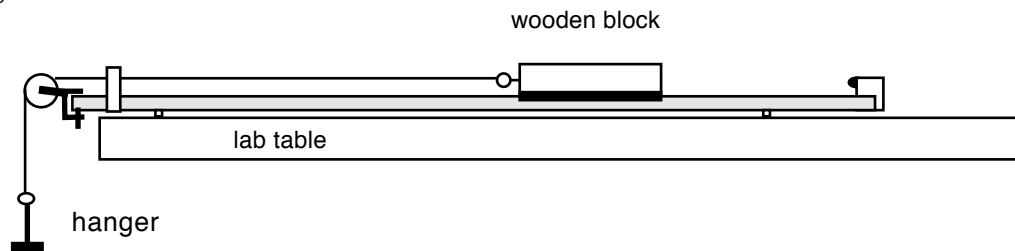


## Friction on a Block

Imagine that some students are doing an experiment involving forces and friction using the equipment shown below. A wooden block is on a horizontal track and is attached via a pulley to a hanger. In the experiment, they will release the hanger and need to measure the acceleration of the block/hanger in order to be able to calculate the force of friction.



### Concepts

1. We often talk about “the system” in physics problems. A system is two or more objects that have the same motion (speeds and accelerations) because they are connected in some way. In this situation, what is the system?
2. If this was a lab, and I asked you to measure the acceleration of the system, how could you do it?
3. There are four big forces that are affecting the system. What are they? Be specific.
4. Two of those big forces cancel each other out. What are they?
5. What force is trying to speed up the system and cause the motion?
6. What force is trying to slow down the system and fight the motion?

### Calculations

For the calculations below, use the following numbers:

$$M_{\text{block}} = 119 \text{ grams} \quad m_{\text{hanger}} = 50 \text{ grams} \quad a_{\text{system}} = 0.934 \text{ m/s}^2.$$

7. What is the applied force on the system? (i.e. Calculate the force that is trying to accelerate the system?)
8. What is the mass of the system?
9. What is the net force on the system?
10. What is the force of friction on the system?

- 7) 0.5 N      8) 0.169 kg      9) 0.16 N      10) 0.34 N