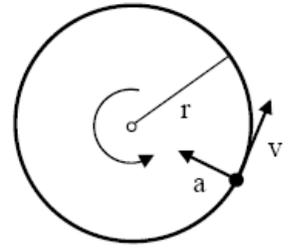
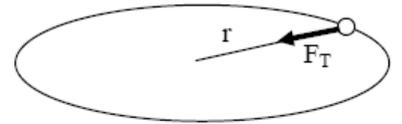


**Circular Motion WS**

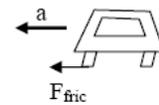
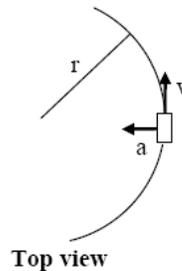
1. If the radius of a merry-go-round is 5.0 m and it makes 15 revolutions per minute, find its centripetal acceleration.



2. You are twirling a rock on a string (assume gravity has no effect on the rock). The mass of the rock is .10 kg, the length of the string is 1.0 m, and it takes 1.0 s to make one revolution. What is the tension force in the string?



3. A car rounds a curve on a flat road (not banked). The radius of the circular curve is  $r = 100. \text{ m}$ , and the speed of the car is  $v = 30. \text{ m/s}$  (about 68 mph). How large a static friction coefficient ( $\mu_s$ , not  $\mu_k$ !) is needed for the car to not skid off the road?



**View from r.....**

4. An athlete whirls a 7.00-kg hammer tied to the end of a 1.30-m chain in a horizontal circle. The hammer makes one revolution in 1.00 s.
  - a. What is the centripetal acceleration of the hammer?

- b. What is the tension in the chain?
5. A coin is placed on a vinyl stereo record making  $33 \frac{1}{3}$  revolutions per minute.
- In what direction is the acceleration of the coin?
  - Find the magnitude of the acceleration when the coin is placed 5.0, 10.0, and 15.0 cm from the center of the record.
6. According to the Guinness Book of World Records, the highest rotary speed ever attained was 2010 m/s (4500 mph). The rotating rod was 15.3 cm (6 in.) long. Assume that the speed quoted is that of the end of the rod.
- What is the centripetal acceleration of the end of the rod?
  - If you were to attach a 1.0-g object to the end of the rod, what force would be needed to hold it on the rod?