do the atoms come from that make up the compounds in the products?” This is the introduction to the conservation of mass and the idea of atoms being rearranged during chemical changes.
7. Students are reminded that the formation of a new substance (the product) is the key evidence for chemical changes.
8. Students now go back to the chemical changes they looked at in the engage portion and asked to identify the new substance, and for evidence that can be observed that proves a new substance was formed.
9. Students are asked “How they know a new substance is formed?” “Where did the atoms come from that formed the new substance?”
10. In groups students create a list of possible evidence to look for that proves a new substance has formed.
11. Students share the list of criteria to look for to prove a new substance and thus a chemical change has occurred: gas produced, solid produced, temperature change, new color formed, new properties observed.

Elaborate:

12. Students are given a handout with the chemical equations that show the reactions they categorized above.
 - a. Ice melting, water boiling, apple turning brown, wood burning, water forming, photosynthesis, etc.
13. Students label the reactants, products formed during the chemical reaction along with the evidence that proves the chemical change

Evaluation:

14. Handouts used during lesson