

Appendix A: Units, Scales, and Conversion Factors

A

CONVERSION FACTORS

Area

1 square kilometer (km^2) =
0.386 square mile
247 acres
100 hectares
1 square mile =
2.59 square kilometers (km^2)
640 acres
259 hectares
1 hectare = 2.47 acres

Length

1 meter = 39.37 inches
1 kilometer = 0.6214 miles

Weight

1 kilogram (kg) = 2.2046 pounds (lb)
1 pound (16) = 0.454 kilogram (kg)
1 metric tonne (ml) (or "long ton") =
1,000 kilograms or 2,204 lbs
1 short ton = 2,000 pounds or 907 kg

Energy

1 Exajoule = 0.9478 quads
1 Gigajoule (GJ) = 0.9478 million Btu
1 MegaJoule (MJ) = 0.9478 thousand Btu
1 quad (quadrillion Btu) =
1.05x 10^{18} Joules (J)
1.05 exajoules (EJ)
4.20x 10^7 metric tonnes, coal
1.72x 10^8 barrels, oil
2.34x 10^7 metric tonnes, oil
2.56x 10^{10} cubic meters, gas
5.8x 10^7 metric tonnes dry wood
2.92x 10^{11} kilowatthours
1 kilowatthour =
3410 British thermal units (Btu)
3.6x 10^6 Joules (J)
1 Joule =
9.48x 10^{-4} British thermal unit (Btu)
2.78x 10^{-7} kilowatthours (kWh)
1 British thermal unit (Btu) =
2.93x 10^{-4} kilowatthours (kWh)
1.05x 10^3 Joules (J)

Volume

1 liter (l) =
0.264 gallons (liquid, U. S.)
6.29x 10^{-3} barrels (petroleum, U. S.)
1x 10^{-3} cubic meters (m^3)
3.53x 10^{-2} cubic feet (ft^3)
1 gallon (liquid, U.S.) =
3.78 liters (l)
2.38x 10^{-2} barrels (petroleum, U. S.)
3.78x 10^{-3} cubic meter (m^3)
1.33x 10^{-1} cubic feet (ft^3)
1 barrel (bbl) (petroleum, U. S.) =
1.59x 10^2 liters (l)
42 gallons (liquid, U. S.)
1 cord wood =
128 cubic feet (ft^3) stacked wood
3.62 cubic meters (m^3) stacked wood

Temperature

From Celsius to Fahrenheit:
 $((9/5) \times (^{\circ}\text{C})) + 32 = ^{\circ}\text{F}$

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From Fahrenheit to Celsius:

$$(5/9) \times ({}^{\circ}\text{F} - 32) = {}^{\circ}\text{C}$$

Temperature changes:

- To convert a Celsius change to a Fahrenheit change:

$$9/5 \times (\text{change in } {}^{\circ}\text{C}) = \text{change in } {}^{\circ}\text{F}$$

| To convert a Fahrenheit change to a Celsius change:

$$5/9 \times (\text{change in } {}^{\circ}\text{F}) = \text{change in } {}^{\circ}\text{C}$$

Example: a 3.0°C rise in temperature = a 5.4 °F rise in temperature

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