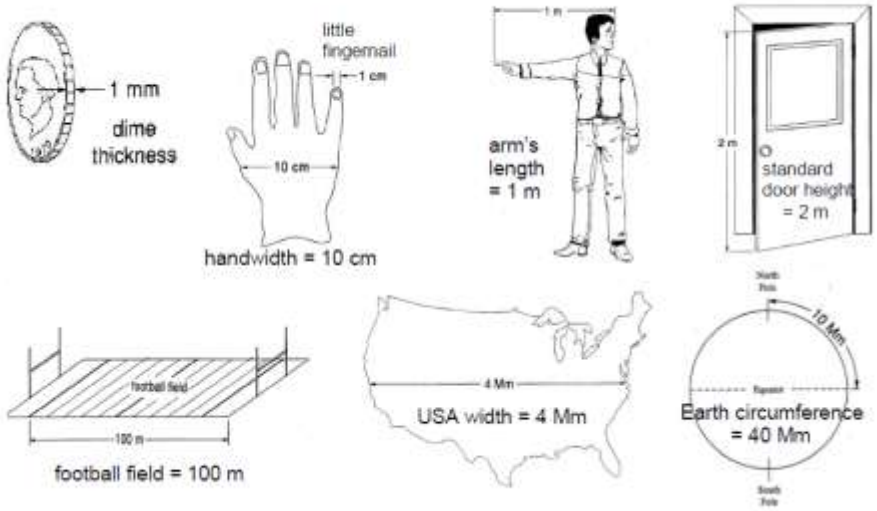
**Measurement Standards & Examples**

## Table 1 Prefixes

| Symbol | Prefix | Factor |
|---|---|---|
| Y | yotta | $10^{24}$ |
| Z | zetta | $10^{21}$ |
| E | exa | $10^{18}$ |
| P | peta | $10^{15}$ |
| T | tera | $10^{12}$ |
| G | giga | $10^{9}$ |
| M | mega | $10^{6}$ |
| k | kilo | $10^{3}$ |
| h | hecto | $10^{2}$ |
| da | deka | $10^{1}$ |
| | | $10^{0} = 1$ |
| d | deci | $10^{-1}$ |
| c | centi | $10^{-2}$ |
| m | milli | $10^{-3}$ |
| μ | micro | $10^{-6}$ |
| n | nano | $10^{-9}$ |
| p | pico | $10^{-12}$ |
| f | femto | $10^{-15}$ |
| a | atto | $10^{-18}$ |
| z | zepto | $10^{-21}$ |
| y | yocto | $10^{-24}$ |

| | |
|---|---|
| Ym | the universe |
| Zm | galaxies |
| Em | farther stars |
| Pm | nearer stars |
| Tm | solar system |
| Gm | star diameters |
| Mm | planets |
| km | cities |
| m | arm's length |
| cm | little fingernail width |
| mm | dime thickness |
| µm | bacteria |
| nm | viruses |
| pm | atoms |
| fm | protons, neutrons |

## Figure 1. Length examples: multiples of meter



Multiples of the cubic meter form nesting cubes (below). As the sides increase 10 times, the volume increases 1000 times.

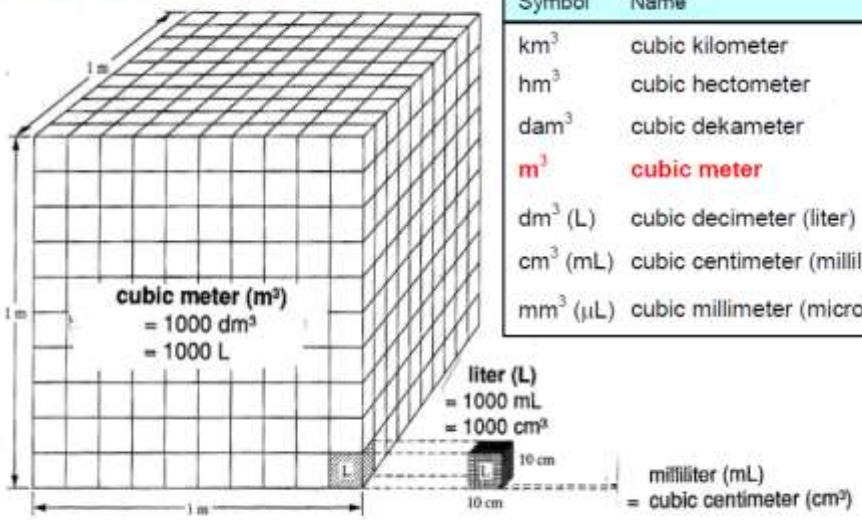



**Table 4 Volume: common multiples of cubic meter**

| Symbol | Name | Equals | Example |
|---|---|---|---|
| $km^3$ | cubic kilometer | $10^9$ $m^3$ | mountain |
| $hm^3$ | cubic hectometer | $10^6$ $m^3$ | large building |
| $dam^3$ | cubic dekameter | $10^3$ $m^3$ | large house |
| $m^3$ | **cubic meter** | $10^0$ $m^3$ | desk |
| $dm^3$ (L) | cubic decimeter (liter) | $10^{-3}$ $m^3$ | bottle |
| $cm^3$ (mL) | cubic centimeter (milliliter) | $10^{-6}$ $m^3$ | bean |
| $mm^3$ (μL) | cubic millimeter (microliter) | $10^{-9}$ $m^3$ | sand grain |

**Figure 2. Volume: multiples of cubic meter**

| Table 5 Area: common multiples of square meter | | | |
|---|---|---|---|
| Symbol | Name | $m^2$ | Equals |
| $Mm^2$ | square megameter | = $10^{12}$ $m^2$ | = 1 000 000 $km^2$ |
| $km^2$ | square kilometer | = $10^6$ $m^2$ | = 100 $hm^2$ = 100 ha |
| $hm^2$ (ha) | square hectometer (hectare) | = $10^4$ $m^2$ | = 10 000 $m^2$ |
| **$m^2$** | **square meter** | = $10^0$ $m^2$ | = 10 000 $cm^2$ |
| $cm^2$ | square centimeter | = $10^{-4}$ $m^2$ | = 100 $mm^2$ |
| $mm^2$ | square millimeter | = $10^{-6}$ $m^2$ | |

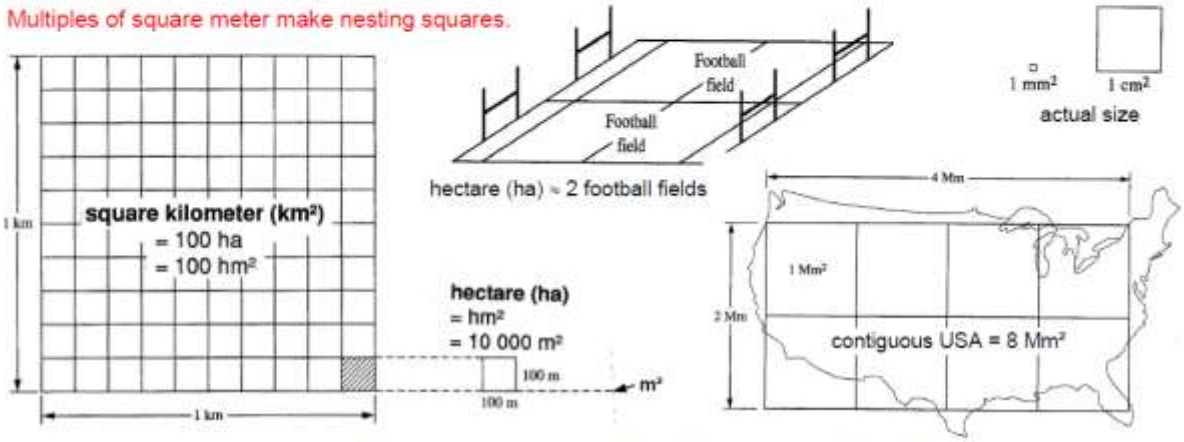



**Figure 3. Area examples: multiples of square meter**

## Table 6 Mass: some multiples of kilogram

| Symbol | Name | Equals | Closely equals mass of |
|---|---|---|---|
| Pg | petagram | $= 10^{12}$ kg | ≈ 1 km³ of water |
| Tg | teragram | $= 10^{9}$ kg | ≈ 1 hm³ of water |
| Gg | gigagram | $= 10^{6}$ kg | ≈ 1 dam³ of water |
| Mg | megagram | $= 10^{3}$ kg | ≈ 1 m³ of water |
| **kg** | **kilogram** | BASE UNIT | ≈ 1 L (dm³) of water |
| g | gram | $= 10^{-3}$ kg | ≈ 1 mL (cm³) of water |
| mg | milligram | $= 10^{-6}$ kg | ≈ 1 µL (mm³) of water |

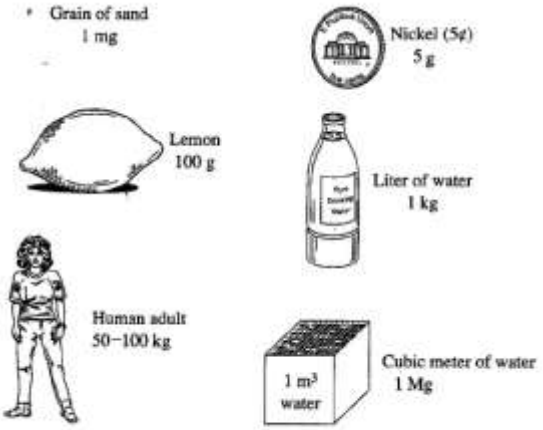



**Fig. 4. Mass examples: multiples of kilogram**

# Figure 5. Temperature: kelvin and Celsius scales