Potential Energy

- A force is “conservative” if it always does the same work between two points, no matter what the path/timing is
  - Ex: gravity, springs
- For conservative forces, can define potential energy so that difference between two points is opposite work done *by* the force $\Delta U = -W$
- Useful because we don’t have to calculate work directly if we know PE formula!
  - Springs: $U = \frac{1}{2} k x^2$
  - Gravity: $U = mgy$

Using Conservation of Energy

- Potential energy is a pre-integrated work, just use formula instead of work
  - Then: $\Delta K + \Delta U = W_{other}$

Forces that do work that you didn't write PE for

- Use to relate speed & position before to speed & position after
  - No need to know details of what happens in between
- Note: only differences matter
  - Can set y=0 anywhere for gravity, as long as same coord. Throughout problem

Using Conservation of Energy

- Another way to think about it: difference in total energy before and after is how much entered/left system
- If no forces unaccounted for in PE: K+U same before and after: $K_0 + U_0 = K_f + U_f$