

Units of Measurement: Problems

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1. The speed of light is roughly 3×10^8 m/s. Convert it to miles per hour, given that 1 mi = 1.61 km.
2. Convert 35 kilometers to centimeters.
3. Pick the option that makes the most sense and *explain why you picked it*. You want to know how much total energy is required to operate a 100 watt lightbulb. Do you need any more information? (a) No. (b) Yes; you need to know the temperature of the light bulb when it is on. (c) Yes; you need to know how long the light bulb is on.
4. Your car gets 43 miles to the gallon. 1 gal = 3.79 L. One liter of gas is \$1.11. If 1 mi = 1.61 km, how much would it cost for you to drive 643 km?
5. You burn 300 Calories while doing an aerobics class for 45 minutes. What is your average power during the class, in watts? Is it enough to keep a 100-watt light bulb shining? Recall that 1 Cal = 4184 joule, and $1 \text{ watt} = 1 \frac{\text{joule}}{\text{s}}$.
6. Operating at full capacity, the Fort St. Vrain Nuclear Power Station in Colorado can generate 740 megawatts of power. Nuclear fission of 1 kilogram of uranium-235 releases 16 million kilowatt-hours of energy. How much energy, in kilowatt-hours, can the plant generate in a 30-day month? How much uranium-235, in kilograms, is needed by the plant each month? If a typical home uses 1000 kilowatt-hours per month, how many homes can this power plant supply with energy?