	Classic mechanics	Relativistic Mechanics
Mass	$m = m_0$	$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$
Momentum	$p = m_0 v$	$p = \frac{m_0 v}{\sqrt{1 - \frac{v^2}{c^2}}}$
Longitudinal and transverse acceleration	$a_L = \frac{F_L}{m_0}$ $a_T = \frac{F_T}{m_0}$	$a_L = \frac{F_L}{m_0}\left(1 - \frac{v^2}{c^2}\right)^{\frac{3}{2}}$ $a_T = \frac{F_T}{m_0}\left(1 - \frac{v^2}{c^2}\right)^{\frac{1}{2}}$
Speed addition	$v_{12} = v_1 + v_2$	$v_{12} = \frac{v_1 + v_2}{1 + \frac{v_1 v_2}{c^2}}$
Kinetic energy	$E_k = \frac{1}{2} m_0 v^2$	$E_k = \frac{m_0 c^2}{\sqrt{1 - \frac{v^2}{c^2}}} - m_0 c^2$
Frequency shift Source →← receiver ← Source receiver →	$f' = f\left(1 + \frac{v}{c}\right)$ $f' = f\left(1 - \frac{v}{c}\right)$	$f' = f\sqrt{\frac{c + v}{c - v}}$ $f' = f\sqrt{\frac{c - v}{c + v}}$
Length contraction	$l' = l$	$l' = l\sqrt{1 - \frac{v^2}{c^2}}$
Time dilation	$t' = t$	$t' = t\sqrt{1 - \frac{v^2}{c^2}}$
Spatial transformation	$x' = x - vt$	$x' = \frac{x - vt}{\sqrt{1 - \frac{v^2}{c^2}}}$
Time transformation	$t' = t$	$t' = \frac{t - \frac{xv}{c^2}}{\sqrt{1 - \frac{v^2}{c^2}}}$

The blue-coloured formulas can be derived directly from the second law of dynamics in connection with the equivalence principle $E = mc^2$.