2023, April 22

Chemistry 2, Lesson 14

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Combustion

1. In a combustion reaction, oxygen combines with a substance and releases energy in the form of ___ and ___.

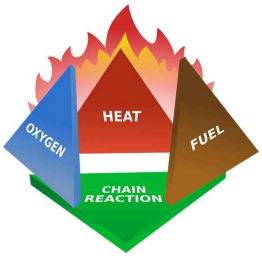
   heat, light

2. The "A New Job for Cowboys" article emphasizes how chemical reactions follow the law of conservation of mass that was discovered by Antoine Lavosier. The combustion reaction for fire is shown below. Based on what you learned so far, fill in the missing product below which accounts for the remaining mass in the reaction.

   Burning wood from trees + Oxygen → ashes + water vapor + ___

   carbon dioxide.

3. The blue flame created when using a gas stovetop is an example of a (**complete** | incomplete) combustion reaction because there is no soot created.
4. One simple way to visually describe the chemistry of fire is the fire tetrahedron shown below. This image shows the four required elements to create a combustion reaction (i.e. a fire).



   This is not a question, but a statement. I am confused by its presentation.

5. List three possible fuel sources that might be part of a combustion reaction.

   Wood, grass, or coal may fuel a combustion reaction.

6. Fire prevention is all about removing one of the four elements in the fire tetrahedron. Focus on one of the elements in the tetrahedron and explain how someone can prevent or extinguish a fire.

   Someone can prevent or extinguish a fire by removing strewn-about fuel from an area. Removing branches and leaves from the area surrounding a fire allows for some control of the fire's path.

Corrosion

1. Review the chemical equations for rust and tarnish. What is the main difference between rust and tarnish? (Hint: You might need a periodic table to help with your labeling/explanation).

   Tarnish is a replacement reaction, and rust is a combination reaction.

2. Most fine jewellery is made with precious metals, like silver, gold, and platinum. Why do you think that is the case?

   Fine jewellery is often made of precious metals, in part due to the lack of susceptibility to rusting.

3. Below is a picture of the Statue of Liberty. Since its original unveiling, it has undergone a chemical transformation. How do we know it has undergone a chemical change?

   No image of the Statue of Liberty is provided. I am given the impression that this question's preparation was either left unfinished or that the image was deleted in a digital format conversion. We know that the statue of liberty has undergone chemical change due to its change in color.

4. Though corrosion often carries a negative connotation, it is not always bad. For example, consider the Statue of Liberty again. At its unveiling in 1886, it was brown, like a copper penny. 20 years later, it had become green, as it still remains in the 21st century. This green layer is called a patina. Read the excerpt below, taken from a 1925 editorial from the New York Sun.

   "Salt air has given 'Miss Liberty' her present sea-green complexion, so often remarked from passing liners. Deep-sea winds brawling up the Narrows from Sandy Hook have oxidized her copper and provided a weatherproof coating, which, her custodians say, will make her last forever ... or as long as stone and metal hold together."
   — Copper.org

   Based on that excerpt, what is one main benefit of the layer of patina that has formed on the Statue of Liberty?

   A main benefit of the layer of patina that has formed on the Statue of Liberty is a unique and naturally occurring color palette.