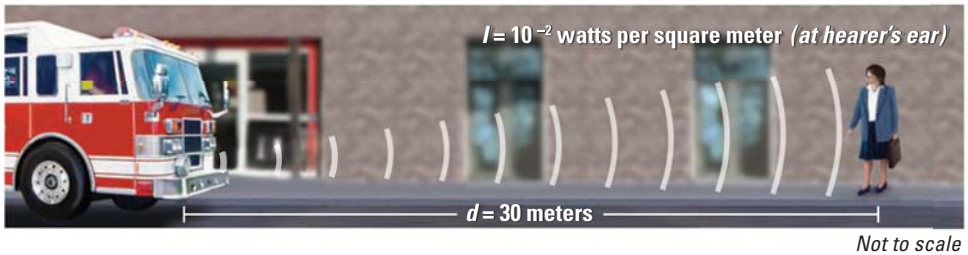
56. SCIENCE Diffusion is the movement of molecules from one location to another. The time t (in seconds) it takes molecules to diffuse a distance of x centimeters is given by $t = \frac{x^2}{2D}$ where D is the diffusion coefficient.

a. You can examine a cross section of a drop of ink in water to see how the ink diffuses. The diffusion coefficient for the molecules in the drop of ink is about 10^{-5} square centimeter per second. How long will it take the ink to diffuse 1 micrometer (10^{-4} centimeter)?

b. Check your answer to part (a) using unit analysis.

57. TAKS REASONING The intensity of sound I (in watts per square meter) can be modeled by $I = 0.08Pd^{-2}$ where P is the power (in watts) of the sound's source and d is the distance (in meters) that you are from the source of the sound.



Not to scale

a. What is the power (in watts) of the siren of the firetruck shown in the diagram?

b. Using the power of the siren you found in part (a), simplify the formula for the intensity of sound from the siren.

c. *Explain* what happens to the intensity of the siren when you double your distance from it.

58. CHALLENGE Coal can be burned to generate energy. The heat energy in 1 pound of coal is about 10^4 BTU (British Thermal Units). Suppose you have a stereo. It takes about 10 pounds of coal to create the energy needed to power the stereo for 1 year.

a. About how many BTUs does your stereo use in 1 year?

b. Suppose the power plant that delivers energy to your home produces 10^{-1} pound of sulfur dioxide for each 10^6 BTU of energy that it creates. How much sulfur dioxide is added to the air by generating the energy needed to power your stereo for 1 year?

MIXED REVIEW FOR TAKS

TAKS PRACTICE at classzone.com

REVIEW Lesson 8.1; TAKS Workbook

59. TAKS PRACTICE Which expression describes the area in square units of a rectangle that has a width of $3x^3y^2$ and a length of $2x^4y^3$? *TAKS Obj. 5*

Ⓐ $6xy$ Ⓑ $6x^7y^5$ Ⓒ $6x^7y^6$ Ⓓ $6x^{12}y^6$

REVIEW TAKS Preparation p. 836; TAKS Workbook

60. TAKS PRACTICE The edge length of one cube is 3 times the edge length of another cube. How many times greater is the volume of the first cube than the volume of the second cube? *TAKS Obj. 8*

Ⓕ 3 Ⓖ 9 Ⓗ 27 Ⓙ 81

EXTRA PRACTICE for Lesson 8.3, p. 945 **ONLINE QUIZ** at classzone.com