

Question #283

Shown in the photograph at the left below is a physical pendulum with a bicycle wheel mounted at the end of the physical pendulum. The bicycle wheel can be free to rotate about its axis, as seen by clicking the photograph at left below, or it can be tied down, as seen in the photograph at the right, so that it cannot rotate at all.



If the wheel is tied down, so that it cannot rotate about its axis, it rotates with some period, as seen in a video by clicking your mouse on the photograph at the right above. The pendulum is allowed to make ten oscillations while the clock runs, so the period is the final measurement on the clock divided by ten.

Now suppose that the cord tying the wheel is released, allowing the wheel to rotate about its axis, if it wants to. The pendulum will be pulled to the side as in the case above and again released from rest, but with the wheel free to rotate about its axis.

With the wheel free to rotate, which of the following statements are correct?

- (a) The period of oscillation will be greater with the wheel free.
- (b) The period of oscillation will be less with the wheel free.
- (c) The oscillation will immediately damp out because the wheel will begin to rotate.
- (d) A coupling resonance will occur between pendulum oscillations and wheel rotations.

Click here for [Answer #283](#) after April 23, 2007.

[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](#).