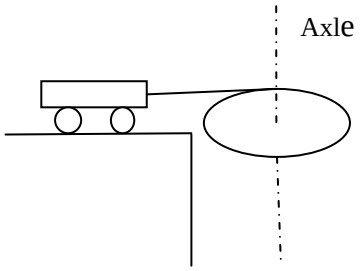
Pre-lab 12 Rotational motion and translational motion

You are now the expert of both rotational motion and linear motion separately. In this lab, we need to combine them together.

(a) In old days, a windmill will have the wind power rotating a big wheel so that grains could get grinded. Now, we have some better tools. Assume a car is attached with a wheel be sting so that the car can drag the wheel to spin as shown below. It is known that the car can offer a constant force. With and without the wheel, would the car has same acceleration? And why?



(b) If the radius of the wheel doesn't change, but its mass gets heavier, do you think the acceleration of the car will change or not?

(c) If the mass of the wheel is fixed, but its radius gets bigger, do you think the acceleration of the car will change or not?

(d) Let's put in some numbers. If the car has a mass of 1 kg, with a force 1N driving it moving forward. With a wheel of 1 m diameter and 1kgm^2 inertia, What would be the acceleration of the car?