

Help Sheet on Net Force & Acceleration (Newton's 2nd Law of Motion)

It takes practice to be able to analyze situations involving motion. Problems can be posed in a variety of ways. Sometimes you will know something about the motion of an object and you will be asked to analyze the forces acting on the object. In other cases, you will know the forces acting on the object and will be asked to predict its motion.

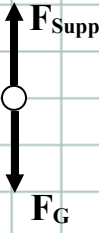

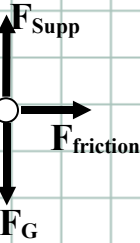

The worksheet on the next two pages shows you 4 elements that should be regular parts of your analysis:

- Drawing a force diagram(s)
- Determining Net Force
- Finding the acceleration
- Understanding what the object is actually doing



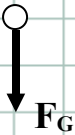
In the following worksheet, you will be asked to fill in the missing parts of the analysis. Again, this process is similar to that needed for many of the motion problems that you will analyze in class, on quizzes and exams.

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Fill in the missing parts of the following table that describe the motion of a book pushed across a table, then slows to a stop without running into anything. Remember, that Newton's 2nd Law says the acceleration is equal to the net force divided by the mass. However, also remember that the acceleration is always in the same direction as the net force.

Force Diagram	Net Force	Acceleration (left, right, or zero)?	Describe the object's motion
1) 		Zero	
2) 			Moving to the left, speeding up
3) 		Right	
4) 	$F_{\text{net}} = 0$		

Fill in the missing parts of the following table that describe the motion of a ball thrown vertically (straight up)- assume air resistance is negligible. Remember, that Newton's 2nd Law says the acceleration is equal to the net force divided by the mass. However, also remember that the acceleration is always in the same direction as the net force.

Force Diagram	Net Force	Acceleration (up, down, or zero)?	Describe the object's motion
5) While hand is pushing up 			Ball is moving upward at increasing speed
6) Part way up 		Down	Ball is moving upward, but slowing down
7) At peak 			Ball is stopped for an instant; F_G still acts even though ball is stationary
8) On the way back down 