Isaac Thomison and Stephon
Physics-Redmond-T/Th 3rd

Work and Energy (Work Section) Physics Mid-Term Review

Energy gives us one more tool to use to analyze physical situations. When forces and accelerations are used, you usually freeze the action at a particular instant in time, draw a free-body diagram, set up force equations, figure out accelerations, etc. With energy the approach is usually a little different. Often you can look at the starting conditions (initial speed and height, for instance) and the final conditions (final speed and height), and not have to worry about what happens in between. The initial and final information can often tell you all you need to know.
Whenever a force is applied to an object, causing the object to move, work is done by the force. If a force is applied but the object doesn't move, no work is done; if a force is applied and the object moves a distance d in a direction other than the direction of the force, less work is done than if the object moves a distance d in the direction of the applied force.
The physics definition of "work" is: W=Fd cos8, where 8 = the angle between the force and the displacement.
The unit of work is the unit of energy, the joule (J). 1 J = 1 N m.
Work can be either positive or negative: if the force has a component in the same direction as the displacement of the object, the force is doing positive work. If the force has a component in the direction opposite to the displacement, the force does negative work.
If you pick a book off the floor and put it on a table, for example, you're doing positive work on the book, because you supplied an upward force and the book went up. If you pick the book up and place it gently back on the floor again, though, you're doing negative work, because the book is going down but you're exerting an upward force, acting against gravity. If you move the book at constant speed horizontally, you don't do any work on it, despite the fact that you have to exert an upward force to counter-act gravity.