SCIENCE FUSION Physical Science

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PowerNotes

Unit 1 **Lesson 2** Properties of Matter

Physical Education

What are physical properties of matter?

- A characteristic of a substance that can be observed without changing the identity of the substance is called a **physical property**.
- All of the senses can be used to observe physical properties.

What are physical properties of matter?

- Mass and volume are physical properties.
- Changing the mass or volume of a substance does not change the substance's identity.
- The state of matter is a physical property. The state of matter is the physical form of the matter.
- Most matter exists as a solid, liquid, or gas.

What are physical properties of matter?

- Electrical conductivity is a measure of how well electric currents move through a substance.
- Density is the measure of the amount of matter in a given volume.
- Thermal conductivity is the rate at which a substance transfers heat.

What are physical properties of matter?

- Solubility is the ability of a substance to dissolve in another substance.
- Malleability is the ability of a substance to be rolled or pounded into various shapes.
- Magnetic attraction is also a physical property that can be observed.

What are physical properties of matter?

- The shine, or luster, of a metal can be easily observed.
- The melting point of a substance is the temperature at which it changes from a solid to a liquid.
- The boiling point of a substance is the point at which the substance boils.

Identity Theft

What are chemical properties of matter?

- A **chemical property** describes the ability of a substance to change into a new substance with different properties.

- The ability to rust or tarnish is a chemical property. When a metal rusts or tarnishes, it changes to a different substance.

What are chemical properties of matter?

- Chemical properties can be identified by the changes they produce.
- Flammability is the ability of a substance to burn.
- Reactivity is the ability of a substance to interact with another substance and form one or more new substances.

Property Boundaries

What is the difference between physical and chemical properties?

- Physical properties can be observed without changing the identity of a substance.
- Chemical properties can be observed only by changing the identity of a substance.

Identify Yourself

How can physical and chemical properties identify a substance?

- Properties unique to a substance are its *characteristic properties.*
- Characteristic properties stay the same regardless of the amount of the sample.
- Characteristic properties can be physical properties or chemical properties.

Change of Appearance

What are physical changes of matter?

- A **physical change** is a change that affects one or more physical properties of a substance.
- The appearance, shape, or size of a substance may be altered during a physical change.
- Physical changes, such as changes in state, do not change the chemical identity of a substance.

Change from the Inside

What are chemical changes of matter?

- A **chemical change** is the process by which one or more substances change into entirely new substances.
- Chemical changes are not the same as chemical properties.
- Burning is a chemical change; flammability is a chemical property.

What are chemical changes of matter?

- When the particles and chemical bonds that make up a substance are rearranged, a chemical change has taken place.
- Chemical changes are often influenced by temperature.
- Higher temperatures often mean faster chemical reactions.

Look for the Signs

How can you tell a chemical change has happened?

- There are several signs that a chemical reaction has occurred.
- Observing two or more of these signs during a change means you are likely observing a chemical change.

How can you tell a chemical change has happened?

- Odors can be produced during a chemical change.
- Fizzing and foaming may mean gases are being produced.
- The production of gas is often evidence of a chemical change.
- Boiling also can produce gas bubbles, but boiling is a physical change.

How can you tell a chemical change has happened?

- A *precipitate* is a solid that falls out of solution.
- The formation of a precipitate can indicate a chemical change.
- Energy that changes from one form to another can be evidence of a chemical change.
- Changes in temperature and color can be signs of a chemical change.

How can you tell a chemical change has happened?

- Will heating the water in this beaker cause a physical or chemical change?

Conservation Is the Law

What is the law of conservation of mass?

- French chemist Antoine Lavoisier studied chemical changes in which substances appeared to gain or lose mass.
- Lavoisier completed experiments in sealed bulbs to show conservation of mass during a reaction.

What is the law of conservation of mass?

- The **law of conservation of mass** states that in ordinary chemical and physical changes, mass is not created or destroyed. It is only transformed into different substances.

What is the law of conservation of mass?

- Physical changes are reversible and follow the law of conservation of mass.
- Mass is conserved during chemical changes. The mass of the starting materials is the same as the mass of the end products.