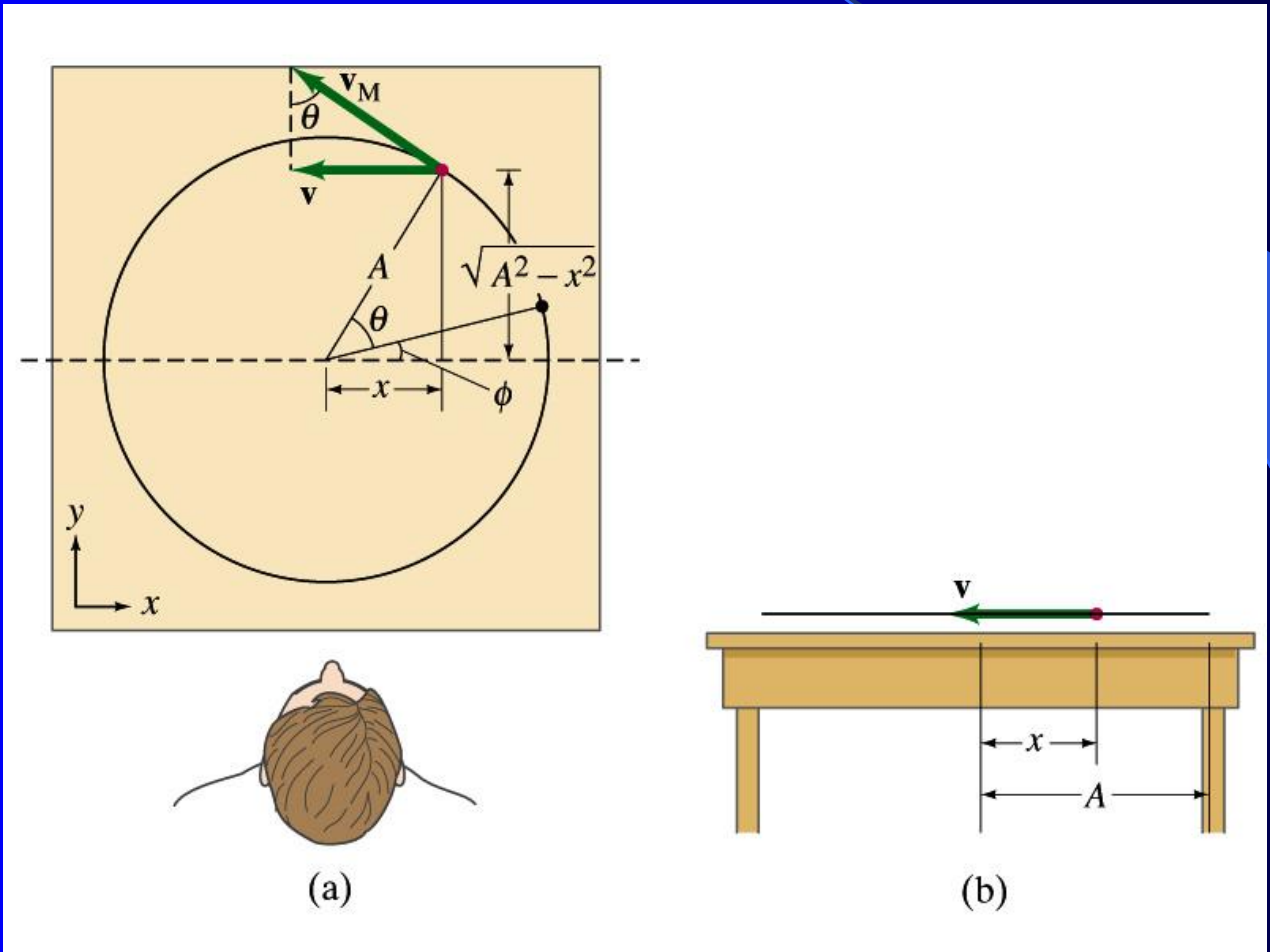
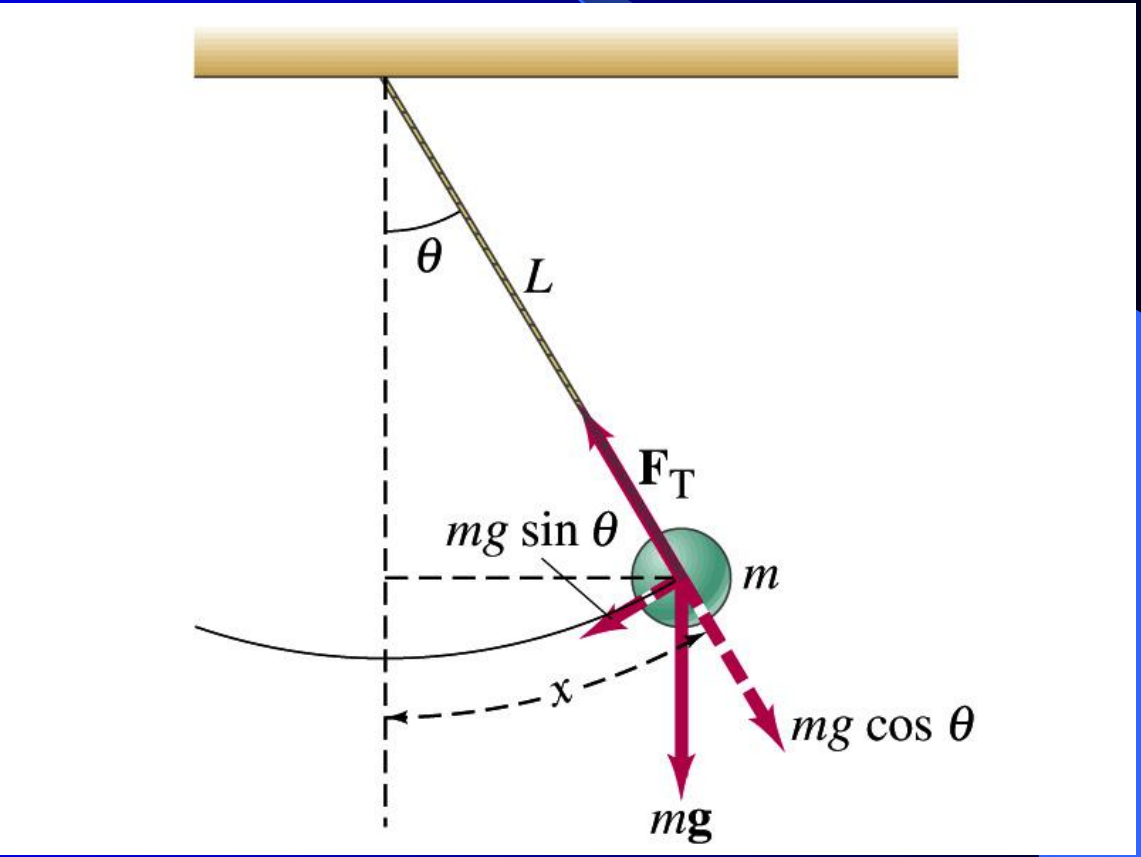
SHM and Uniform Circular Motion



The “Simple” Pendulum

- Restoring Force
  $F=-mg\sin\theta\approx-mg\theta$
- $\sin\theta\approx\theta$ for small θ
- $x=L\theta$
- $F \approx -(mg/L)\,x$



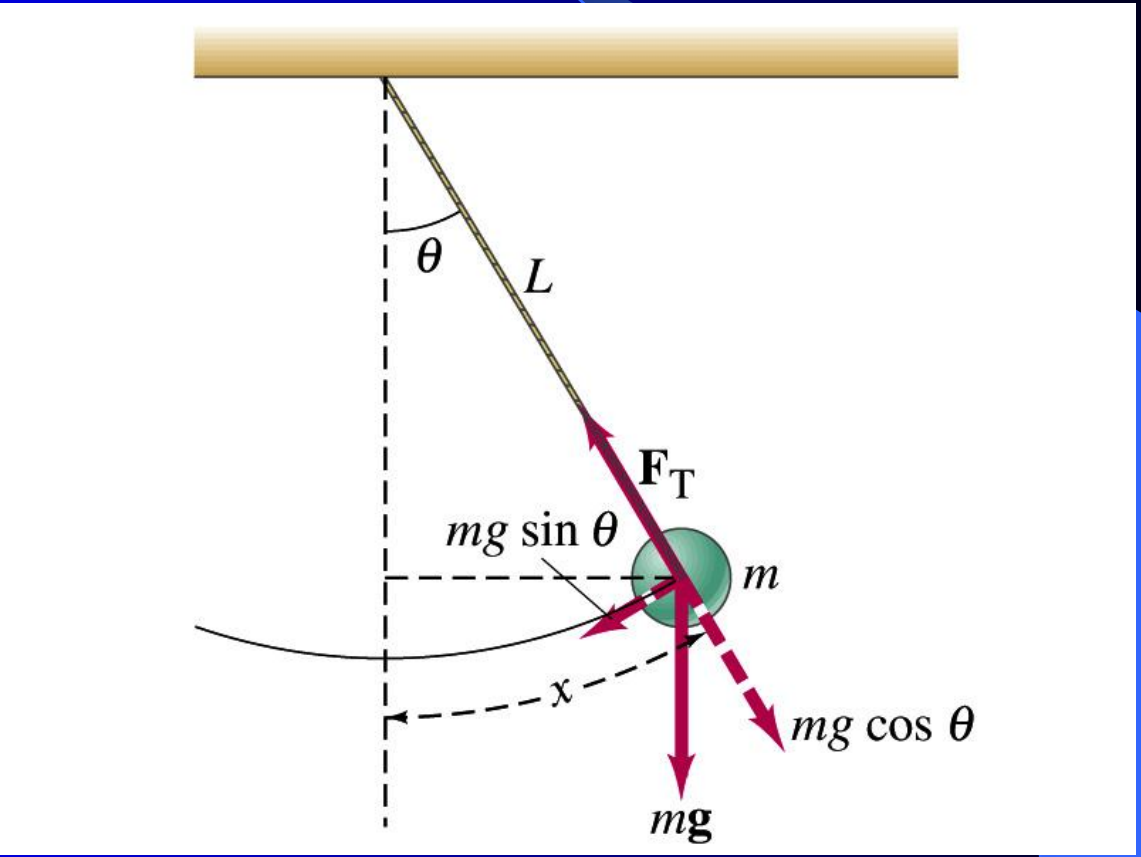
The “Simple” Pendulum

- $F \approx -(mg/L)\, x$
- $F = -\ k\ x$
- $k \approx mg/L$

$$\theta = \theta_{\max} \cos(\omega t + \phi)$$

$$\omega^2 = \frac{k}{m} = \frac{g}{L}$$

$$T = \frac{2\pi}{\omega} = 2\pi\sqrt{\frac{L}{g}}$$



Bridge