There's even a little bit more that we can learn about our energy diagram.

And I'd like to just clean this diagram up for a little second, because I want to work in this area.

Suppose our system, because the work non-conservative is 0, tells us that the mechanical energy is constant.

Now we don't know how much mechanical energy our system is.

That's a constant of the system.

But let's just suppose that our mechanical energy is written like that.

And we'll just clean up a little, give ourselves a little space.

So here is the mechanical energy of the system, and that's a constant.

And now we can talk about two more special points.

A point over here, and at this point, let's just think about what our mechanical energy tells us.

This is a special point, but let's begin with one right here.

If our particle is at this location, then this represents the potential energy and the difference between the energy and the potential energy is the kinetic energy.

So this here represents the kinetic energy.

And now we can ask ourselves what would happen to the energies as our particle is moving?

So if we start right here, the kinetic energy is 0.

Because all the potential energy, all the energy is potential.

And as a particle starts to move, let's say it has a little bit of energy.

It starts to move in this direction.

Then the kinetic energy starts to increase until we get to this point, where the kinetic energy is maximum at the stable equilibrium point where the force is 0.

Now the kinetic energy decreases because remember, it's now going against the force.

The side the force was pointing in that direction.

Here it was in the other direction.

And until we finally get to this point where, again, the energy of system is equal to all potential energy, and so there is no kinetic energy.

So I'll call this point A, and I'll refer to this point over here, diagram is getting a little crowded, as B.

And those points A and B are what we call the turnaround points.

And they represent the places where the kinetic energy at XA is equal to the kinetic energy at XB, which is 0.

Now the last thing that we like-- there's a lot of information, as you can see, contained in these energy diagrams.

And the last bit of information that we'd like to ask ourselves is what would happen if instead of having-- confining our system to this area, we increased our mechanical energy so we're up here.

And let's just follow qualitatively the motion of a particle that begins say, over here, with a little bit of kinetic energy and potential energy.

And if the particle starts off with the velocity in the positive x direction, then it's going to move in this direction.

And you can see the kinetic energy is increasing.

Here we have a maximum amount of kinetic energy.

But notice that over here the particle still has some positive kinetic energy, and so it can get over this hill.

And when it gets to the other side, the force was in the positive direction.

It increases its kinetic energy, and it goes off to what we're referring to as infinity.

So one analogy that people like to make is to understand the motion, think of a marble that's rolling down a hill.

And this is just a metaphor for this potential energy function.

As the marble rolls down the hill, it gains kinetic energy.

It loses potential energy.

It comes maximum at the bottom of the hill.

As it goes up the hill, it still has enough kinetic energy to get over the top of the hill and to start to come down the other side.

And of course, our particle can never get to the speed of light.

So our model has to break off at one point.