# Physics Equations Sheet

**GCSE Additional Science / Physics**  
(AS1, AS2 and PH2)

<table>
<thead>
<tr>
<th>Equation</th>
<th>Description</th>
<th>Variables</th>
</tr>
</thead>
</table>
| \( a = \frac{F}{m} \) or \( F = m \times a \) | \( a \): acceleration  
\( m \): mass  
\( a \): acceleration | \( F \): resultant force  
\( m \): mass  
\( a \): acceleration |
| \( a = \frac{v - u}{t} \) | \( a \): acceleration  
\( v \): final velocity  
\( u \): initial velocity  
\( t \): time taken | \( a \): acceleration  
\( v \): final velocity  
\( u \): initial velocity  
\( t \): time taken |
| \( W = m \times g \) | \( W \): weight  
\( m \): mass  
\( g \): gravitational field strength | \( W \): weight  
\( m \): mass  
\( g \): gravitational field strength |
| \( F = k \times e \) | \( F \): force  
\( k \): spring constant  
\( e \): extension | \( F \): force  
\( k \): spring constant  
\( e \): extension |
| \( W = F \times d \) | \( W \): work done  
\( F \): force applied  
\( d \): distance moved in the direction of the force | \( W \): work done  
\( F \): force applied  
\( d \): distance moved in the direction of the force |
| \( P = \frac{E}{t} \) | \( P \): power  
\( E \): energy transferred  
\( t \): time taken | \( P \): power  
\( E \): energy transferred  
\( t \): time taken |
| \( E_p = m \times g \times h \) | \( E_p \): change in gravitational potential energy  
\( m \): mass  
\( g \): gravitational field strength  
\( h \): change in height | \( E_p \): change in gravitational potential energy  
\( m \): mass  
\( g \): gravitational field strength  
\( h \): change in height |
| \( E_k = \frac{1}{2} \times m \times v^2 \) | \( E_k \): kinetic energy  
\( m \): mass  
\( v \): speed | \( E_k \): kinetic energy  
\( m \): mass  
\( v \): speed |
| \( p = m \times v \) | \( p \): momentum  
\( m \): mass  
\( v \): velocity | \( p \): momentum  
\( m \): mass  
\( v \): velocity |
<table>
<thead>
<tr>
<th>Equation</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>( I = \frac{Q}{t} )</td>
<td>( I ) current, ( Q ) charge, ( t ) time</td>
</tr>
<tr>
<td>( V = \frac{W}{Q} )</td>
<td>( V ) potential difference, ( W ) work done, ( Q ) charge</td>
</tr>
<tr>
<td>( V = I \times R )</td>
<td>( V ) potential difference, ( I ) current, ( R ) resistance</td>
</tr>
<tr>
<td>( P = \frac{E}{t} )</td>
<td>( P ) power, ( E ) energy, ( t ) time</td>
</tr>
<tr>
<td>( P = I \times V )</td>
<td>( P ) power, ( I ) current, ( V ) potential difference</td>
</tr>
<tr>
<td>( E = V \times Q )</td>
<td>( E ) energy, ( V ) potential difference (Higher Tier only), ( Q ) charge</td>
</tr>
</tbody>
</table>