

# Physics Survival Guide

---

How to Study and Ace Any Physics Course

Wayne Huang, PhD

Keith Duda, M.Ed.



2009 Edition

**Rapid Learning Center**  
<http://www.RapidLearningCenter.com>

Copyright © 2009 Rapid Learning Inc.

#### Disclaimer

While all attempts have been made to verify the information provided in this Guide, the author does not assume any responsibility for errors, omissions, or contrary interpretation of subject matter. When in doubt, consult your instructor or textbook. The information in this Guide is for recommendation only, and is not an endorsement of any product, nor does the author or publisher accept any liability whatsoever as a result of usage. Some links presented in this Guide may change.

#### Dedication

My students are my teachers. I have learned and been inspired so much from them. For that, I dedicate this Guide to them.

## FOREWORD – THE WINNING EDGE IN PHYSICS

Physics can be described as the study of how the universe works. Its mastery enables an easy path to engineering, chemistry, biology, geology, forensics and other related subjects. To understand physics is to understand its principles and then apply them to unfamiliar context. It does not require extensive memorization like biology.

The most important skill in physics is problem solving. It isn't merely the process of getting the right answer to a particular question. Students often get too wrapped up in simply verifying an answer and then just moving on. Instead, at the core of physics is the ability to understand a physical situation, analyze its properties and components, then accurately predict an outcome.

Don't be intimidated. In reality, you don't need to spend more time studying physics than other subject if you use a smart study system to understand all the important concepts and principles. The key to effective learning in physics is to memorize the least and apply this knowledge to the fullest.

Many of you apply the same study methods from non-science subjects to science classes, and have difficulty in these classes. Even within the science disciplines, you might get yourself in trouble by studying the same way in physics as in biology. At one end of science, biology and geology are information intensive subjects. You can read through the text and memorize the content, and you will do fine. At the other end, physics and calculus are fundamental sciences. If you master a few basic concepts and principles, and learn to derive from these fundamentals, you will survive. Understanding and internalizing the ideas is the key!

If you are looking for an effective, high-yield way to study physics, this Guide is for you. Forget about plowing through many weighty textbooks and overwhelming yourself with unnecessary information. Our goal here is to spend minimum effort to achieve maximum results. Bring your physics learning into focus – you'll learn what you need to learn.

As most of you have experienced, at first physics seems difficult, yet it is very learnable if you know how. The very issue of how to study physics is the focus of this Guide. The survival skills you learn will accelerate your mastery of physics and improve your grade quickly. Ignoring them will guarantee that you stay stuck in a rut of inefficiency, which might lead to failure. If you follow the 5-stage systematic method outlined in this Guide, you will significantly improve your learning and achieve a better grade with less study time.

Let's crack on. Get the winning edge today.

*"Perhaps the most valuable result of education is the ability to make yourself do the thing you have to do, when it ought to be done, whether you want to or not. It is the first lesson that must be learned."*

*--Thomas Huxley*

## Table of Contents

FOREWORD – THE WINNING EDGE IN PHYSICS.....	3
WHY READ THIS GUIDE? .....	6
<i>The End &lt;/Old&gt;</i> .....	6
<i>Stop! Don't Read This Guide.</i> .....	6
<i>WIIFM</i> .....	7
<i>Who Are You?</i> .....	7
<i>How to Use this Guide?</i> .....	9
<i>What is Not in this Guide?</i> .....	10
CHAPTER 1: THE SURVIVAL BASICS .....	11
<i>The Physics Survival Mindset</i> .....	11
<i>The Physics Survival Instincts</i> .....	12
CHAPTER 2: THE SURVIVAL GEAR.....	21
<i>PhysMastery Preview Template</i> .....	21
<i>Lecture/Reading Note Template</i> .....	22
<i>Cheat Sheet Templates</i> .....	24
<i>Problem Solving Worksheet Template</i> .....	24
<i>Math Review Cheat Sheet</i> .....	26
<i>Mock Exam Template</i> .....	27
<i>Weekly Study Organizer Template</i> .....	28
CHAPTER 3: THE SURVIVAL SYSTEM - PHYSMASTERY™ .....	30
<i>How Does It Work?</i> .....	30
<i>Customizing Your Own Attack Strategies</i> .....	31
<i>Stage #2: Lecture - Listen and Take Notes Effectively</i> .....	35
<i>Stage #3 Review – Read and Solve with Ease</i> .....	37
<i>Stage #4: Exam Prep – Get Ready Effortlessly</i> .....	39
<i>Stage #5: Exam-Taking - Score High Strategically with Confidence</i> .....	44
CHAPTER 4: THE SURVIVAL GUIDE TO PREVIEWING .....	46
CHAPTER 5: THE SURVIVAL NOTE TAKING.....	48
CHAPTER 6: THE SURVIVAL TEXTBOOK-READING.....	53
CHAPTER 7: THE SURVIVAL GUIDE TO HOMEWORK .....	56
CHAPTER 8: HOW TO PREPARE FOR THE EXAM .....	61
CHAPTER 9: THE SURVIVAL EXAM-TAKING.....	64
CHAPTER 10: EFFECTIVE MEMORIZATION IN PHYSICS .....	79
CHAPTER 11: THE TEN CORE SURVIVAL SKILLS .....	86
<i>Survival Skill #1: Study Effectively like Smart Students</i> .....	86
<i>Survival Skill #2: Top 10 Things You Should Know About Physics</i> .....	90
<i>Survival Skill #3: Basic Math for Physics</i> .....	94
<i>Survival Skill #4: Problem Solving Made Easy</i> .....	100
<i>Survival Skill #5: Top 10 Answer Checkers in Physics</i> .....	103
<i>Survival Skill #6: The Four Step Panic Plan – How to Cram Systematically</i> .....	108
<i>Survival Skill #7: Fighting the Computer Distraction</i> .....	110
<i>Survival Skill #8: Focus On What You Need To Learn</i> .....	112
<i>Survival Skill #9: Learn to Predict Exam Questions</i> .....	113
<i>Survival Skill #10: Organize Your Problem Solving</i> .....	114

CHAPTER 12: TOP 12 CONFUSIONS IN PHYSICS.....	117
1. <i>Mass and Weight</i> .....	117
2. <i>Two Dimensional Problem Solving</i> .....	117
3. <i>Learn the Greek Alphabet</i> .....	118
4. <i>Math Skills</i> .....	118
5. <i>Centripetal and Centrifugal Force</i> .....	118
6. <i>Real and Virtual Images</i> .....	119
7. <i>Electric Potential</i> .....	119
8. <i>Adding Vectors</i> .....	120
9. <i>The Acceleration of Falling Objects</i> .....	121
10. <i>The Right Hand Rule</i> .....	121
11. <i>Graphing</i> .....	122
12. <i>Rotational Motion</i> .....	122
CHAPTER 13: THE INSIDER'S GUIDE TO YOUR PROFESSOR.....	124
<i>Breaking the Silence – The Ten Confessions of Professors</i> .....	124
<i>How to Deal with Your Professor</i> .....	127
<i>Don't Ask Your Professor These Dumb Questions!</i> .....	129
<i>How to Read Your Professor's Mind</i> .....	129
<i>The Professor's Black List of Students</i> .....	131
CHAPTER 14: THE PHYSICS SURVIVAL SOURCES.....	133
<i>Site #1: About Physics</i> .....	133
<i>Site #2: MP3 Physics Lectures</i> .....	133
<i>Site #3: Instant Homework Solutions</i> .....	133
<i>Site #4: Rating Your Professors</i> .....	134
<i>Site #5: Tutors for Hire</i> .....	134
<i>Site #6: Physics Forulas</i> .....	134
<i>Site #7: Physics Study Cards</i> .....	134
<i>Site #8: Powers of 10</i> .....	134
<i>Site #9: Online Courses</i> .....	135
<i>Site #10: Online Unit Conversion</i> .....	135
CHAPTER 15: FUNDAMENTAL PRINCIPLES IN PHYSICS.....	136
THE NEW BEGINNING .....	137