Name _____ Date _____

Analyzing Data

Section 2 Scientific Notation and Dimensional Analysis

Main Idea — **Details**

Scan *Section 2 of your text. Use the checklist below as a guide.*

- Read all section titles.
- Read all boldfaced words.
- Read all tables and graphs.
- Look at all pictures and read the captions.
- Think about what you already know about this subject.

Write *three facts you discovered about scientific notation and dimensional analysis.*

1. _____

2. _____

3. _____

New Vocabulary *Use your text to define each term.*

scientific notation _____

_____

dimensional analysis _____

_____

conversion factor _____

Academic Vocabulary *Define the following term.*

sum _____

Name _____ Date _____

Section 2 Scientific Notation and Dimensional Analysis (continued)

Main Idea **Details**

Scientific Notation

Use with Example Problem 2, page 41.

Solve *Read Example Problem 2 in your text.*

You Try It

Problem

Change the following data into scientific notation:

a. The distance between Pluto and the Sun is 5,913,000 km.

b. The density of nitrogen gas, a major component of Pluto's atmosphere, is .0012506 g/cm^3.

1. Analyze the Problem

Known: _____

Unknown: _____

You are given two measurements. In both cases, the answers will be factors between 1 and 10 that are multiplied by a power of ten.

2. Solve for the Unknown

Move the decimal point to produce a factor between 1 and 10. Count the number of places the decimal point moved and the direction.

a. _____ *The decimal point moved ____ places to the ____.*

b. _____ *The decimal point moved ____places to the _____.*

Remove the extra zeros at the end or beginning of the factor.

Multiply the result by 10^n where n equals the _____.

_____. When the decimal point moves to the left, n is a _____ number. When the decimal point moves to the right, n is a _____ number. Remember to add units to the answers.

a. _____

b. _____

3. Evaluate the Answer

The answers have _____ factors. The first factor is a number between _____ and _____. In answer a, because the distance to Pluto is a large number, 10 has a _____ exponent. In answer b, because the density of nitrogen gas is a very small number, the exponent is _____.

Section 2 Scientific Notation and Dimensional Analysis (continued)

Main Idea

Using Conversion Factors

Use with Example Problem 4, page 46.

Details

Solve *Read Example Problem 4 in your text.*

You Try It

Problem

The Cassini probe heading toward Saturn will reach speeds of 5.2 kilometers per second. How many meters per minute would it travel at this speed?

1. **Analyze the Problem**

   Known: _____

   Unknown: _____

   You need conversion factors that relate kilometers to meters and seconds to minutes. A conversion factor is a _____ of _____ used to express _____ in _____.

2. **Solve for the Unknown**

   First convert kilometers to meters. Set up the conversion factor so that the kilometer units will cancel out.

$$\frac{5.2\ \text{km}}{\text{s}} \times \frac{1000\ \text{m}}{1\ \text{km}} = \frac{\quad\text{m}}{\text{s}}$$

   Next convert seconds to minutes. Set up the conversion factor so that the seconds will cancel out.

$$\frac{5200\ \text{m}}{\text{s}} \times \frac{60\ \text{s}}{1\ \text{min}} = \frac{\quad\text{m}}{\text{min}}$$

3. **Evaluate the Answer**

   To check your answer, you can do the steps in reverse order.

$$\frac{5.2\ \text{km}}{\text{s}} \times \frac{60\ \text{s}}{1\ \text{min}} = \frac{312\ \text{km}}{\text{min}} \times \frac{1000\ \text{m}}{\text{km}} = \frac{\quad\text{m}}{\text{min}}$$