Figure 4.7
Using a spring scale to measure force

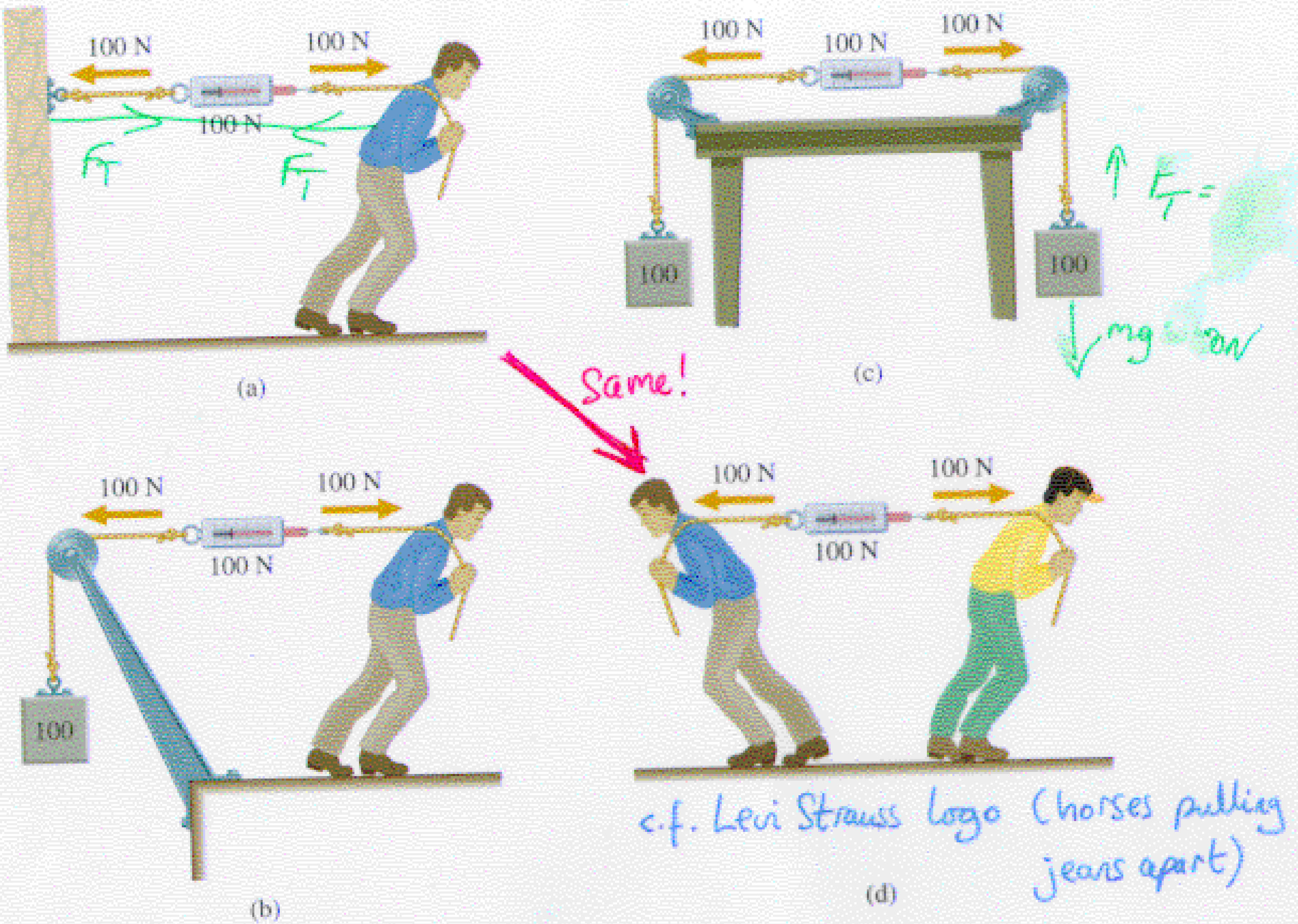


Figure 4.11
A free-body diagram

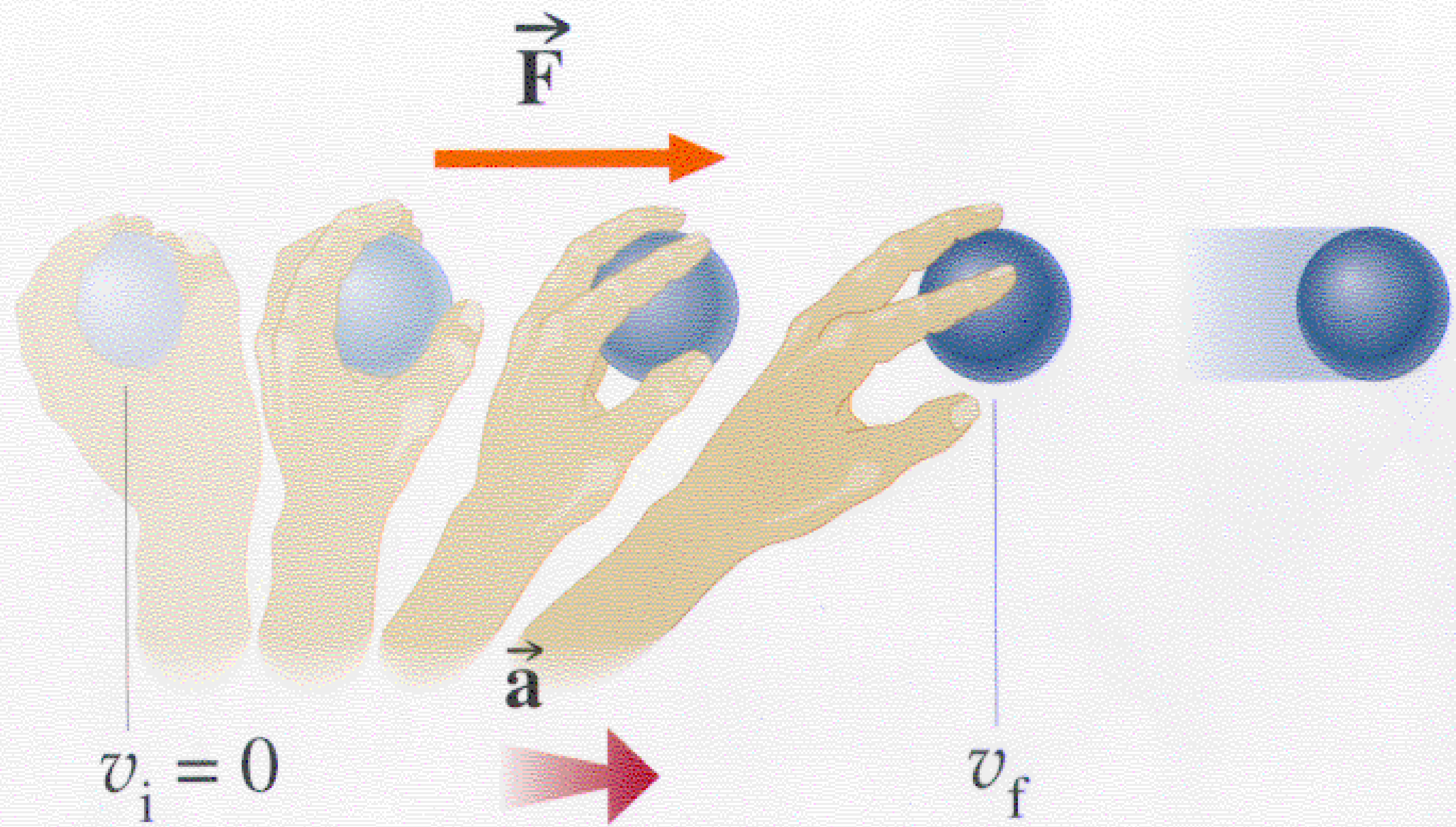
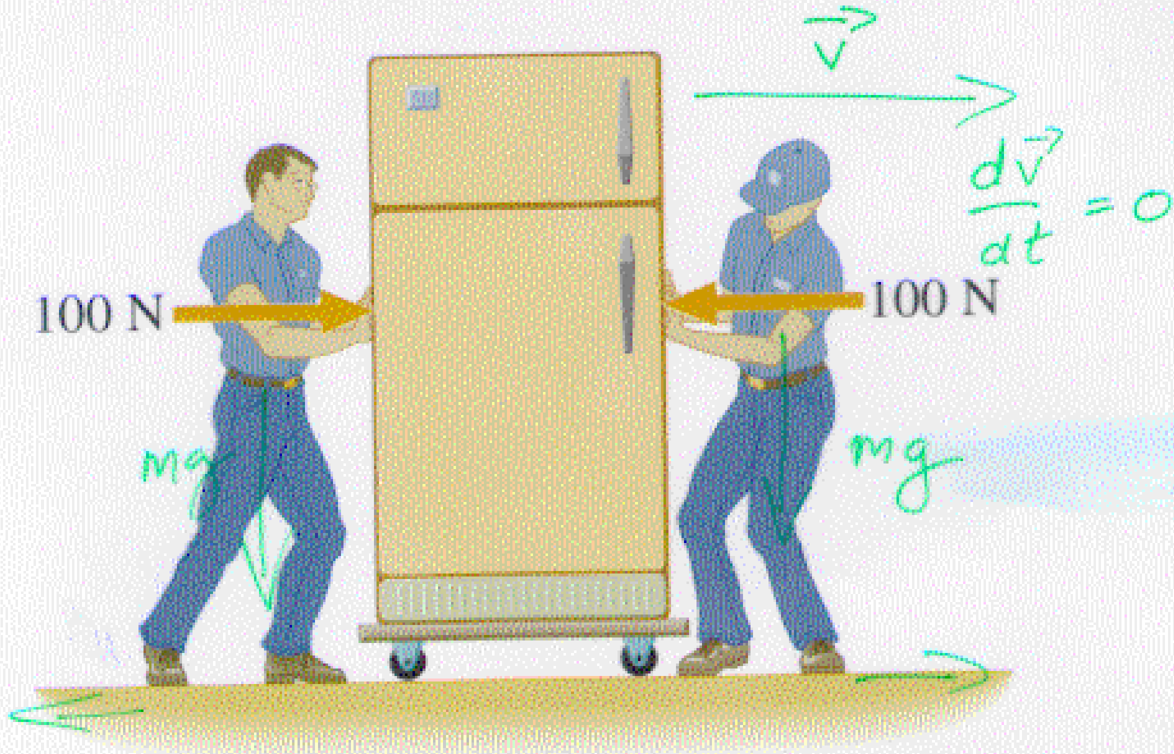
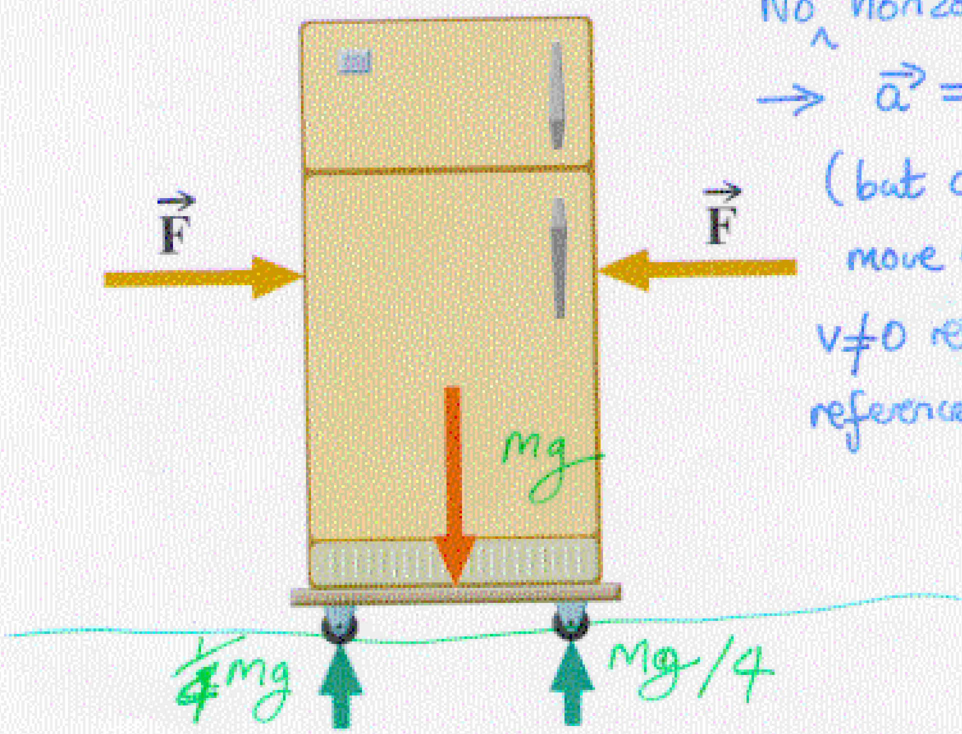


Figure 4.16

Equal but oppositely directed forces acting on an object



(a)



No net horizontal force

→ $\vec{a} = 0$

(but can still move with $v \neq 0$ relative to reference frame)

(b) Free-body diagram

Figure 4.17

Horizontal force and the resulting horizontal acceleration

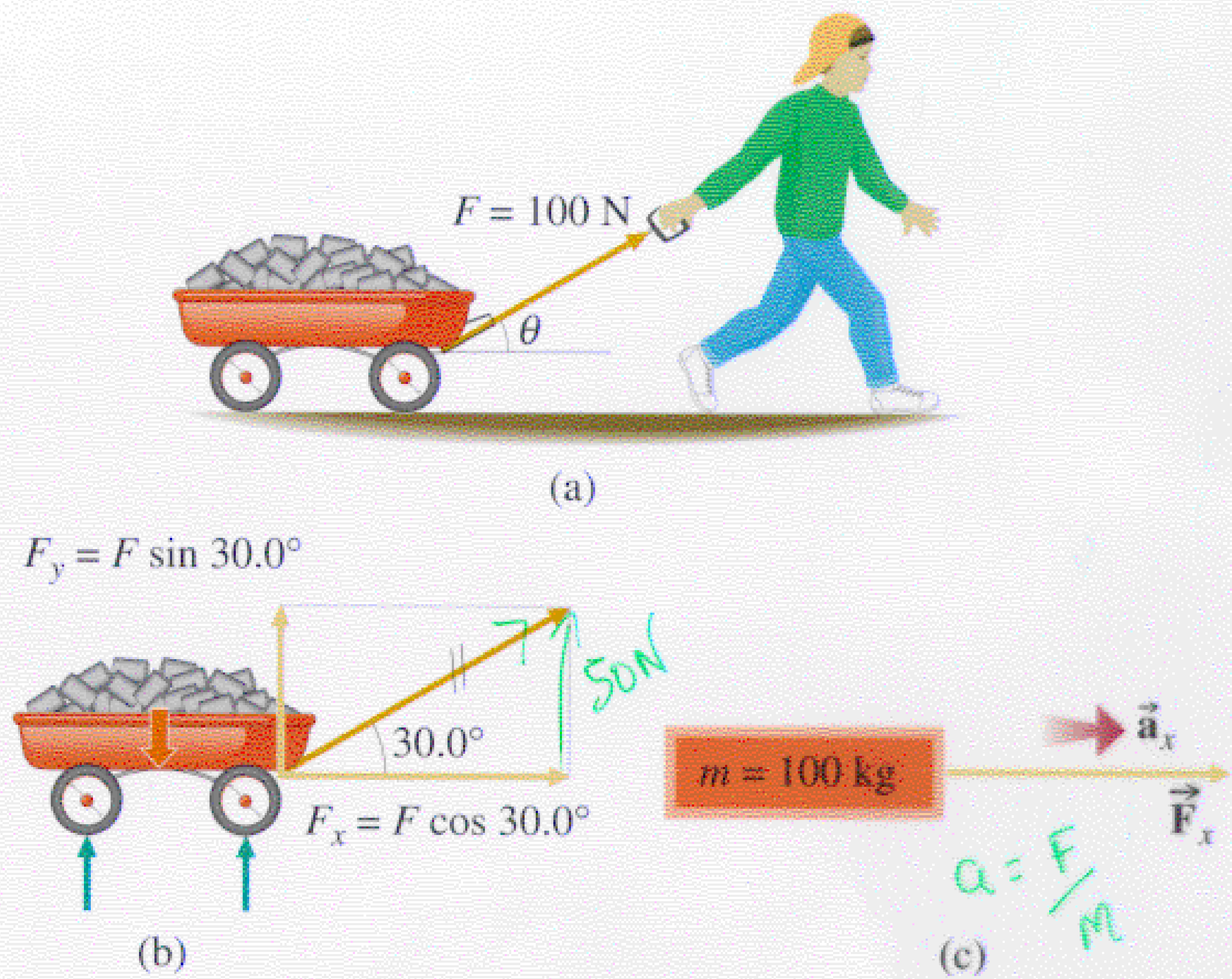
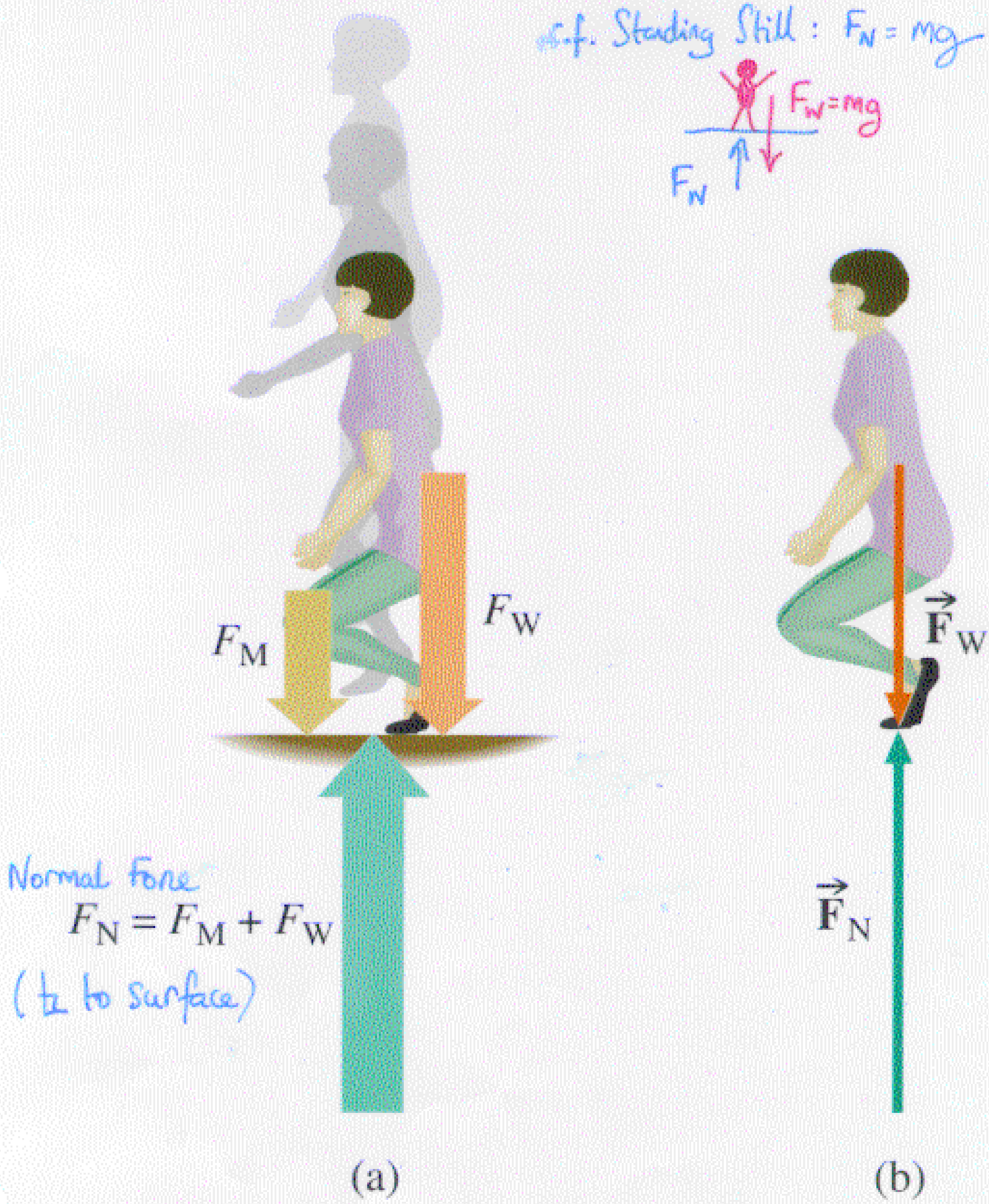
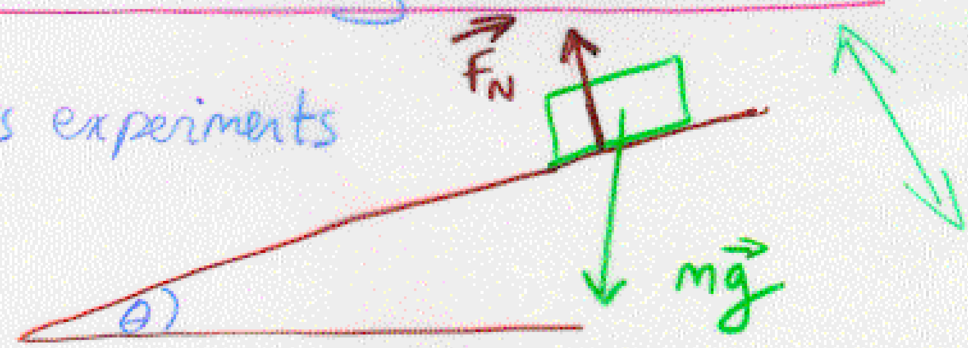


Figure 4.22
Forces acting on a person jumping



Dynamics: Motion Along Inclined Planes

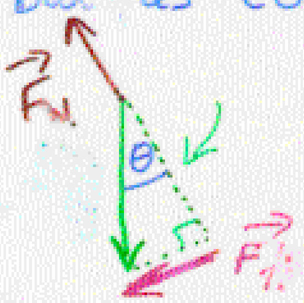
cf. Galileo's experiments



adjustable ramp.

Mass supported by the plane surface, exerting Normal Force $\vec{F}_N$ ⊥ to surface

$\vec{F}_N$ balances component of weight $\vec{F}_W = mg$



i.e. $\vec{F}_N = \vec{F}_W \cos\theta$

$= mg \cos\theta$

Component of accelerates mass down plane

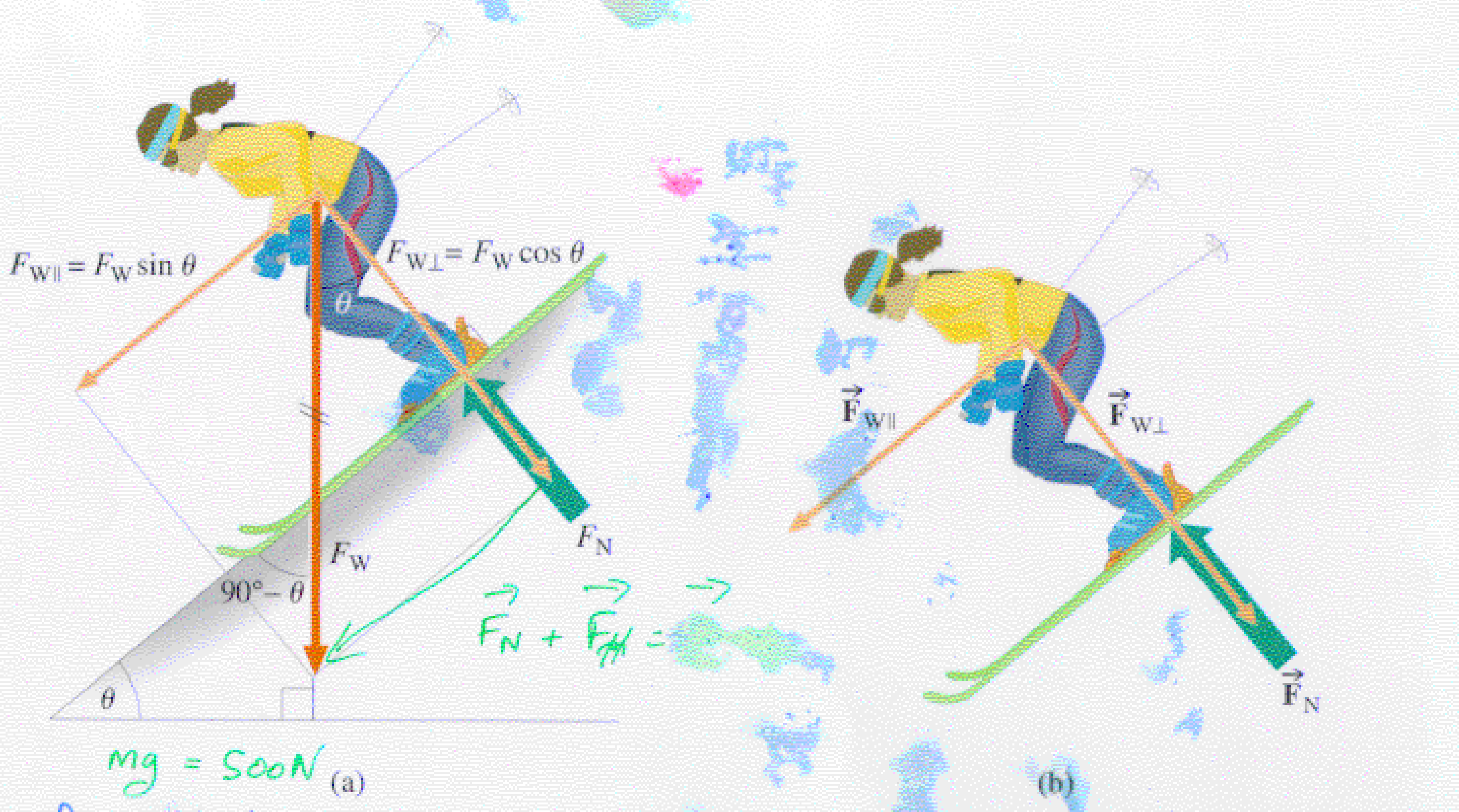
i.e. along plane $= \vec{F}_W \sin$

$\Rightarrow$ accel. $\frac{dv}{dt} = g \underbrace{\sin\theta}_{\leq 1}$, indep. of

Since $g \sin\theta < g$, can use plane to "slow down" free-fall of object $\rightarrow$ can meas. g.

Transparency 29

Figure 4.24
Skier on an inclined plane



e.g. for $m = 50kg$, $\theta = 30°$, force of inc... $= mg\cos\theta = 425\,N$ ($< mg$)

accel. down slope $a_{/\!/} = g\sin 30° = \frac{1}{2}g$ (... -ROM)