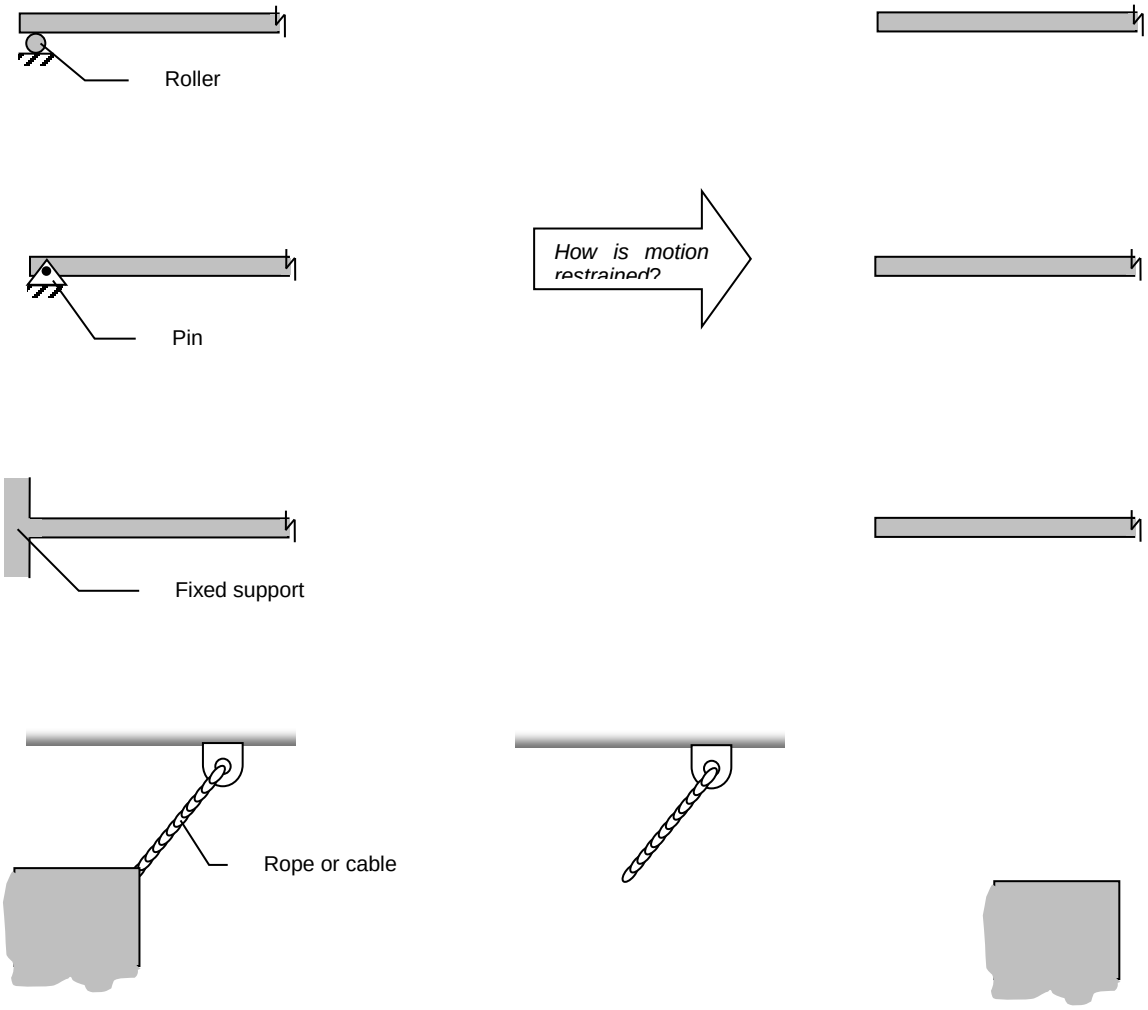
ACTIVE LEARNING EXERCISE: Types of supports and their reactions

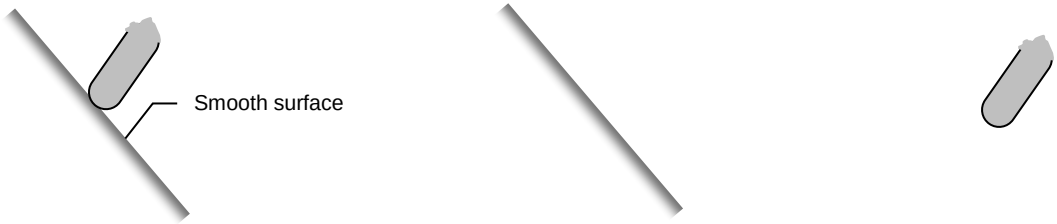
When we isolate a system for analysis, we "remove" supports and replace them with the forces and/or moments they supply to the system. Such forces/moments are called **reactions**.

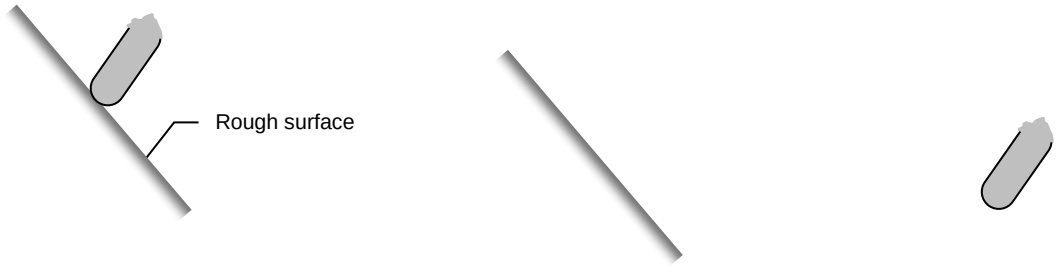
When trying to figure out whether a reaction consists of forces, moments, or both, it is useful to think about the way in which the support *restrains the motion* of the system. This will also help us determine the directions these forces/moments are directed. For example, if a support keeps something from moving up and down, then a reaction force develops in the vertical direction. If a support keeps something from rotating about an axis, then a moment reaction develops about that axis.

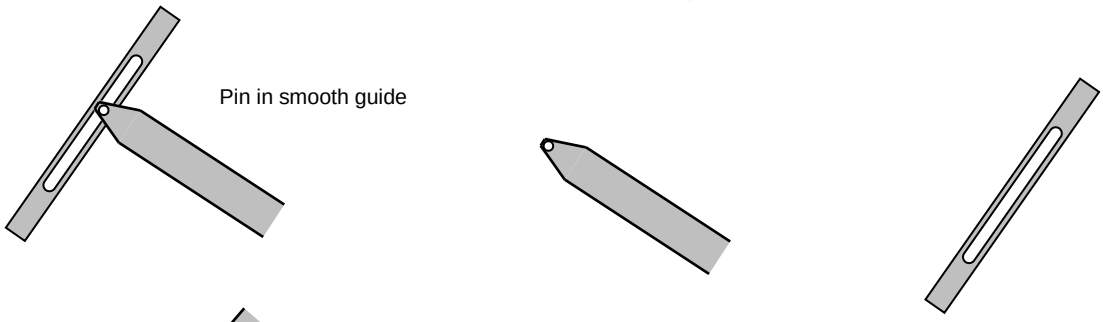
Keeping this advice in mind, see if you can determine the reactions supplied by these three common supports.

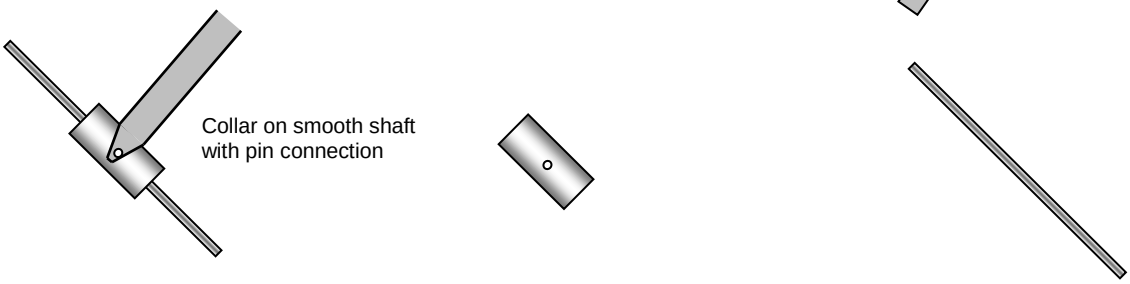


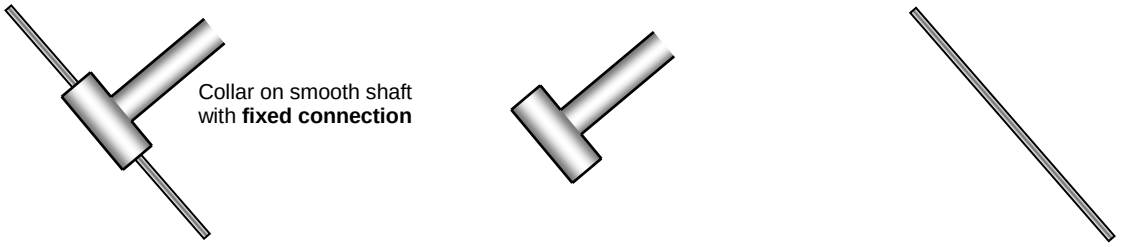
(Don't miss the exciting conclusion to this exercise on the back of this page!)

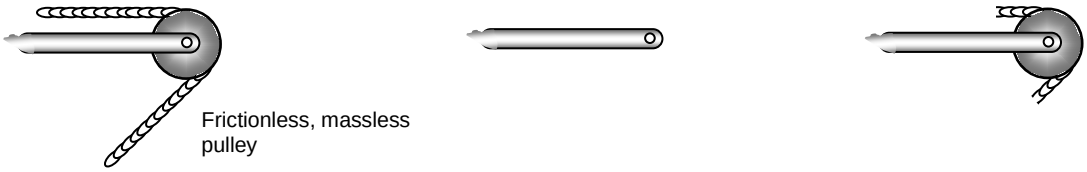

Smooth surface


Rough surface


Pin in smooth guide


Collar on smooth shaft
with pin connection


Collar on smooth shaft
with **fixed connection**


Frictionless, massless
pulley