

# Contents at a Glance

<b><i>Introduction</i></b> .....	<b>1</b>
<b><i>Part I: The Mind of the Renaissance</i></b> .....	<b>7</b>
Chapter 1: Leonardo: The Big Picture .....	9
Chapter 2: Living in Renaissance Italy .....	23
Chapter 3: Uncovering the Life and Mind of a Genius .....	49
Chapter 4: Influencing Leonardo .....	75
<b><i>Part II: Building on What Others Knew: Leonardo's Scientific Mind</i></b> .....	<b>101</b>
Chapter 5: The Art of the Human Body .....	103
Chapter 6: An Inquiring Mind: Leonardo and the Natural World .....	127
<b><i>Part III: Reinventing the Wheel: New Machines for a New World</i></b> .....	<b>149</b>
Chapter 7: Machines for Home and Work .....	151
Chapter 8: Leo the Defense Contractor: His Water Works and War Machines .....	163
Chapter 9: Leonardo's Flying Machines .....	179
<b><i>Part IV: The Divinity of the Painter and Architect</i></b> .....	<b>191</b>
Chapter 10: The Master of His (Artistic) Domain: Transforming Renaissance Art .....	193
Chapter 11: <i>Mona Lisa's</i> Smile and Other Mysterious Mugs: Leonardo's Portraits .....	213
Chapter 12: Town and Country: Leo's Landscapes, Maps, and City Designs .....	229
<b><i>Part V: Leonardo, His Religious Artwork, and The Da Vinci Code</i></b> .....	<b>249</b>
Chapter 13: Getting Religion: Leonardo's Religious Beliefs and Paintings .....	251
Chapter 14: Leonardo's (Faux) Fresco: <i>The Last Supper</i> .....	275
Chapter 15: Breaking <i>The Da Vinci Code</i> .....	289
<b><i>Part VI: The Part of Tens</i></b> .....	<b>307</b>
Chapter 16: Leonardo's Ten (Or So) Manuscripts .....	309
Chapter 17: Leonardo's Top Ten Masterpieces .....	315
Chapter 18: Ten Plus Places to Find Leonardo's Original Works .....	319
Chapter 19: Ten Fun Facts about Leo .....	325

<i>Appendix A: A Brief Chronology of Leonardo's Life and Times</i> .....	331
<i>Appendix B: Outside Reading (And More) for the Overachievers</i> .....	341
<i>Index</i> .....	351

# Table of Contents

---

## ***Introduction* ..... 1**

About This Book .....	1
Conventions Used in This Book .....	2
What You're Not to Read .....	3
Foolish Assumptions .....	3
How This Book Is Organized .....	4
Part I: The Mind of the Renaissance .....	4
Part II: Building on What Others Knew:	
Leonardo's Scientific Mind .....	4
Part III: Reinventing the Wheel: New Machines for a New World ....	4
Part IV: The Divinity of the Painter and Architect .....	5
Part V: Leonardo, His Religious Artwork,	
and <i>The Da Vinci Code</i> .....	5
Part VI: The Part of Tens .....	5
Appendixes .....	5
Icons Used in This Book .....	6
Where to Go from Here .....	6

## ***Part I: The Mind of the Renaissance* ..... 7**

### **Chapter 1: Leonardo: The Big Picture ..... 9**

Knock, Knock. Who's There? Leonardo . . . ..	10
From humble beginnings .....	10
Jack-of-all-trades .....	12
Inspiring Leonardo's genius .....	14
Lost in Time: Leo's Limitations .....	17
The agony and the ecstasy (Or, the perfectionist	
and the procrastinator) .....	17
A man without letters .....	18
A product of history? .....	19
Communicating effectively — or not .....	20
Revisiting the Beloved Leo Today .....	21

### **Chapter 2: Living in Renaissance Italy ..... 23**

Introducing . . . Drumroll, Please . . . the Renaissance .....	24
Giving birth to the Renaissance .....	25
Out with the new; in with the old .....	26
Ushering in new ideals: Humanism .....	30

Sorting Out All Those Italian City-States .....	32
Strolling the streets of Florence .....	33
Moving up in Milan: The Sforza dynasty .....	37
Duking It Out, Literally: The Italian Wars .....	38
The nutshell version .....	39
The long version .....	39
Coping with Renaissance Religion .....	41
Struggling for power: The Holy Roman Empire versus the papacy .....	41
Listing Church ideals and then straying from them .....	43
Loosening the Church's iron grip .....	44
Responding to secular threats .....	45
Examining the Legacy of the Renaissance .....	47
<b>Chapter 3: Uncovering the Life and Mind of a Genius .....</b>	<b>49</b>
Chilling in Vinci: Leonardo's Childhood .....	50
The love child .....	50
Not a boy, not yet a man .....	53
The world was a closed oyster .....	55
Honoring Thy Master: In Andrea del Verrocchio's Workshop .....	55
Working in Verrocchio's workshop .....	56
Collaborating, the name of the game .....	57
Gaining Independence: Leonardo's First Florentine Period .....	58
Receiving his first commissions .....	58
Considering Leonardo's sexuality .....	59
Romping through the Sforza Court of Milan .....	61
Highlighting strengths as military engineer .....	61
Serving as court artist .....	62
Returning to Florence: Leo's Second Florentine Period .....	66
First up: An altar painting .....	66
A slight detour: On the march with Cesare Borgia .....	67
Back to the drawing board: Fending off his rivals .....	68
Heading Back to Milan .....	70
Living the High Life at the Papal Court in Rome .....	71
Philosophizing in France with François I .....	72
A Life in Full .....	73
<b>Chapter 4: Influencing Leonardo .....</b>	<b>75</b>
Ushering in Renaissance Art .....	75
The door contest .....	76
Artists, the new rock stars .....	78
Keeping It Real: The New Renaissance Style .....	79
Breaking away from medieval art .....	79
Inventing, Renaissance style: Three greats .....	81

The Culture of Patronage .....84  
 Living off the upper crust: The patrons .....84  
 The nuts and bolts of patronage .....85  
 The pros and cons of patronage .....85  
 Apprenticing in the Artist’s Workshop .....87  
 Becoming an apprentice .....87  
 Living in Verrocchio’s workshop .....88  
 Imitating the master — or not .....91  
 Joining the old boys’ club: The artists’ guild .....92  
 Demystifying a Mysterious World .....93  
 Burning the candle: Leonardo’s library .....93  
 See me; hear me; touch me; feel me .....95  
 Adding it all up: Math and the Renaissance .....96  
 Influencing the World .....98

***Part II: Building on What Others Knew:  
 Leonardo’s Scientific Mind ..... 101***

**Chapter 5: The Art of the Human Body .....103**

Anatomical Progress in Leonardo’s Day .....103  
 Leo’s Magical, Mechanical Anatomical Methods .....105  
 Dissection: Getting to the heart of the matter .....105  
 Nuts and bolts: Leo’s view of the human body .....107  
 Leonardo’s Discoveries and Theories .....107  
 Divining proportion: Vitruvian Man .....108  
 Boning up and muscling in .....111  
 Pondering matters of the heart .....112  
 Gulping down dinner .....114  
 Thinking hard about the noggin .....115  
 Seeing through the window to the soul .....116  
 Pithing a frog: The nervous system .....118  
 Depicting the babe in the womb  
 (and some odd lessons in sex) .....118  
 Contributing to Modern Science: Leonardo’s Anatomy Studies .....120  
 Experimenting the scientific way .....121  
 Illustrating anatomical beauty .....122  
 Challenging common knowledge .....123  
 Establishing a reputation and making an impact .....125

**Chapter 6: An Inquiring Mind: Leonardo and the Natural World ... 127**

Hitting Pay Dirt: Leo’s Botanical Studies .....128  
 Lounging around in the Italian garden .....128  
 The flowering of botanical illustration .....130  
 Focusing on the trees of the forest .....133



- Digging Deep inside the Earth: Leo's Geology and Paleontology Studies .....135
  - The earth — 4.5 billion years and counting .....135
  - Dead again: Fossils .....136
- Staying Afloat in Hydrological Science .....139
  - The lifeblood of the universe .....139
  - The nature of waves .....140
  - Bending nature to human will .....141
- Gazing at the Heavens: Astronomy .....141
  - Twinkle, twinkle, little star . . . .....142
  - Earth is just another planet: The heliocentric theory .....143
- Movin' and Groovin': The Science of Mechanics .....144
  - Buying into the pyramid scheme .....145
  - Action, reaction: Laws of motion .....145
- Son of Experience: Leonardo and His Scientific Impact .....147

***Part III: Reinventing the Wheel:  
New Machines for a New World ..... 149***

**Chapter 7: Machines for Home and Work .....151**

- Tooling Around in Leonardo's Day .....151
- The Work Machines .....153
  - Lifting requires more than muscle, baby .....153
  - Drilling deep inside nature .....154
  - Milling food and other goods .....154
  - Spinning faster . . . and faster . . . .....155
- Other Improvements and Inventions .....156
  - It's about \*#&@% time! .....156
  - Hold the presses! .....157
  - Moving onward: Leonardo's car .....157
  - Da Vinci, da Vinci, give me your answer true:
    - Leonardo's bicycle .....158
- Modernizing the Household .....160
- Back to the Future: The Impact of Leonardo's Mechanical Designs .....160
  - Guiding principles .....161
  - Anticipating the Industrial Revolution .....162

**Chapter 8: Leo the Defense Contractor:  
His Water Works and War Machines .....163**

- Leonardo's Amazing Human-Powered Water Feats .....164
  - Diving into the deep blue seas .....164
  - Walking on water .....166
  - Just paddling around: Watercraft .....167
  - Dredging the ocean (or lagoon) floor .....167
  - Connecting water and land: Canals .....168
  - Building bridges over troubled waters .....169
  - Changing the course of the river: The Arno project .....170

Designing More Weapons for War .....171  
 Moving across enemy lines: Armored tanks .....172  
 Storming walls .....173  
 Diving 20,000 leagues under the sea: The submarine .....173  
 Battleship down! Leonardo’s hull rammer .....174  
 Not exactly Robin Hood: Catapults and crossbows .....174  
 Improving cannons and prefiguring the machine gun .....175  
 Slicing soldiers, the old-fashioned way:  
     Leonardo’s scythed chariots .....176  
 Battling His Way through History: Leonardo’s Impact .....177

**Chapter 9: Leonardo’s Flying Machines .....179**

Introducing Leonardo and His Feathered Friends .....179  
 Theorizing . . . and facing reality .....180  
 Pinpointing problems .....182  
 It’s a Bird, It’s a Plane, It’s . . . Leonardo’s Flying Machines! .....182  
 Designing the human uccello (Bird) .....183  
 Calling Earth to Leonardo, Earth to Leonardo:  
     The gadgets .....185  
 Fred Flintstone meets George Jetson:  
     The mechanical models .....186  
 If you can’t fly, then float: A primitive parachute .....188  
 Connecting Leonardo’s Theories and Inventions  
     to Modern Times .....189  
     The birds and the bees (or bats) .....189  
     A few degrees of separation: The Wright Brothers connection .....190

***Part IV: The Divinity of the Painter and Architect ..... 191***

**Chapter 10: The Master of His (Artistic) Domain:  
 Transforming Renaissance Art .....193**

A Hundred Years of Change .....194  
 Reviewing age-old techniques .....194  
 Coming to a head .....194  
 Eyeing the competition: Leonardo’s major rivals .....196  
 Ideas That Informed Leonardo’s Art .....199  
 Seeing the larger truths .....199  
 Applying mathematics to art .....200  
 Putting things in perspective .....202  
 Pioneering a New Realism in Painting .....206  
 Solving the problem of lighting: Chiaroscuro .....206  
 Reviving Flat Stanley: Sfumato .....207  
 Applying proportion to painting .....208  
 Twisting this way and that: Contrapposto .....209  
 Using and Sticking With Oil Paints .....210  
 Egg versus oil: A brief comparison of paint .....210  
 Experimenting with oil .....212

<b>Chapter 11: <i>Mona Lisa's Smile and Other Mysterious Mugs: Leonardo's Portraits</i></b> .....	<b>213</b>
Sitting for Leonardo: The Portraits .....	214
<i>Ginevra de' Benci</i> (c. 1474) .....	214
<i>Lady with an Ermine</i> (Cecilia Gallerani) (c. 1482–83) .....	215
<i>Portrait of a Musician</i> (c. 1482–90) .....	217
<i>Portrait of an Unknown Woman</i> (La Belle Ferronière) (c. 1490–95) .....	218
<i>Isabella d'Este</i> (c. 1499) .....	219
<i>Mona Lisa</i> (1503) .....	220
Funny Face(s): The Grotesques .....	225
Setting the Standard for Portraiture .....	228
<b>Chapter 12: Town and Country: Leo's Landscapes, Maps, and City Designs</b> .....	<b>229</b>
Depicting Nature's Forces: Leo's Landscapes .....	230
Landscape drawing for Santa Maria della Neve .....	230
Rain, rain, go away: The Deluge series .....	231
Designing the Ideal City .....	233
Laying the groundwork: Renaissance architecture 101 .....	233
Rebuilding Milan: Leonardo's ambitious plan .....	236
Mapmaker, Mapmaker, Make Me a Map .....	238
Mapping out Imola .....	239
Under the Tuscan sun .....	240
Looking down on the Italian Coast .....	241
Imagining Castles, Cathedrals, Churches, and Châteaux .....	242
The domes on the church go 'round and 'round . . . ..	242
Palaces in the air .....	244
Rapunzel, Rapunzel: Leonardo's castles .....	246
Circulating Classical Ideas Today .....	248
<b><i>Part V: Leonardo, His Religious Artwork, and The Da Vinci Code</i></b> .....	<b>249</b>
<b>Chapter 13: Getting Religion: Leonardo's Religious Beliefs and Paintings</b> .....	<b>251</b>
Goin' to the Chapel . . . or Maybe Not: Leonardo's Views on Religion .....	252
Bucking church practices and Christian norms .....	252
Piecing together his philosophy .....	253
Universalizing the Language of Religion: Christian Iconography .....	254
Understanding Renaissance iconography .....	254
Comparing Leonardo's iconography .....	255

Singing a New Tune: Leonardo's Angels .....	256
<i>Baptism of Christ</i> (c. 1472–75) .....	257
<i>Annunciation</i> (c. 1472–75) .....	258
Multiplying Madonnas .....	259
<i>Madonna with the Carnation</i> (c. 1475–80) .....	260
<i>Madonna Benois</i> (c. 1475–80) .....	260
<i>Madonna Litta</i> (c. 1490) .....	261
<i>Virgin of the Rocks</i> .....	262
<i>Madonna with the Yarnwinder</i> (c. 1500–10) .....	264
Other Biblical Folks .....	265
<i>St. Jerome</i> (c. 1480–83) .....	266
<i>St. John the Baptist</i> (c. 1513–16) .....	267
Other Religious Paintings .....	268
<i>Adoration of the Magi</i> (c. 1481–82) .....	268
<i>Burlington House Cartoon</i> (c. 1499–1500) .....	270
<i>The Virgin and Child with St. Anne</i> (c. 1508–10) .....	271
Rethinking Leo's Religious Pieces .....	272

## **Chapter 14: Leonardo's (Faux) Fresco: *The Last Supper* ..... 275**

Looking Closely at <i>The Last Supper</i> .....	276
Reviewing the biblical back story .....	276
Reworking a traditional scene .....	277
Synthesizing Style in <i>The Last Supper</i> .....	280
Setting the scene and deciphering the symbols .....	281
Experiencing (and imagining) perspective .....	281
Damaging (And Restoring) the Painting:	
Techniques and Controversy .....	283
Leonardo's disappearing fresco .....	284
Restoring (or, repainting) the masterpiece .....	285
The lingering controversy over restoration .....	286
Popularizing <i>The Last Supper</i> : Its Cultural Impact .....	287

## **Chapter 15: Breaking *The Da Vinci Code* ..... 289**

Summarizing <i>The Da Vinci Code</i> .....	290
The Novel's Claims: Fact or Fiction? .....	292
Revisiting the Council of Nicaea .....	292
Looking the Gnostic Gospels in the face .....	293
Shining the spotlight on Mary Magdalene .....	295
Identifying the holy grail .....	296
Secret sects: The Priory of Sion .....	298
Evil societies: Opus Dei Dei Dei Dum .....	299
If you're royalty, I'm definitely royalty: The Merovingian line .....	299
Onward Gnostic soldiers: The Knights Templar .....	300
Back to the Main Man — Leonardo! .....	301
Fun — and fallacious — facts .....	301
Uncovering the hidden clues in his art .....	302
Hot on the Trail, from Paris to London .....	305

**Part VI: The Part of Tens .....307****Chapter 16: Leonardo's Ten (Or So) Manuscripts .....309**

Codex Atlanticus .....	310
Codex Arundel .....	310
Codex Ashburnham .....	311
Codices of the Institute de France .....	311
Codex "On the Flight of Birds" .....	311
Trattato della Pittura (Treatise on Painting) .....	312
Madrid Manuscripts I and II .....	312
Codex Trivulzianus .....	312
Codex Leicester .....	313
The Forster Codices .....	313
Windsor Castle Royal Library Collection .....	314
Manuscripts in Other Collections .....	314

**Chapter 17: Leonardo's Top Ten Masterpieces .....315**

<i>Mona Lisa</i> .....	315
<i>The Last Supper</i> .....	316
<i>Burlington House Cartoon</i> .....	316
<i>The Virgin and Child with St. Anne</i> .....	316
<i>Adoration of the Magi</i> .....	317
<i>Virgin of the Rocks</i> .....	317
<i>St. Jerome</i> .....	317
<i>Lady with an Ermine (Cecilia Gallerani)</i> .....	318
<i>St. John the Baptist</i> .....	318
<i>Ginevra de' Benci</i> .....	318

**Chapter 18: Ten Plus Places to Find Leonardo's Original Works ... 319**

The Louvre Museum, Paris .....	319
Uffizi Gallery, Florence .....	320
Convent of Santa Maria delle Grazie, Milan .....	320
Musei Vaticani, Vatican, Rome .....	321
National Gallery, London .....	321
The Hermitage, St. Petersburg .....	321
Alte Pinakothek, Munich .....	322
National Gallery of Art, Washington, D.C. ....	322
Biblioteca Ambrosiana, Milan .....	323
Czartoryski Museum, Cracow .....	323
In Private Collections .....	323

**Chapter 19: Ten Fun Facts about Leo . . . . . 325**

- Fresh Out of the Oven: The Story Begins .....325
- Facing Sexual Misgivings (Or Others', Anyway) .....325
- His Lovable Traits . . . . .326
- . . . and His Quirky Ones .....326
- Measuring Leo's Skill Set .....327
- Cultivating Those Contradictions .....327
- Rubbing Elbows with Fame .....328
- Besting All around Him: Leo's Firsts .....328
- Taking a Hit: Leo's Failures .....329
- Going Pop: Leo's Leading Lady, *Mona Lisa* .....329

***Appendix A: A Brief Chronology of Leonardo's  
Life and Times . . . . . 331***

- Key Early Renaissance Events .....331
- Leonardo's Life and Work .....332

***Appendix B: Outside Reading (And More)  
for the Overachievers . . . . . 341***

- Reading about Renaissance Italy .....341
- In His Own Words: Leo's Notebooks .....342
- Biographies and Overviews of Leo's Life .....342
- Popular Nonfiction about Leo . . . and You .....343
- Specialized Studies of Leonardo's Work .....344
  - Art and architecture .....344
  - Human anatomy .....345
  - Nature, science, and technology .....345
- Fictionalizing Leonardo: Literary Spin-Offs .....346
- Leonardo for Younger Readers .....347
- Informative Web Sites about Leonardo .....348
- The (Scholarly) Fan Clubs .....349
- Leonardo in 3-D: Video, CDs, and Film .....350

***Index . . . . . 351***

