

Dear parents or guardians,

Your son's or daughter's science class will soon begin exploring a unit entitled "Properties of Matter". In this unit, students will learn how physical and chemical properties are used to distinguish between different types of matter. Pure substances, mixtures, elements, and compounds will be investigated while exploring chemical reactions, conservation of matter and the Periodic Table of Elements. By the end of the unit, students should demonstrate a clear understanding of the unit's main ideas and should be able to discuss the following topics:

1. Physical and chemical properties that are used to identify and classify matter
  - *Mass and volume are used to determine the density of a substance*
  - *Physical properties can be seen and measured whereas chemical properties can only be observed in a chemical change.*
2. Compare and contrast pure substances (elements and compounds) and mixtures
  - *All the particles in a pure substance are identical and at least one particle is different from the rest in a mixture.*
  - *Elements are the simplest substances that can be obtained by physical or chemical means.*
  - *Mixtures can be separated by physical means whereas compounds must be separated chemically.*
3. The movement of and spacing between particles (atoms or molecules) in each of the four states of matter and changes in states of matter
  - *The temperature of a sample is determined by the kinetic energy of particles.*
  - *The spacing between the particles in a sample and the kinetic energy of the particles determine the state of matter of a substance.*
  - *Four states of matter are solid, liquid, gas, and plasma.*
4. Groups of atoms are reformed in chemical changes (reactions) and the Law of Conservation of Matter
  - *Chemical reactions take place when bonds between atoms are formed, broken, and/or reformed.*
  - *When a chemical reaction takes, the new substances (products) that are formed with have different chemical and physical properties than the starting substances (reactants).*
  - *The total mass of the reactants equals the total mass of the products. Mass cannot be created nor destroyed in a chemical reaction.*
5. The patterns of the Periodic Table of Elements can be used to predict chemical reactions between elements.
  - *Elements are identified by the atomic number (number of protons) in the nucleus of an atom of the element.*
  - *The period (horizontal row) of the Periodic Table correspond to the number of electron levels present in the elements of the period.*
  - *Elements in a group (a vertical column) of the Periodic Table share similar chemical properties including the number of valance electrons*
  - *The elements of the Periodic Table can be classified into the categories of metals, nonmetals, and metalloids. Metalloids share characteristics of both metals and nonmetals.*

### **Questions to Ask Along the Way**

You can help your child learn about these topics by asking interesting questions as he or she progresses through the unit. For example, you may wish to ask your child the following questions:

- How can you use density to determine if an object will float or sink?
- Do weight and mass mean the same thing?
- Is rust on an old car an example of a physical or chemical change?
- How could you separate a mixture of sand, sugar, and iron filings?
- What are some signs that a chemical change has taken place?
- Why is a ice cube melting a physical change and not a chemical change?
- How do forensic detectives use physical and chemical properties to help solve a crime?
- How can the position of an element on the Periodic Table be used to predict the properties of that element?

Thank you for your time and interest. Your participation in your child's education is a sure way to encourage learning!

Sincerely,