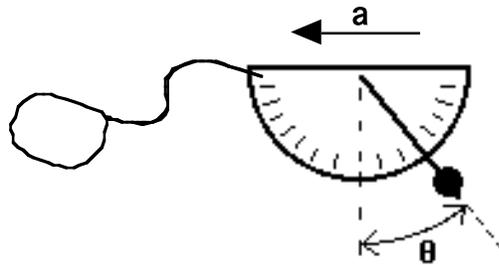


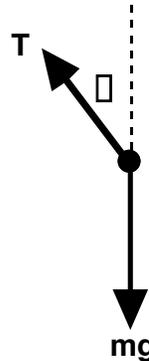
PROTRACTOR AND HANGING WEIGHT USED AS A LATERAL OR LONGITUDINAL ACCELEROMETER

A protractor with a hanging weight may be used as a lateral or longitudinal accelerometer. When the protractor is held with its top edge horizontal, the weight swings to one side as you round a curve, or swings backward or forward as you speed up or slow down. Use an object that is rounded and relatively soft as the weight. Consider what might happen if it were to strike the student's face or eye during the ride. A small rubber stopper might work well.

To measure lateral (sideways) acceleration, hold the protractor in front of you so that its straight edge is horizontal and is PERPENDICULAR to the direction of travel.



To measure longitudinal (forward or backward) acceleration, hold the protractor off to one side so that its straight edge is horizontal and is PARALLEL to the direction of travel.



$$T \cos \phi = mg$$

$$T \sin \phi = ma$$

solving for a,

$$a = g \tan \phi$$

BE SURE TO DEVISE SOME SORT OF WRIST TETHER. Depending on the type of protractor, you may be able to tie string directly to it, or you may have to drill a hole in the protractor for the string or perhaps tape the string to it.

CRITICAL SAFETY NOTE:

Any instruments or devices carried on rides by students should be provided with some kind of wrist tether, so that if dropped, the instrument will not fall off the ride and cause injury or damage.
