

Chapter 4 Summary

4.1 Studying Matter

Key Concepts

- When studying matter, it is important to know the location of safety equipment in your classroom and the meanings of the safety icons and WHMIS symbols.
- Matter can be classified according to its composition, as mixtures or pure substances.
- An element is a pure substance that cannot be broken down into simpler substances through physical or chemical methods.
- A compound is a pure substance that is composed of two or more elements, that are chemically combined. A compound can be broken down into its elements only by chemical methods.
- Elements and compounds are part of your daily life and include such things as water, salt, oxygen, carbon dioxide, and aluminum.
- The production and use of new chemicals can have both negative and positive consequences. Although we may benefit from their applications, potential negative consequences also need to be considered.



4.2 Physical Properties

Key Concepts

- A physical property of an element or a compound can be observed and measured without changing the identity of the substance.
- Qualitative physical properties include colour, odour, state, texture, lustre, and malleability. Quantitative physical properties include viscosity, melting point, boiling point, solubility, hardness, conductivity, and density.
- Density can be calculated by dividing the mass of a substance by its volume $D = \frac{m}{V}$.
- Diamonds are valuable as gemstones because they have high lustre, are transparent, and refract light brilliantly. Diamonds are useful for industrial applications because they are extremely hard, have very low reactivity with chemicals, and have low electrical conductivity.
- Water has many unique properties. It is present on Earth in all three states. It has a solid state that is less dense than its liquid state. It can absorb a large amount of heat. It has the ability to dissolve numerous essential chemicals and nutrients.



4.3 Chemical Properties

Key Concepts

- A chemical property of an element or a compound describes its ability to react with other substances and form new substances.
- Chemical properties of a substance include reactivity with other substances, combustibility, stability, and toxicity.
- The chemical properties of peroxide make it useful in hair dye. Nevertheless, there are hazards associated with its use that include skin and eye irritation.
- The stability and toxicity of a substance may influence its impact on the environment. For example, the toxic effects of DDT are made worse by its high stability.

