

# Moving arms helps balance in walking

**Question:** Why is it normal to move your arms when you walk or run?

**Answer:** I think that while people walk and run their motions are chosen to reduce effort, increase speed, and keep stable. If someone walked or ran with their arms hanging straight down instead of swinging them, they would get more tired. They couldn't run as quickly. And they might fall down more.

How does swinging your arms make walking and running easier and faster? I don't think anyone really knows, but here are a few ideas:

■ If you hang from a rope and swing your legs as if you were walking, your body will twist back and forth. When you walk, that twisting tendency is still there. Swinging your arms opposite to your legs, like most people do, twists you the opposite way so it's easier to walk straight.

■ If you just relax your arms, they will swing because your shoulders move when you walk. It takes effort to stop them from swinging. People are lazy, so they let their arms swing.

■ Swinging arms can help push you forward. Each time you swing your arm, you throw your fist forward like a ball. At the end of the forward swing, your fist pulls your body to catch up.

Why doesn't the "throwing" effect cancel the "catching" effect? That's the kind of thing we are still trying to figure out.



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*A walking robot in Andy Ruina's Human Power and Robotics Laboratory in Cornell University's department of theoretical and applied mechanics. The swinging arms of this robot help make it walk more stably.*

*Ask A Scientist appears each Wednesday on the science page. Questions are answered by research scientists at Cornell University. If you have a question, write to Ask A Scientist, c/o The Ithaca Journal, 123 W. State St., or e-mail it to <gann013@attglobal.net>. You can also check out the Ask A Scientist Web site at <www.ccmr.cornell.edu/ask>.*

## ASK A SCIENTIST



**Ruina**

Today's question was answered by scientist Andy Ruina  
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Today's question was asked by student

Mark DeCirce  
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**Teacher:** Mrs. Summerlee



**DeCirce**