

## Free-Body Diagrams

Name:

Block:

Construct free body diagrams for the following situations for the following situations at the instant in time for which they are described. Be sure to label the forces according to type ( $F_N$ ,  $F_g$ ,  $F_A$ , etc.) and draw the arrows such that their length reflects the magnitude of the force.

1. A book is at rest on top of a table.
2. A book is being pushed to the right across a table surface with a constant velocity. (Neglect air friction)
3. A book is being pushed to the right across a table surface and is accelerating in the direction of the push. (Neglect air friction)
4. A gymnast is suspended from the ceiling by two ropes.
5. A student is pushing lightly upon a large box in an attempt to push it to the right across the floor but the box fails to move.
6. A box moving to the right (which was previously pushed) gradually slows to a stop.
7. A ball is dropped from rest from the top of a building. (Neglect air friction)
8. A football is being thrown upwards and rightwards.
9. Several seconds after being thrown, a football is moving upwards and rightwards towards the peak of its trajectory. (Neglect air friction)
10. Several seconds after being thrown, a football reaches the peak of its trajectory. (Neglect air friction)
11. A falling skydiver is speeding up.
12. A falling skydiver has reached terminal velocity.
13. After reaching terminal velocity, a falling skydiver has opened her parachute.
14. A car is moving to the right at a high speed across a level roadway; the driver's foot remains on the gas pedal.
15. A car is skidding to a stop (with wheels locked) while travelling to the right across a level roadway.
16. A picture hangs by two wires oriented at angles to the vertical.