

PH 221 Week 5

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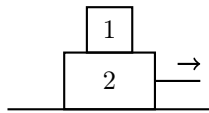
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This material is borrowed/adapted from Chapter 7 of the *Student Workbook for Physics for Scientists and Engineers*, and from PH 201 Tutorial 5 for Fall 2020.

R5-1: Interactions and the Third Law

For the following situations, draw free-body diagrams and indicate the Newton's third law pairs.

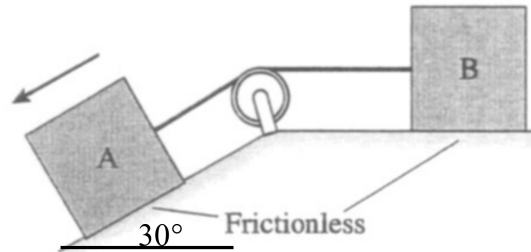
- (a) A massless string pulls a box across the floor. Friction is not negligible.
- (b) The bottom block is pulled by a massless string. Friction is not negligible. Treat the two blocks as separate objects.



- (c) A skateboarder is pushing on the ground to speed up. Treat the person and the skateboard as separate objects.

R5-2: Two Blocks on a Frictionless Half-Ramp

Consider the situation depicted below. Friction is negligible for the blocks and surface, and we will assume the strings and pulley are ideal (massless, frictionless, etc.).



- (a) Draw a free-body diagram for each block.
- (b) Indicate the Newton's third law pairs.
- (c) Find the normal force on each block.
- (d) Find the acceleration of the two blocks.
- (e) Find the tension in the string.