So far in the course, we've been studying the motion of collections of particles.

We would know like to consider rigid bodies.

Now, rigid bodies can be translated in space as I move it like this.

Or we can rotate this rigid body about some point.

I can rotate it about the end point.

I can rotate it about a point which we call the center of mass.

So I can rotate it about the center of mass.

I can take the rigid body and I can rotate it about the center of mass, and also translate it in space.

So there's many types of motions that we can do with rigid bodies.

Sometimes the motions are quite complicated.

If I spin it like that, it is a very more complicated motion.

You can see that it's rotating about this axis.

So what we'd like to do now is analyze how to think about the motion of rigid bodies.

And what we'd like to do is idealize our rigid body.

So even though we looked at a rod here, let's just draw some extended idealized rigid body.

And let's identify two points in that rigid body-- the j-th point and the k-th point.

And we'll think of our rigid body as a bunch of point-like particles mj and mk.

And the important thing that defines a rigid body is the condition that the distance-- and we'll draw a vector from the k-th particle to the j-th particle.

So we'll draw that as rjk.

And actually, I'd like to write it from the k-th particle to the j-th particle rjk.

And our condition is that the magnitude of this vector, which I'll denote as rjk is constant for all points j and k.

Now, what does that mean?

That means the distance between any two points in the rigid body stays fixed no matter how the rigid body is moving and no matter what two points I choose.

The distance between any two points is fixed.

So we'll rewrite this as the distance between any two points is fixed.

So that doesn't change.

And that's what we call the rigid body condition.