

Free-Body Diagrams

Read from **Lesson 2** of the **Newton's Laws** chapter at **The Physics Classroom**:

<http://www.physicsclassroom.com/Class/newtlaws/u2l2b.html>

<http://www.physicsclassroom.com/Class/newtlaws/u2l2c.html>

MOP Connection: Newton's Laws: sublevel 5

Construct free-body diagrams for the following physical situations. Label all forces (e.g, F_{grav} , F_{norm} , F_{app} , F_{frict} , F_{air} , F_{tens} , etc.).

- a. A physics book rests upon a level table.



- b. A skydiver is falling and has reached a terminal velocity.



- c. A large crate is being pushed leftward at a constant velocity.



- d. A sledder has reached the bottom of a hill and is coasting rightward while slowing down.



- e. A ball is moving upwards towards its peak. Ignore air resistance.



- f. An air track glider moves rightward at constant speed.



- g. The brakes are applied to a rightward moving car and it skids to a stop.



- h. A spider is slowly descending a thin silk thread at constant speed.



- i. A projectile is moving upwards and rightwards towards the peak of its trajectory.



- j. An elevator is rising at a constant velocity; it is not touching the elevator shaft.



- k. An upward rising elevator is slowing down; it is not touching the elevator shaft.



- l. A force is applied to accelerate a crate across a rough horizontal surface.

