InterActions Unit 1 Chapter 3 Sample Quiz KEY

Make sure you review all the sample quizzes/exams from the unit. Unit exams are comprehensive.

Use your Scientists' Consensus Ideas sheets for assistance.

1. A characteristic property is

    a. a measurable property that is unique about the object such as its mass and volume.

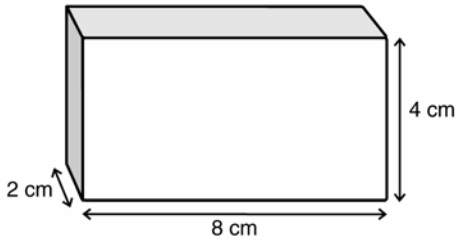
    b. a measurable property that tells you something about the object such as its color and shape.

    c. any property that describes the object.

    d. a measurable property that is unique about the material the object is made of.

    Characteristic properties help you decide what kind of material an object is made of. Characteristic properties are different for different kinds of materials. This question asks you the definition of "characteristic property." The science words you might need to define are located in the margins of your textbook. The glossary is also a good way to look up the definition of words.

2. Calculate the volume of the rectangular solid shown (width=8 cm, height = 4 cm, depth = 2 cm)



a. 24 cm^3.

b. 16 cm^3.

c. 8 cm^3.

d. 64 cm^3.

e. There is not enough information to determine an answer.

The volume is calculated using the formula

$$Volume = width \times height \times depth$$
$$= 8\,cm \times 4\,cm \times 2\,cm$$
$$= 64\,cm^3$$

This question asks you to calculate the volume of a rectangular solid using a mathematical formula.

3. Don has a block of mass 500 g and width, height, and depth of 5.7 cm each. Using the table of densities, what is the block made of?

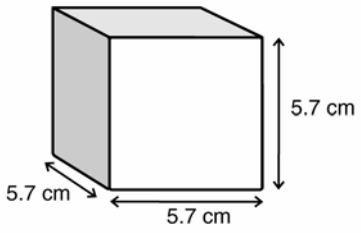
   a. Antifreeze

   b. Salt water

   c. Tin

   d. Aluminum

   e. Acetic Acid



The volume is the calculated using the formula

$$\begin{aligned} Volume &= width \times height \times depth \\ &= 5.7\,cm \times 5.7\,cm \times 5.7\,cm \\ &= 185.2\,cm^3 \end{aligned}$$

The density of the block is calculated using the formula

$$\begin{aligned} density &= \frac{mass}{volume} \\ &= \frac{500\,g}{185.2\,cm^3} \\ &= 2.7\,\frac{g}{cm^3} \end{aligned}$$

This value is in the *Table of Densities* in the *InterActions'* Appendix. It is the density of aluminum. To answer this question you need to know how to calculate volume, density, and how to look up the density of materials in a table of densities.

4. Possible evidence for an interaction between two objects of like electric charge (either both positive or both negative) is

    a. one object moves away from the other

    b. one object moves toward the other

    c. neither repel nor attract

    d. There is not enough information to answer the question.

    Like charges repel each other. This is a defining characteristic of the electric-charge interaction. To answer this question you need to know this defining characteristic of the electric-charge interaction and use it.

5. Electrically charged objects

    a. always attract uncharged objects

    b. sometimes attract uncharged objects

    c. neither repel nor attract uncharged objects

    d. There is not enough information to answer the question.

    Electrically charged objects attract uncharged objects. This is a defining characteristic of an electric-charge interaction. To answer this question you need to know this defining characteristic of the electric-charge interaction and use it.

6. Magnets

    a. attract all metal objects

    b. attract some metals objects

    c. neither repel nor attract metal objects

    d. There is not enough information to answer the question.

    Magnets attract some metal objects, those that are magnetic materials. This is a defining characteristic of the magnetic interaction. To answer this question you need to know this defining characteristic of the magnetic interaction and use it.

7. To make an electromagnet you could

   a. electrically charge a magnet by rubbing it with a piece of cloth.

   b. magnetize an electrically charged object by rubbing it with a piece of cloth.

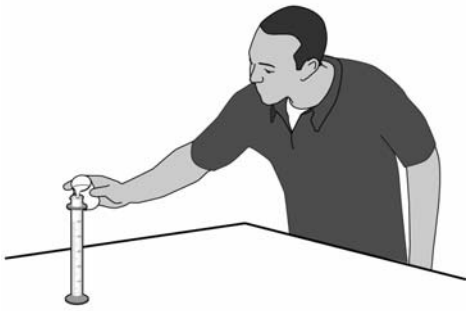
   c. connect a magnet in a closed electric circuit with a battery

   d. connect a magnetic material in a closed electric circuit with a battery.

   e. coil a wire around magnetic material and connect it in a closed circuit with a battery.

   You could make an electromagnet by coiling a wire around a magnetic material and connecting the wire to an electrical source like a battery. To answer this question you need to know what an electromagnet is.

8. Officer Brown has discovered some unknown liquid at the scene of a crime. He wishes to determine what it is. He collects 3 g of the liquid and places it in a graduated cylinder. The volume of the liquid is 2.68 cm^3. What is the liquid?



   The liquid can be determined by calculating the density of the material.

$$density = \frac{mass}{volume}$$

$$= \frac{3\,g}{2.68\,cm^3}$$

$$= 1.12\,\frac{g}{cm^3}$$

   This is the density of antifreeze.

   Characteristic properties such as density can be used to determine what a substance is made of. To answer this question you need to know that density is a characteristic property that can be used to identify substances, and you need to know how to compute density. Use the *Table of Densities* in the *InterActions'* appendix.

9. Amalie is trying to determine what two wires are made of, and whether or not they are made of the same material. She measures the electrical conductivity of the wires and determines the electrical conductivity of the wires to be 995 mA and 996 mA. She then calculates the uncertainty in her measurements to be 1 mA. Hence one wire has an electrical conductivity between 994 and 996 mA, and the other between 995 and 997 mA. From the electrical conductivity alone she can only determine that these wires may be made of tin or copper. What can Amalie do to determine what the two wires are made of?

She could calculate their densities by measuring each wire's mass and dividing it by its volume. The density of copper and tin are very different. Copper has a density of 8.9 g/cm^3 and tin has a density of 5.8 g/cm^3.

Characteristic properties such as density and electrical conductivity can be used to determine what a substance is made of. To answer this question you need to know what a characteristic property is. Use the *Table of Densities* in the *InterActions'* appendix.