**Physical Science Formulas**

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| --- | --- | --- | --- |
| **Area** | $$A=lw$$ | $$l=\frac{a}{w}$$ | $$w=\frac{a}{l}$$ |
| **Volume** | $$v=lwh$$ | $$l=\frac{v}{wh}$$ | $$w=\frac{v}{lh}$$ | $$h=\frac{v}{lw}$$ |
| **Density** | $$d=\frac{m}{v}$$ | m = dv | $$v=\frac{m}{d}$$ |
| **Concentration** | $$c=\frac{mass of solute}{volume of solvent}$$ | $$v=\frac{m}{c}$$ | m = cv |
| **Kinetic** **Energy** | $$KE=\frac{1}{2}mv^{2}$$ | $$m=\frac{2KE}{v^{2}}$$ | $$v=\sqrt{\frac{2 KE}{m}}$$ |
| **Potential** **Energy** | PE = mgh | $$m=\frac{PE}{gh}$$ | $$h=\frac{PE}{mg}$$ |
| **Conservation of Mechanical Energy** | (KE + PE)beginning = (KE + PE)end |  |
| **Work** | W = fd | $$f=\frac{W}{d}$$ | $$d=\frac{W}{f}$$ |
| **Power** | $$P=\frac{W}{t}$$ | W = Pt | $$t=\frac{W}{P}$$ |
| **Speed** | $$s=\frac{d}{t}$$ | $$t=\frac{d}{s}$$ | d = st |
| **Acceleration** | $$a=\frac{v\_{f}-v\_{i}}{t}$$ | $$t=\frac{v\_{f}-v\_{i}}{a}$$ | $V\_{f}=at+V$i | $$V\_{i}=V\_{f}- at$$ |
| **Newton’s****2nd Law** | F = ma | $$a=\frac{F}{m}$$ | $$m=\frac{F}{a}$$ |
| **Velocity of** **falling object** | v = $g$t | $$g=\frac{v}{t}$$ | $$t=\frac{v}{g}$$ |
| **Momentum** | p = mv | $$m=\frac{p}{v}$$ | $$v=\frac{p}{m}$$ |
| **Speed of****wave** | v = λƒ | $$λ=\frac{v}{ƒ}$$ | $$ƒ=\frac{v}{λ}$$ |

**Mechanical Advantage Equations** Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period \_\_\_\_\_\_\_

**Ideal Mechanical Advantage (IMA)**

- The mechanical advantage based on the design of the machine

- See equations below

**Actual Mechanical Advantage (AMA)**

- The mechanical advantage based on the use of the machine.

- AMA = output force or resistance force/weight (Fr)/(W)

 input force effort force (Fe)

|  |  |  |
| --- | --- | --- |
| **Machine** | **IMA** | **AMA** |
| Lever | length of lever armlength of resistance arm | output forceinput force |
| Ramp | length of rampheight of ramp | output forceinput force |
| Pulley | # of supporting ropes | weightinput force |
| Wheel & Axle | radius of wheelradius of axle | output forceinput force |
| Screw | Pitch (# threads/dist.) | output forceinput force |

|  |  |  |  |
| --- | --- | --- | --- |
| **Efficiency** | $$Eff=\frac{Work Output}{ Work input}$$ | Wo = Wi(Eff) | $$W\_{i}=\frac{W\_{o}}{Eff}$$ |