

Answers to Sample chem.-phys problems pg1:

1. C. Creation of heat—because heat increased or decreased, this is evidence a chemical reaction occurred.
2. C. There is no fuel in the container—fire consumes oxygen as it burns. Without oxygen, there is no fire.
3. A. The water is still water—heat was added and taken away from this reaction, but the final substance is not new. It is still water.
4. C. Formation of water—a new substance being created is the best evidence of a chemical reaction. The mixture “popping” is often different and exciting, but does not guarantee a chemical reaction, however, the forming of a new substance does.

Answers to Sample chem.-phys problems pg2:

5. B. A new substance that formed from chemical change—Chemical changes produce new substances. Rust is an example of a new substance found on iron and other metals once they are exposed to water and oxygen.

Answers to Sample chem.-phys problems pg3:

1. B. This model best represent helium because helium has an atomic number of 2 which gives it 2 protons. Because it has 2 protons it will also have 2 electrons. Don't forget, protons belong in the nucleus with the neutrons and electrons go in the shells outside the nucleus.
2. D. Oxygen—the atomic number for oxygen is 8. This means it has 8 protons and 8 electrons.
3. B. 10—Hydrogen has (1) proton in each atom and there are 2 atoms present; Oxygen has (8) protons and there is 1 atom present. Total there are 10 protons in one molecule of H₂O or water.
4. A. Proton number—The proton number tells you what element it is because the number of protons is called the atomic number. The atomic number shows you its placement on the periodic table.

Answers to Sample chem.-phys problems pg4:

1. B. Is still in the beaker—because the sugar is still sugar and can be observed that way, a chemical reaction has not occurred. Evaporation is a phase change, not a chemical reaction.
2. C. Chemical Change—a new substance has formed so this is a chemical reaction or chemical change.
3. D. It causes a permanent color change—The permanent color change is an example of a new substance. Because it is “permanent” indicates that it cannot go back to its original color without the use of more chemicals for an additional chemical change.
4. D. The properties of the original substances change—When a new substance is formed during a chemical reaction, the properties of that substance change with it. EX: After a nail develops rust on it, it can no longer be used for its intended purpose...as a building material. It is weak and cannot withstand heavy loads or pressure.
5. A. Forms a new substance—when heat is added to substances they *usually* undergo chemical changes. Usually, but not always. Sometimes they will have phase changes. However, when the lemon juice turns brown, it changes to a new substance and is no longer lemon juice. It's properties have changed as well; it can now be seen, where as the original lemon juice could not have been seen.