

# ***FACULTY NOTES***

The LTAs and Spinoffs are designed so that each professor can implement them in a way that is consistent with his/her teaching style and course objectives. This may range from using the materials as out-of-class projects with minimal in-class guidance to doing most of the work in class. The LTAs and Spinoffs are amenable to small group cooperative work and typically benefit from the use of some learning technology. Since the objective of the LTAs and Spinoffs is to support the specific academic goals you have set for your students, the Faculty Notes are not intended to be prescriptive. The purpose of the Faculty Notes is to provide information that assists you to take full advantage of the LTAs and Spinoffs. This includes suggestions for instruction as well as answers for the exercises.



## FACULTY NOTES

### SPINOFF 8B

#### Unit Analysis

This Spinoff is on the topic of unit conversions. Throughout the LTA, students must convert from one unit or rate to another. While it is possible to do this by multiplication or division or proportion, it is much more efficient to use unit fractions. Since this is an important tool for science, this is a good place for students to learn the technique. This works quite nicely as a homework assignment before starting the LTA.

#### Solutions

1) Answers will vary. Possibilities include: 5280 feet = 1 mile and 1000 grams = 1 kilogram

$$2) \frac{60 \text{ seconds}}{1 \text{ minute}} \text{ or } \frac{1 \text{ minute}}{60 \text{ seconds}}$$

3) Answers vary according to the answers for exercise 1.

$$4) \frac{7200 \text{ seconds}}{1} \times \frac{1 \text{ minute}}{60 \text{ seconds}} \times \frac{1 \text{ hour}}{60 \text{ minutes}} = 2 \text{ hours}$$

$$5) \frac{110 \text{ feet}}{1 \text{ second}} \times \frac{1 \text{ mile}}{5280 \text{ feet}} \times \frac{60 \text{ seconds}}{1 \text{ minute}} \times \frac{60 \text{ minutes}}{1 \text{ hour}} = 75 \text{ miles/ hour}$$

$$6) \frac{100 \text{ square feet}}{1} \times \frac{144 \text{ square inches}}{1 \text{ square foot}} = 14,400 \text{ square inches}$$

$$7) \frac{50 \text{ cubic feet}}{1} \times \frac{1728 \text{ cubic inches}}{1 \text{ cubic foot}} \times \frac{16.387064 \text{ cubic centimeters}}{1 \text{ cubic inch}}$$

$$= 1,415,842.33 \text{ cubic centimeters}$$

$$8) \frac{56,633 \text{ cubic centimeters}}{1} \times \frac{1 \text{ cubic inch}}{2.54^3 \text{ cubic centimeters}} \times \frac{1 \text{ cubic foot}}{1728 \text{ cubic inches}} = 2.00 \text{ cubic feet}$$

9) Answers will vary, but all should convey the idea that converting from a larger to a smaller unit produces a larger numerical answer, and converting from a smaller to a larger unit yields a smaller numerical answer.