$$
\begin{aligned}
G &= 6.67 \times 10^{-11}\ N \cdot m^2/kg^2 \\
g &= 9.8 m/s^2 \\
c &= 3.00 \times 10^8 m/s \\
\rho_{\text{ice}} &= 0.92 \times 10^3 kg/m^3 \\
\rho_{\text{water}} &= 1.00 \times 10^3 kg/m^3 \\
\rho_{\text{blood}} &= 1.06 \times 10^3 kg/m^3 \\
\rho_{\text{lead}} &= 11.3 \times 10^3 kg/m^3 \\
\alpha_{\text{aluminum}} &= 2.4 \times 10^{-5} K^{-1} \\
\alpha_{\text{copper}} &= 1.7 \times 10^{-5} K^{-1} \\
\alpha_{\text{steel}} &= 1.2 \times 10^{-5} K^{-1} \\
c_{\text{aluminum}} &= 910 J/\left(kg \cdot K\right) \\
c_{\text{copper}} &= 390 J/\left(kg \cdot K\right) \\
c_{\text{water}} &= 4190 J/\left(kg \cdot K\right) \\
c_{\text{ice}} &= 2100 J/\left(kg \cdot K\right) \\
L_f \text{ (copper)} &= 134 \times 10^3 J/kg \\
L_f \text{ (mercury)} &= 11.8 \times 10^3 J/kg \\
L_f \text{ (water)} &= 334 \times 10^3 J/kg \\
L_v \text{ (copper)} &= 5069 \times 10^3 J/kg \\
L_v \text{ (mercury)} &= 272 \times 10^3 J/kg \\
L_v \text{ (water)} &= 2256 \times 10^3 J/kg \\
N_{\text{A}} &= 6.02 \times 10^{23}\ \text{mol}^{-1} \\
M_{\text{Earth}} &= 5.97 \times 10^{24}\ kg \\
R_{\text{Earth}} &= 6.38 \times 10^6 m \\
m_{\text{e}} &= 9.11 \times 10^{-31}\ kg \\
m_{\text{p}} &= 1.67 \times 10^{-27}\ kg \\
1 \text{ m} &= 3.28 \text{ ft} \\
1 \text{ lb} &= 4.45\ N \\
\frac{d}{dx}x &= 1 \\
\frac{d}{dx}\left(au\right) &= a\frac{du}{dx} \\
\frac{d}{dx}\left(u+v\right) &= \frac{du}{dx}+\frac{dv}{dx} \\
\frac{d}{dx}x^m &= mx^{m-1} \\
\frac{d}{dx}\left(uv\right) &= u\frac{dv}{dx}+v\frac{du}{dx} \\
\int dx &= x \\
\int au\ dx &= a\int u\ dx \\
\int \left(u+v\right)dx &= \int u\ dx + \int v\ dx \\
\int x^m\ dx &= \frac{x^{m+1}}{m+1} \quad (m \neq -1) \\
\Delta x &= x_2 - x_1 \\
\bar{v} &= \frac{\Delta x}{\Delta t} = \frac{x_2 - x_1}{t_2 - t_1} \\
\bar{s} &= \frac{\text{total distance}}{\Delta t} \\
v &= \frac{dx}{dt}
\end{aligned}
$$

$$
\begin{aligned}
\bar{a} &= \frac{\Delta v}{\Delta t} = \frac{v_2 - v_1}{t_2 - t_1} \\
a &= \frac{dv}{dt} \\
v &= v_0 + at \\
x - x_0 &= v_0 t + \frac{1}{2}at^2 \\
v^2 &= v_0^2 + 2a\left(x - x_0\right) \\
x - x_0 &= \frac{1}{2}\left(v_0 + v\right)t \\
x - x_0 &= vt - \frac{1}{2}at^2 \\
a_x &= a\cos\theta \\
a_y &= a\sin\theta \\
a &= \sqrt{a_x^2 + a_y^2} \\
\tan\theta &= \frac{a_y}{a_x} \\
\vec{a}\cdot\vec{b} &= ab\cos\phi \\
c &= ab\sin\phi \\
\vec{v} &= \frac{d\vec{r}}{dt} \\
\vec{a} &= \frac{d\vec{v}}{dt} \\
x - x_0 &= v_{0x}t \\
y - y_0 &= v_{0y}t - \frac{1}{2}gt^2 \\
y &= \left(\tan\theta_0\right)x - \frac{gx^2}{2\left(v_0\cos\theta_0\right)^2} \\
R &= \frac{v_0^2}{g}\sin\left(2\theta_0\right) \\
a &= \frac{v^2}{r} \\
T &= \frac{2\pi r}{v} \\
\Sigma\vec{F} &= m\vec{a} \\
W &= mg \\
\vec{F}_{\text{AB}} &= -\vec{F}_{\text{BA}} \\
f_s &= \mu_s N \\
f_k &= \mu_k N \\
F &= \frac{mv^2}{r} \\
K &= \frac{1}{2}mv^2 \\
\Delta K &= K_f - K_i = W \\
W &= Fd\cos\phi \\
W &= \vec{F}\cdot\vec{d} \\
W_g &= mgd\cos\phi \\
\Delta K &= W_a + W_g \\
W &= \int_{x_i}^{x_f} F(x)\ dx \\
F &= -kx \\
W_s &= -\frac{1}{2}kx^2 \\
\bar{P} &= \frac{W}{\Delta t}
\end{aligned}
$$

$$P = \frac{dW}{dt}$$
$$P = \vec{F} \cdot \vec{v}$$
$$U = mgy$$
$$U(x) = \frac{1}{2}kx^2$$
$$E = K + U$$
$$F(x) = -\frac{dU(x)}{dx}$$
$$W_{\text{app}} = \Delta E$$
$$\Delta E = -f_k d$$
$$P = \frac{dE}{dt}$$
$$x_{\text{com}} = \frac{1}{M}\Sigma_{i=1}^{n} m_i x_i$$
$$\vec{r}_{\text{com}} = \frac{1}{M}\Sigma_{i=1}^{n} m_i \vec{r}_i$$
$$x_{\text{com}} = \frac{1}{M}\int x \; dm$$
$$x_{\text{com}} = \frac{1}{V}\int x \; dV$$
$$\Sigma \vec{F}_{\text{ext}} = M\vec{a}_{\text{cm}}$$
$$\vec{p} = m\vec{v}$$
$$\Sigma \vec{F} = \frac{d\vec{p}}{dt}$$
$$\vec{P} = M\vec{v}_{\text{cm}}$$
$$\Sigma \vec{F}_{\text{ext}} = \frac{d\vec{P}}{dt}$$
$$\vec{P} = \text{constant}$$
$$\vec{J} = \int_{t_i}^{t_f} \vec{F}(t) \; dt$$
$$\vec{p}_f - \vec{p}_i = \Delta\vec{p} = \vec{J}$$
$$v_{1f} = \frac{m_1 - m_2}{m_1 + m_2} v_{1i}$$
$$v_{2f} = \frac{2m_1}{m_1 + m_2} v_{1i}$$
$$v_{cm} = \frac{P}{m_1 + m_2}$$
$$\theta = \frac{s}{r}$$
$$\Delta\theta = \theta_2 - \theta_1$$
$$\omega = \frac{d\theta}{dt}$$
$$\alpha = \frac{d\omega}{dt}$$
$$\omega = \omega_0 + \alpha t$$
$$\theta - \theta_0 = \omega_0 t + \frac{1}{2}\alpha t^2$$
$$\omega^2 = \omega_0^2 + 2\alpha\left(\theta - \theta_0\right)$$
$$\theta - \theta_0 = \frac{1}{2}\left(\omega_0 + \omega\right)t$$
$$\theta - \theta_0 = \omega t - \frac{1}{2}\alpha t^2$$
$$s = \theta r$$
$$v = \omega r$$
$$a_t = \alpha r$$
$$a_r = \frac{v^2}{r} = \omega^2 r$$
$$I = \Sigma m_i r_i^2$$
$$I = \int r^2 dm$$
$$K = \frac{1}{2}I\omega^2$$
$$\tau = rF\sin\phi$$
$$\tau = I\alpha$$
$$\Sigma\tau = I\alpha$$
$$v_{cm} = \omega R$$
$$K = \frac{1}{2}I_{cm}\omega^2 + \frac{1}{2}Mv_{cm}^2$$
$$\vec{\tau} = \vec{r} \times \vec{F}$$
$$\vec{l} = \vec{r} \times \vec{p} = m\left(\vec{r} \times \vec{v}\right)$$
$$\Sigma\vec{\tau} = \frac{d\vec{l}}{dt}$$
$$L = I\omega$$
$$F = G\frac{m_1 m_2}{r^2}$$
$$U = -G\frac{m_1 m_2}{r}$$
$$v = \sqrt{\frac{2GM}{R}}$$
$$T = 1/f$$
$$\omega = 2\pi f$$
$$1\text{atm} = 1.013 \times 10^5 Pa$$
$$\rho = \frac{\Delta m}{\Delta V}$$
$$p = \frac{\Delta F}{\Delta A}$$
$$p_2 = p_1 + \rho g\left(y_1 - y_2\right)$$
$$p = p_0 + \rho g h$$
$$R = Av$$
$$p_1 + \frac{1}{2}\rho v_1^2 + \rho g y_1 = p_2 + \frac{1}{2}\rho v_2^2 + \rho g y_2$$
$$p + \frac{1}{2}\rho v^2 + \rho g y = \text{a constant}$$
$$T_F = \frac{9}{5}T_C + 32^o$$
$$T_C = \frac{5}{9}\left(T_F - 32^o\right)$$
$$T_K = T_C + 273.15$$
$$\Delta L = \alpha L_0 \; \delta T$$
$$Q = mc \; \Delta T$$
$$Q = \pm mL$$