- Last Lecture
  - Friction
- Today
  - Springs
- Important Concepts
  - The magnitude of the spring force depends linearly on the distance the spring is stretched or compressed.
  - The direction of the force is inward at both ends for a stretched spring and outward at both ends for a compressed spring.

Important Reminders

- Pset # 4 due here tomorrow at 10am.
- Next Mastering Physics deadline is next Monday.
- Next In-Class Experiment is next Tuesday.
- Next Pset due next Friday.

- Want to make 8.01L better? Volunteers needed for a student advisory board, if you are interested. A better course and free food!

Properties of Spring Force

- The direction is always unambiguous!
  - In for stretched spring, out for compressed spring.
- The magnitude is always unambiguous!
  - $|F|=k(\ell-\ell_0)$
- Two possibilities for confusion.
  - Double negative: Using F=−kx where it doesn't belong
  - Forgetting the "unstretched length", ℓ_0

Summary

- $\vec{F} = -k\left(\vec{l} - \vec{l}_0\right) \qquad |F| = k\left(l - l_0\right)$
- Don't "double negative" your spring force.
- Think carefully about the geometry. Don't forget the unstretched length of the spring.
- Two or more springs in parallel have an effective spring constant of $k_{eff} = k_1 + k_2 + ...$
- Two or more springs in series have an effective spring constant of $\dfrac{1}{k_{eff}} = \dfrac{1}{k_1} + \dfrac{1}{k_2} + ...$