Matter and its properties  

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Subjects:  General Chemistry 1

Tags: Matter

Resources

Chemistry. (12th ed.)


Content Standard

The learners demonstrate an understanding of the properties of matter and its various forms

Performance Standard

The learners design using multimedia, demonstrations, or models, a representation or simulation of any of the following:

1. atomic structure
2. gas behavior
3. mass relationships in;
4. reactions

Learning Competencies

The learners recognize that substances are made up of smaller particles

The learners describe and/or make a representation of the arrangement, relative spacing, and relative motion of the particles in each of the three phases of matter

The learners distinguish between physical and chemical properties and give examples

The learners distinguish between extensive and intensive properties and give examples

The learners use properties of matter to identify substances and to separate them
The learners differentiate between pure substances and mixtures

The learners differentiate between elements and compounds

The learners differentiate between homogenous and heterogenous mixtures

The learners recognize the formulas of common chemical substances

The learners describe separation techniques for mixtures and compounds

The learners compare consumer products on the basis of their components for use, safety, quality and cost

Introduction 5 mins

INTRODUCTION (Five minutes)

1. Introduce the learning objectives by using the suggested protocol (Read-aloud):
   1. I will be able to describe the particulate nature of the different forms of matter
   2. I will be able to classify the properties of matter
   3. I will be able to differentiate pure substance and mixtures; elements and compounds; homogeneous and heterogeneous mixtures
   4. I will be able to recognize the formulas of some common substances
   5. I will be able to discuss methods to separate the components of a mixtures
   6. I will be able to recognize chemical substances present in some consumer products

2. Present the keywords for the concepts to be learned:
   1. Atoms
   2. Chemical properties
   3. Compounds
   4. Distillation
   5. Elements
   6. Extensive properties
   7. Filtration
   8. Gas
   9. Heterogeneous mixtures
   10. Homogeneous mixtures
   11. Intensive properties
   12. Ions
   13. Liquid
   14. Magnetic separation
   15. Mixtures
   16. Molecules
   17. Physical properties
   18. Pure substances
   19. Solid

Motivation 15 mins
Present two 60-mL plastic syringes with the needle removed and replaced by a seal. One syringe contains a small block of wood, while the other contains entrapped air. The plunger is set to touch the wood block, as shown below:

![Syringes Diagram]

Ask them what will happen if the plunger will be pushed down the syringe.

Then, make one learner push the plunger in the two syringes, and check if they have predicted the behavior of the plunger in the two syringes correctly.

Ask them to answer the question: Why is it easier to compress the entrapped air than the wood block?

Highlight that a particulate model for matter is very useful in explaining the properties of matter. Point out that some basic concepts on matter that have been introduced in junior high school will be reviewed in this lesson.

**Instruction/Delivery 60 mins**

Construct the following block diagram and make the learners fill it up using the keywords listed in the board.

![Particulate Model Diagram]

Ask them to answer the question: How do the following particles differ from each other?

- Atoms
- Molecules
- Ions

Construct the following block diagram and make them fill it up using the keywords listed in the board.

![States of Matter Diagram]

For the bottom layer of boxes, ask them to illustrate how the particles are distributed or arranged in each state of
matter using circles.

Ask them to answer the following questions:

1. How separated are the particles in each state of matter?
2. How free are the particles to move in each state of matter?

Ask them to classify the following substances according to the three states of matter:

1. Iron nail
2. Sugar
3. Syrup
4. Air
5. Ice
6. Alcohol

Construct the following block diagram and make them fill it up using the keywords listed in the board.

Ask them to answer the following questions:

1. What is the difference between physical properties and chemical properties?
2. How do the extensive properties differ from the intensive properties?

Ask them to classify the following examples as physical or chemical properties:

1. Melting of ice
2. Evaporation of water
3. Rusting
4. Digestion

Ask them to classify the following examples as intensive or extensive properties:

1. Boiling point
2. Weight
3. Volume
4. Density

Construct the following block diagram and make them fill it up using the keywords listed in the board.

Ask them to answer the question: How do pure substances differ from mixtures?

Present the following substances (or pictures of these substances), and ask them to answer the question: Which of the following are pure substances and which are mixtures?

1. Table sugar
2. Table salt
3. Iodized salt
4. Brown sugar
5. Distilled water
6. Soft drinks
7. Oxygen gas (in tank)
8. Human breath

Ask them to answer the question: What is the difference between elements and compounds? Give examples of each.
Ask them to answer the question: What is the difference between homogeneous and heterogeneous mixtures?

Present the following mixtures (or pictures of these mixtures), and ask them the question: Which of the following are homogeneous mixtures? Which are heterogeneous mixtures?

1. Rubbing alcohol
2. Mixture of water and oil
3. Mixture of salt and pepper
4. Carbonated soft drink
5. Human breath

Construct the following block diagram and make them fill it up using the keywords listed in the board.

Learner prompt: Look at this diagram. Give three common ways to separate the components of a mixture?

Ask them to answer the question: When can each method be used in separating the components of a mixture?

Ask them to answer the question: How can the following components of the following mixtures be separated?

- Salt from salt water
- Salt from a mixture of iron and salt

Enrichment 0 mins

Enrichment

Evaluation 10 mins

1. Make them do an activity wherein they will apply the visualization of matter to classify pure substances, mixtures, elements, and compounds. See attached sheet.
2. Written task (assignment): Classify some substances found in the kitchen and in the bathroom as pure substances or mixtures; elements or compounds; and homogeneous or heterogeneous mixture.
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