

Dear Jax,  
 How do zippers zip??  
 Taylor Waxman  
 Santa Monica, California

Beakman or Jax  
 1130 Walnut St.  
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 Question & your city/state

**WHAT YOU NEED:** Wooden board or sheet of heavy cardboard - thread - small cardboard box - small rocks

**WHAT TO DO:** Put one end of the board or cardboard on a step outside. Tie the thread to the

box so that you can lift it straight up. Lift the box to the height of the step. Gently add rocks – *no dropping* – until the thread breaks. How many rocks were in the box when the string broke?

With a new thread on the box, put it at the

bottom of the board. Add the same number of rocks it took to break the string. Use the thread to *gently* drag the box up the ramp. Add more rocks.

**SO WHAT:** One can lift a lot more rocks to the same height if you drag them up a ramp, which is really an *inclined plane*.

And it works the other way around, too. If you jam an inclined plane into something like a log, it will split in half.

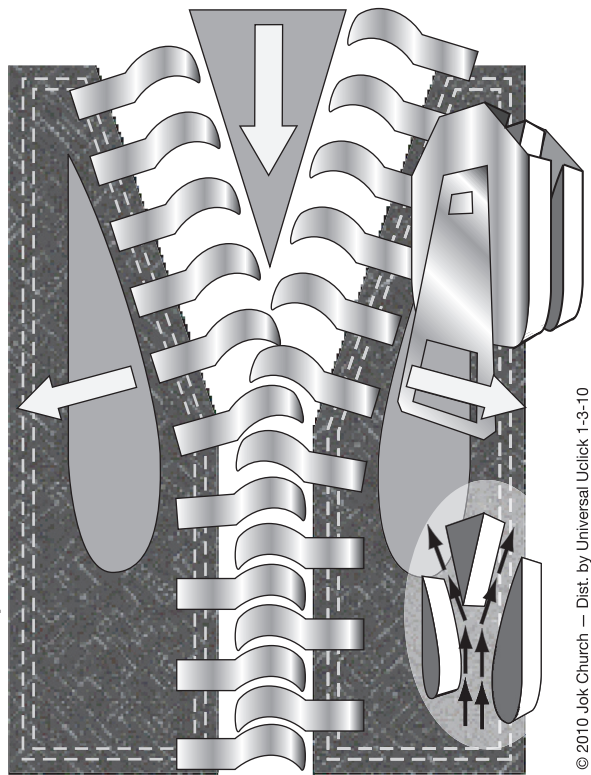
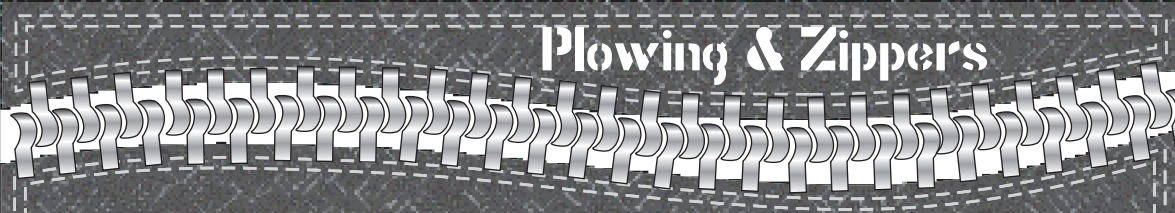
The inclined plane takes a little bit of up-and-down work and turns it into lots and lots of sideways work.

Dear Taylor,  
 Zippers zipping has a lot to do with plowing. They were named after popular rubbers – a kind of galoshes – the rubber shoe, not the thick stew.

Zippers are about hooks being jammed into each other by the slider, which turns up-and-down zipping action into back-and-forth, sideways work.

When opening, the slider plows apart the hooks using the mechanical advantage one gets from an inclined plane, usually called a *ramp*, or a *wedge*.

*Jax Place*  
 Jax Place



P.S. from Beakman: The first thing zippers were used for was pairs of rubbers from the B.F. Goodrich rubber company.