

The Physics of Soccer:

**Using Math and Science to Improve Your
Game**

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Contents

Preface.....	xv
Who Should Read this Book.....	xvii
Acknowledgments.....	xix
Introduction.....	xxi
Chapter 1 Importance of STEM in Sports	1
Orientation of Soccer Toward STEM	2
Growth of Soccer in the United States.....	7
The Physical Versus the Intellectual	10
Linking Soccer to STEM	11
Science	12
Technology.....	13
Engineering.....	14
Mathematics.....	15
Gravity-Assisted Versus Gravity-Impeded	17
Speed, Velocity, and Acceleration.....	17
Widespread Impact of STEM	20
Chapter 1 References.....	20
Chapter 2 Physics and Motion.....	23
Albert Einstein’s Contributions.....	24
Definition of Physics.....	24
Wide Applications of Physics	25
Major Branches of Physics	25
Scientific Conversion Factors	26
Chapter 2 References.....	29
Chapter 3 Energy and Work.....	31
Physical Science of Energy.....	32
Energy Over Vast Distances.....	36
In the Blink of an Eye	37
Simple Machines for Accomplishing Work.....	38

Simple Machine 1: The Lever.....	39
Simple Machine 2: Wheel and Axle	42
Simple Machine 3: The Pulley.....	44
Simple Machine 4: The Inclined Plane.....	45
Simple Machine 5: The Wedge.....	46
Simple Machine 6: The Screw.....	48
Chapter 3 References.....	49
Chapter 4 Soccer Basics.....	51
Historical Accounts of Soccer.....	53
Global Phenomenon.....	56
Physics of Soccer Stampede	57
Categories of Soccer Abilities.....	58
Basics of the Game	59
The Goal Is to Score Goals	76
Rapid Acceleration.....	77
Constant Movement Required	78
Bringing the Ball under Control	79
Fake-Away Ball Control	81
On-the-Run Ball Control.....	81
Straddle-and-Dribble Ball Control.....	82
Keeping Eyes on the Ball.....	83
Physics of the Human Eye	84
Vision Defects and Correction.....	86
Sight and Sound in Soccer	87
Scanning the Field.....	90
Building Team Chemistry through Training.....	91
Communication during Game.....	91
Understanding Referees	92
Referee and Linesman Signals.....	93
The Joy of Soccer Victory.....	100
Starting Young.....	102
Chapter 4 References	105
Chapter 5 Soccer Motion Analysis	107
Mechanics and Kinematics	108
Biomechanics.....	108
Average Velocity	109

Newton's First Law of Motion.....	110
Newton's Second Law of Motion	111
Newton's Third Law of Motion	112
Force Duration and Motion.....	113
Ball Slowdown by Force Duration in Reverse	113
Force Action and Reaction.....	114
Centripetal and Centrifugal Forces	115
Mass and Weight.....	117
Curving the Ball: The Banana Kick.....	117
Pressure and Ball Spin Principles	118
Impact of Pressure Difference.....	119
Chapter 5 References	121
Chapter 6 Soccer Field Generalship	123
Field Situation Awareness.....	124
Field Formations and Positional Dynamics	125
Field Triangulation.....	127
Scalene Triangle.....	127
Geometric Illusions.....	129
Completion Figures.....	130
Paradox Illusions.....	130
Distorting Illusions.....	132
Perspective, Depth, and Distance.....	133
Geometry of Strides: The Long and Short of It.....	134
Extension of Triangles to Mechanics.....	135
Maximum and Minimum Points	138
Basic Calculation Examples	141
Calculation	143
Question	146
Solution	146
Collisions and Impulse.....	151
Weight, Height, Inertia, and Balance	152
Chapter 6 References	153
Chapter 7 Physics of the Soccer Foot	155
Foot Note	156
Physics Inside the Foot	157
Foot and Boot.....	159

Agony of the Feet.....	160
Chapter 8 Brian Peacock’s Soccer Training Clinic.....	163
Counting and Team Groups	164
Soccer Field Area Analysis	171
Probability of a Win.....	178
Chapter 8 Reference.....	180
Chapter 9 Brian Peacock’s Seventeen Steps of Soccer Training .	181
Squares and Triangles	182
Squares in Practice.....	184
Kicking Experiment.....	187
Human Energy Production and Fatigue.....	188
Physiological Work and Energy Expenditure	189
The Seventeen Steps	194
Chapter 9 Reference.....	212
Chapter 10 Soccer Calculations.....	213
Chapter 10 References	229
Chapter 11 Soccer Trivia.....	231
Author’s Soccer Heritage.....	234
Soccer at Saint Finbarr’s College.....	235
Chapter 12 Scientific Management of Soccer	237
Concept of Six Sigma	238
Concept of Lean Process.....	239
Case Study of Practical Application of Management	241
Don’t Drop the Ball.....	245
Success Examples	249
Chapter 12 References.....	257
Epilogue	259
Appendix Units of Measure and Conversion Factors	261
Useful questions and answers	283
Index	285

Preface

The title of this book, *The Physics of Soccer: Using Math and Science to Improve Your Game*, was selected to serve two purposes, figuratively and literally. The literal interpretation of the title conveys the direct functional role of physics as a scientific tool in the game of soccer. The figurative interpretation conveys the fact that the “physics” of something is often used to refer to how something is done, as in how to practice and execute the game of soccer. For comparison, the book *Factory Physics*¹ by Wallace Hopp and Mark L. Spearman (2008) presents fundamental how-to processes of manufacturing, including cycle time, throughput, quality, capacity, work-in-process, inventory, and reliability. The authors describe twenty-two laws (i.e., physics) for manufacturing that help managers better understand production, control cost, improve performance, and manage workers in a manufacturing plant. *The Physics of Soccer* similarly seeks to improve understanding, control, performance, and player management on the soccer playing field. In effect, the physics behind the game of soccer helps us to understand the game better and makes it possible to play the game more efficiently. Efficiency is defined as the ratio of output (result) to input (effort).

The chapters in *The Physics of Soccer* are Importance of STEM (science, technology, engineering, and mathematics) in Sports; Physics and Motion; Energy and Work; Soccer Basics; Soccer Motion Analysis; Soccer Field Generalship; Physics of the Soccer Foot; Brian Peacock’s Soccer Training Clinic; Brian Peacock’s Seventeen Steps of Soccer Training; Soccer Calculations; Soccer Trivia; and Scientific

1. Hopp, Wallace J. and Mark L. Spearman, *Factory Physics*, 3rd ed., McGraw-Hill International Edition, McGraw-Hill/Irwin, Boston, 2008.

Management of Soccer. An appendix is also provided with units of measurement and conversion factors.

Who Should Read this Book

Although the primary focus of *The Physics of Soccer: Using Math and Science to Improve Your Game* is on adolescent soccer players, younger players will enjoy it also as an introductory preparation for how they may approach soccer in later years. It is never too early to introduce players to the beauty of mathematical and scientific reasoning and their applications.

Soccer coaches, soccer parents, and league administrators can also benefit from the book. For this reason, specific paragraphs are included in the book to address the interests of these groups. Soccer moms and soccer spouses can particularly benefit from the chapters on soccer basics and examples, which are presented in a simple and illustrative format. Similarly, soccer grandparents will be interested in this book as a gift to grandchildren. Even professional soccer players will find the book to be of great value because it can help them understand the physics behind what they do so well. It is hoped that this book can help increase general awareness of science and technology as something we see and use every day, particularly in sports. *The Physics of Soccer* can also help to demystify STEM so that young soccer players can readily embrace it as a career path.

Author's Credentials for the Book

Author Deji Badiru has multiple years of experience with soccer, as listed below:

- Over forty years as a soccer player
- Twenty-five years as a soccer dad
- Five years as youth soccer coach

- Three years as adult soccer coach
- One adult soccer season as soccer husband while his wife, Iswat, played briefly with the “Femme Fatale” adult female soccer team in Norman, Oklahoma, in the mid-1990s.

On the technical side, the author’s credentials span the following:

- Over thirty years as an engineering educator
- Registered professional engineer (PE)
- Certified Project Management Professional (PMP)
- Member of Nigerian Academy of Engineers
- Fellow of the Institute of Industrial Engineers
- Award-winning author, educator, researcher, and administrator

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