

METRIC SYSTEM

base units length = meter (m)
 volume = liter (L) $1 \text{ mL} = 1 \text{ cm}^3$
 mass = gram (g)

prefixes 1,000,000 micro _____ = 1 _____
 1,000 milli _____ = 1 _____
 100 centi _____ = 1 _____
 1 kilo _____ = 1000 _____

The earth contains approximately 1.35×10^{21} L of H_2O . How many cubic miles of H_2O is this?

(1 mile = 5280 ft 1 inch = 2.54 cm)

$$1.35 \times 10^{21} \cancel{\text{L}} \times \frac{1000 \cancel{\text{mL}}}{1 \cancel{\text{L}}} \times \frac{1 \cancel{\text{cm}^3}}{1 \cancel{\text{mL}}} \times \frac{1^3 \cancel{\text{in}^3}}{2.54^3 \cancel{\text{cm}^3}} \times \frac{1^3 \cancel{\text{ft}^3}}{12^3 \cancel{\text{in}^3}} \times \frac{1^3 \text{ miles}^3}{5280^3 \cancel{\text{ft}^3}}$$

$$= 3.24 \times 10^8 \text{ miles}^3$$

3% is fresh water, 69% of fresh water locked in polar caps
 miles³ in polar caps?

$$3\% = \frac{3}{100}$$

$$3.24 \times 10^8 \text{ miles}^3 \text{ H}_2\text{O} \times \frac{3 \text{ fresh H}_2\text{O}}{100 \text{ H}_2\text{O}} \times \frac{69 \text{ caps H}_2\text{O}}{100 \text{ fresh H}_2\text{O}}$$

$$= 6.71 \times 10^6 \text{ miles}^3 \text{ H}_2\text{O polar caps}$$

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Prudhoe Bay, Alaska 9.6×10^9 barrels of oil

1 barrel oil = 42 gallons oil

↳ 19.5 gallons gas

March 2005

U.S. gas consumption
3700 gal/sec

average car 33 miles/gallon

3700 gal = 1 sec

- ① How many miles could the average car drive if all the P.B. oil were refined into gasoline?

$$9.6 \times 10^9 \text{ barrels oil} \times \frac{19.5 \text{ gal gas}}{1 \text{ barrel oil}} \times \frac{33 \text{ miles}}{1 \text{ gal gas}}$$

$$= 6.2 \times 10^{12} \text{ miles}$$

- ② At the March 2005 rate of consumption, how many days would the oil last

$$9.6 \times 10^9 \text{ barrels oil} \times \frac{19.5 \text{ gal gas}}{1 \text{ barrel oil}} \times \frac{1 \text{ sec}}{3700 \text{ gal gas}}$$

$$\times \frac{1 \text{ min}}{60 \text{ sec}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1 \text{ days}}{24 \text{ hrs}} = 586 \text{ days}$$