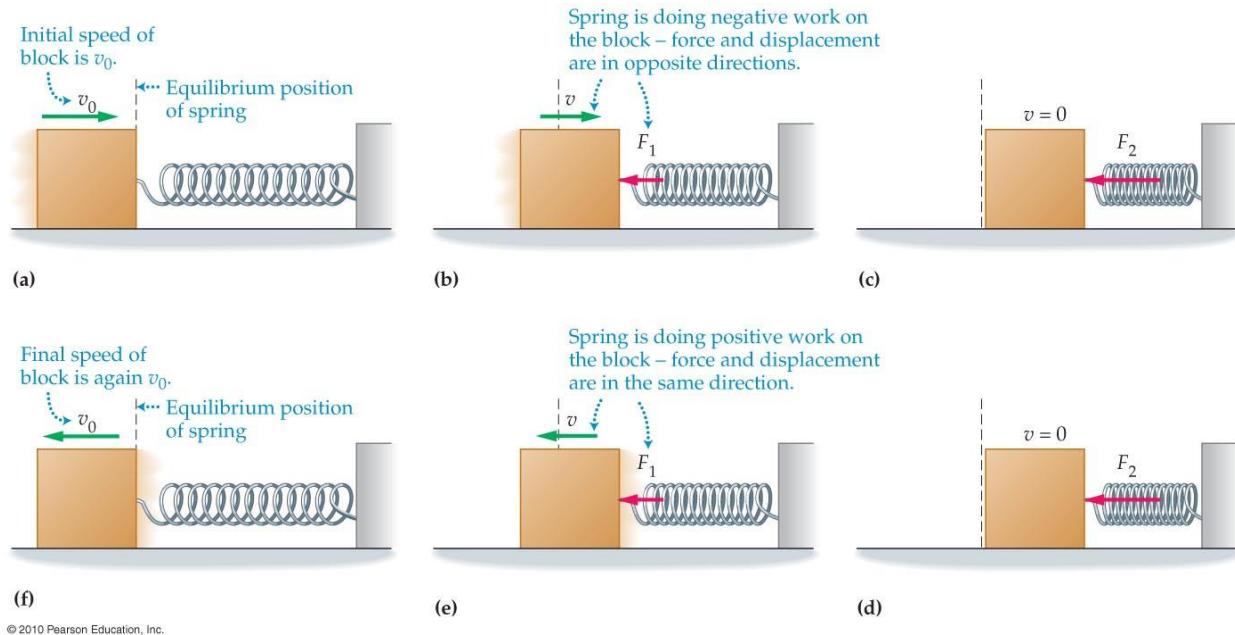


Blocks and Springs



Assumptions: no non-conservative forces

- (a) the block slides to the right on a frictionless surface with a speed v_0 until it encounters a spring; zero net force on the block from the spring when they first come in contact;

$$K_{block} = \frac{1}{2}mv_0^2$$

- (b) the spring exerts a force to the left on the block in the direction opposite the block's motion, which is to the right; the spring does negative work on the block and slows the block down; force from the spring and displacement of the block are in opposite directions
- (c) the negative work done by the spring eventually equals the block's initial kinetic energy, and the block comes momentarily to rest; the spring is now compressed by a distance x and the force from the spring on the block is to the left; $K_{block} = P_{spring} = \frac{1}{2}kx^2$
- (d) the block's velocity is momentarily 0 m/s before the spring begins to expand and move the block to the left
- (e) the block's velocity is now v to the left; the spring then expands by a distance x and does positive work on the block, increasing its speed; force from the spring and displacement of the block are in the same direction
- (f) when the block is no longer in contact with the spring its velocity is v_0 to the left