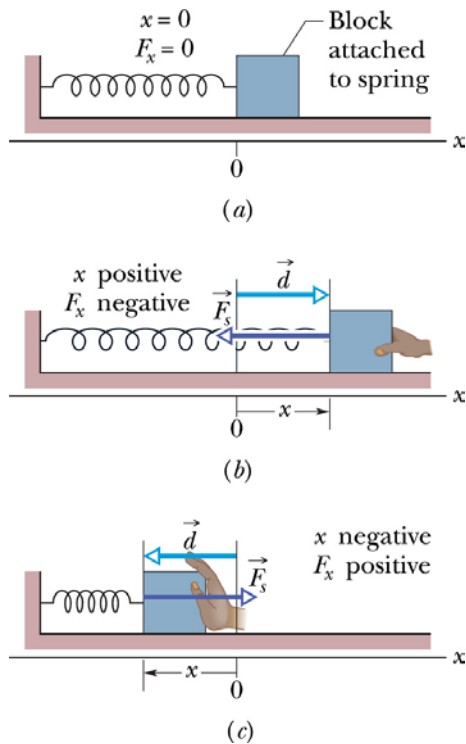


## Spring Force

How do we calculate the work done by a non-constant force? Before we answer the question let's consider the spring force which is an example of a non-constant force.

Consider the following Spring-Mass System.



- Note that the spring force  $F_s$  is always in the opposite direction of the displacement of the mass.
- The larger the displacement from equilibrium, the larger the spring force.

These two properties of the spring force can be summarized by the following equation called Hooke's Law:

$$\boxed{F_s = -kx} \text{ Hooke's Law (Spring Force)}$$

$$\boxed{|F_s| = kx} \text{ (Magnitude of Spring Force)}$$

$F_s$  = spring force (N)

$k$  = spring constant (N/m)

$x$  = displacement of block (spring) from equilibrium position (m)

The value of the spring constant  $K$  is a measure of the stiffness of the spring.