

2.2: Module 2 Practice

Classify Matter

Exercise 2.2.1

Classify each as an element, compound, homogeneous mixture, or heterogeneous mixture.

- a) iodine (I_2)
- b) sodium bicarbonate (baking soda, $NaHCO_3$)
- c) a slice of watermelon
- d) 10% solution of glucose in water
- e) glucose ($C_6H_{12}O_6$)

Answer a

element (some elements exist as diatomic molecules)

Answer b

compound (has chemical formula with more than one element)

Answer c

heterogeneous mixture

Answer d

homogeneous mixture

Answer e

compound

Extensive and Intensive Properties

Exercise 2.2.1

Tell whether each is an extensive or intensive property.

- (a) length
- (b) mass
- (c) temperature
- (d) the weight of a piece of clay
- (e) the color of the clay
- (f) the price of a bunch of apples
- (g) the price per pound of the apples

Answer (a)

Extensive

Answer (b)

Extensive

Answer (c)

Intensive

Answer (d)

Extensive

Answer (e)

Intensive

Answer (f)

Extensive

Answer (g)

Intensive

Change

Exercise 2.2.1

Determine whether each is a chemical or physical change.

- a) You wipe off some nail polish with a cotton ball that has acetone (nail polish remover) on it.
- b) You leave a can outside and it gets rusty.
- c) You melt a piece of lead in a furnace.
- d) You dissolve some salt in water.
- e) You use some 2-component epoxy glue that hardens after being mixed.

Answer a

Physical change (No change in substance identity. Colorful polish dissolves in acetone and moves from nail to cotton ball.)

Answer b

Chemical change (Iron plus oxygen becomes iron oxide.)

Answer c

Physical change (solid to liquid)

Answer d

Physical change (No change in substance identity. Just mixing.)

Answer e

Chemical change (Change in substance identity. Epoxy adhesives have interesting chemical changes. They undergo polymerization and cross-linking.)

Temperature Conversions

Exercise 2.2.1

Convert each Celsius temperature to Fahrenheit and to Kelvin. Use correct significant digits.

- a) 62.7 °C
- b) 4.8 °C
- c) -51.7 °C

Answer a

145 °F, 335.9 K

Answer b

40.6 °F, 278.0 K

Answer c

– 61.1 °F, 221.5 K

Convert each Kelvin temperature to Celsius and to Fahrenheit. Use correct significant digits.

d) 342.70 K

e) 184 K

f) 288.4 K

Answer d

69.55 °C, 157.2 °F

Answer e

– 89 °C, – 130 °F

Answer f

15.3 °C, 59.5 °F

Heat and Specific Heat

Exercise 2.2.1

The specific heat of copper is 0.385 J/g°C. What is it in cal/g°C? (Remember 1 cal = 4.184 J exactly)

Answer

0.0920 cal/g°C

Exercise 2.2.1

Your protein bar is 190 Cal. How much energy is that in J and in kJ? (Remember 1 Cal = 1 kcal = 1000 cal)

Answer

790000 J or 790 kJ

Exercise 2.2.1

You have a piece of metal with a mass of 64.85 g. You find that it takes 293 cal to heat the metal from 22.7 °C to 58.8 °C. What is the specific heat of the metal?

Answer

0.125 cal/g°C

Phase Changes

Theory and Law

Exercise 2.2.1

Tell whether each statement is most similar to a hypothesis, observation, theory, or law.

This box of cereal is less expensive than that one.

Answer

observation

The larger the box of cereal, the lower the price per ounce is.

Answer

law

If I buy the largest package of food I can eat before it goes stale, I will save money on groceries.

Answer

hypothesis

The cost associated with packaging plays an important role in setting the price of groceries. For the size of the packaging, the cost does not increase proportionally to the volume. Therefore, the fraction of the price that is going towards packaging is smaller for larger sizes.

Answer

theory

Precision and Accuracy

Exercise 2.2.1

You used a calibration mass to test three balances. The mass is 25.000 g. Your results are below.

	Balance A	Balance B	Balance C
Trial 1	24.81 g	24.97 g	24.57 g
Trial 2	24.69 g	25.28 g	24.69 g
Trial 3	24.93 g	24.93 g	24.63 g
Trial 4	25.09 g	25.06 g	24.66 g
Trial 5	25.33 g	25.11 g	24.55 g
Average	24.97 g	25.07 g	24.62 g
Standard Deviation	0.25 g	0.14 g	0.06 g

Which balance is the most precise?

Answer

Balance C. (It has the lowest standard deviation. The trials are closest together.)

Which balance is the least precise?

Answer

Balance A.

Which balance is the most accurate?

Answer

Balance A. (The average value is closest to 25.000 g)

Which balance is the least accurate?

Answer

Balance C.

What is the percent error of balance B? (Use the average measurement to calculate.)

Answer

0.3 %.

2.2: Module 2 Practice is shared under a [not declared](#) license and was authored, remixed, and/or curated by LibreTexts.