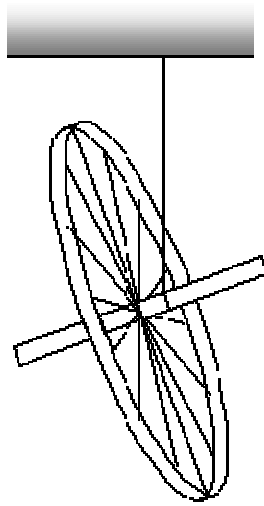# Precession (3a)

Aim: To show how a rotating wheel reacts to an applied torque.

Subjects: 1Q50 (Gyros)

Diagram:

Equipment:
- bicycle wheel with handles
- 1 piece of rope
- 1 stick

Precession (3a)

Presentation: The wheel is rotating and held by a string. The rotating wheel has an angle of about 45°-60° with the vertical. The wheel will precess about a vertical axis. When the instructor pushes with the side of his hands or a stick against one of the handles of the wheel in the direction of precession, then the rotating wheel will rise to a more vertical position. This can be continued, even passing the vertical.

Explanation: The rotating wheel will precess due to gravitational torque, mgs ($I\omega_0$ moves in the direction of this gravitational torque; precession) (see figure 1).
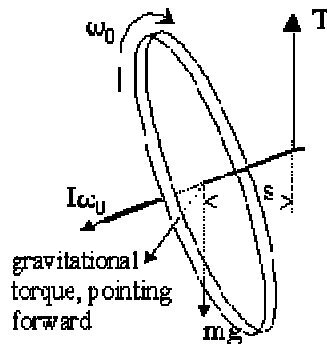

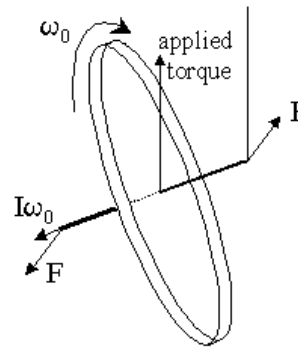Figure 1   Figure 2

F is the applied force in the direction of precession (see figure 2). The applied torque is pointing vertically upward, so now $I\omega_0$ moves also upward.

Sources:
- Freier, George D. and Anderson, Frances J., A demonstration handbook for physics, pag. M-53
- Sutton, Richard Manliffe, Demonstration experiments in Physics, pag. 79