KEY FEATURES OF SPECIAL RELATIVITY

(a) \( \gamma = \frac{1}{\sqrt{1-(v/c)^2}} \geq 1; \quad \beta = v / c \)

(b) \( KE = \text{Work done} = \gamma m_0 c^2 - m c^2 \)
\( \Rightarrow \text{Rest Energy} = m_0 c^2 = E_{\text{rest}} \) (new!)

(c) All conservation laws remain
\( \mathbf{F}_{\text{net}} = \Delta (\gamma m \mathbf{v}) / \Delta t = \Delta \mathbf{p} / \Delta t \)

(d) But Energy now includes rest mass
\( \Delta \text{Cons. of Mass} \rightarrow \Delta \text{Energy} \) meld into 1 LAW

(e) Consequences:
(a) No massive object can ever have speed, \( v \geq c \)

(b) Mass can be converted to ENERGY:
NUCLEAR POWER:

(c) Moving clocks run SLOW: time DILATION
\( \Delta t = \Delta t' / \gamma \)
Moving lengths are CONTRACTED:
\( l = l' / \gamma \)