# Question #30

Gwen is holding a rather heavy set of keys attached to a very light cardboard matchbook by a light string, with the keys hanging over her finger by only a few inches of string, as seen in the photograph below. She will release the matchbook from rest in the position shown.

The question is what will happen when the matchbook is released.

One possibility is that the keys will fall to the floor because they are very heavy compared with the rest of the system. Another possibility is that the matchbox will start to fall, and because of the long string it will exert a lot of "centrifugal force" on the keys and pull the keys back over Gwen's finger. A third possibility is something in between these extremes. Perhaps the torque exerted by the matchbox end of the string will counterbalance the inertia of the keys, causing the system to stop with the string over Gwen's finger (does this make any sense?). If neither the keys nor the matchbox pulls the other over Gwen's finger, exactly what *will* happen?

So what will happen when Gwen releases the matchbox?

- (a) The keys will fall, pulling the matchbox over Gwen's finger.
- (b) The matchbox will pull the keys over Gwen's finger.
- (c) Neither of the above.

Click here for Answer #30 after September 18, 2000.

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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.