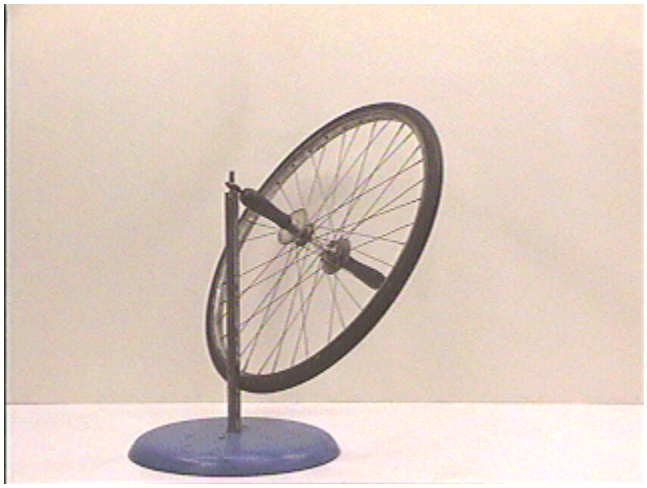
Answer #85

The answer is (c): the bicycle wheel gyroscope will rotate clockwise around the pivot, a motion known as "precession," as seen in an mpeg video by clicking your mouse on the photograph below.



When Gwen spins the gyroscope, its rotation can be represented by a vector as follows: curl the fingers of your right hand in the direction of rotation of the wheel, and your thumb will point in the direction of the angular momentum vector. This is in the direction *away* from Gwen. The torque, created by the gravitational force on the wheel, is given by the cross product of the vector distance from the pivot to the center of mass of the wheel **r** and the vector force **F**, or **rxF**, which is toward the right front of the photograph from where Gwen is positioned. This causes the wheel to precess around the pivot in the clockwise direction, as seen.

Note also the slight scalloping motion of the wheel as it precesses. This motion, called "nutation," occurs because the gyroscope begins to fall downward immediately after it is released but before its precession ensues.

Archive 5

Question of the Week

Outreach Index Page

Lecture-Demonstration Home Page

For questions and comments regarding the *Question of the Week* contact
Dr. Richard E. Berg by e-mail or using phone number or regular mail address
given on the Lecture-Demonstration Home Page.