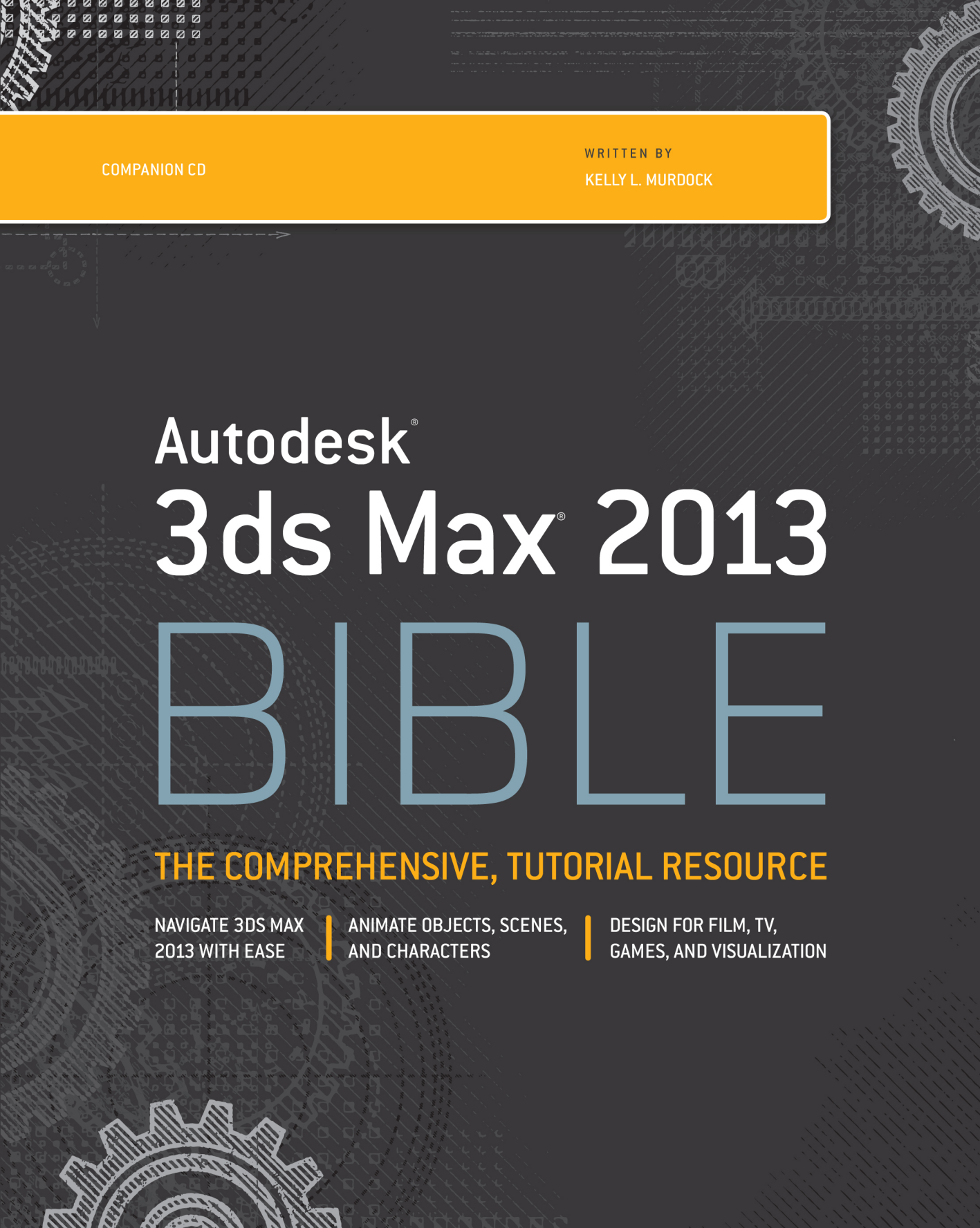




COMPANION CD

WRITTEN BY
KELLY L. MURDOCK

Autodesk® 3ds Max® 2013 BIBLE

THE COMPREHENSIVE, TUTORIAL RESOURCE

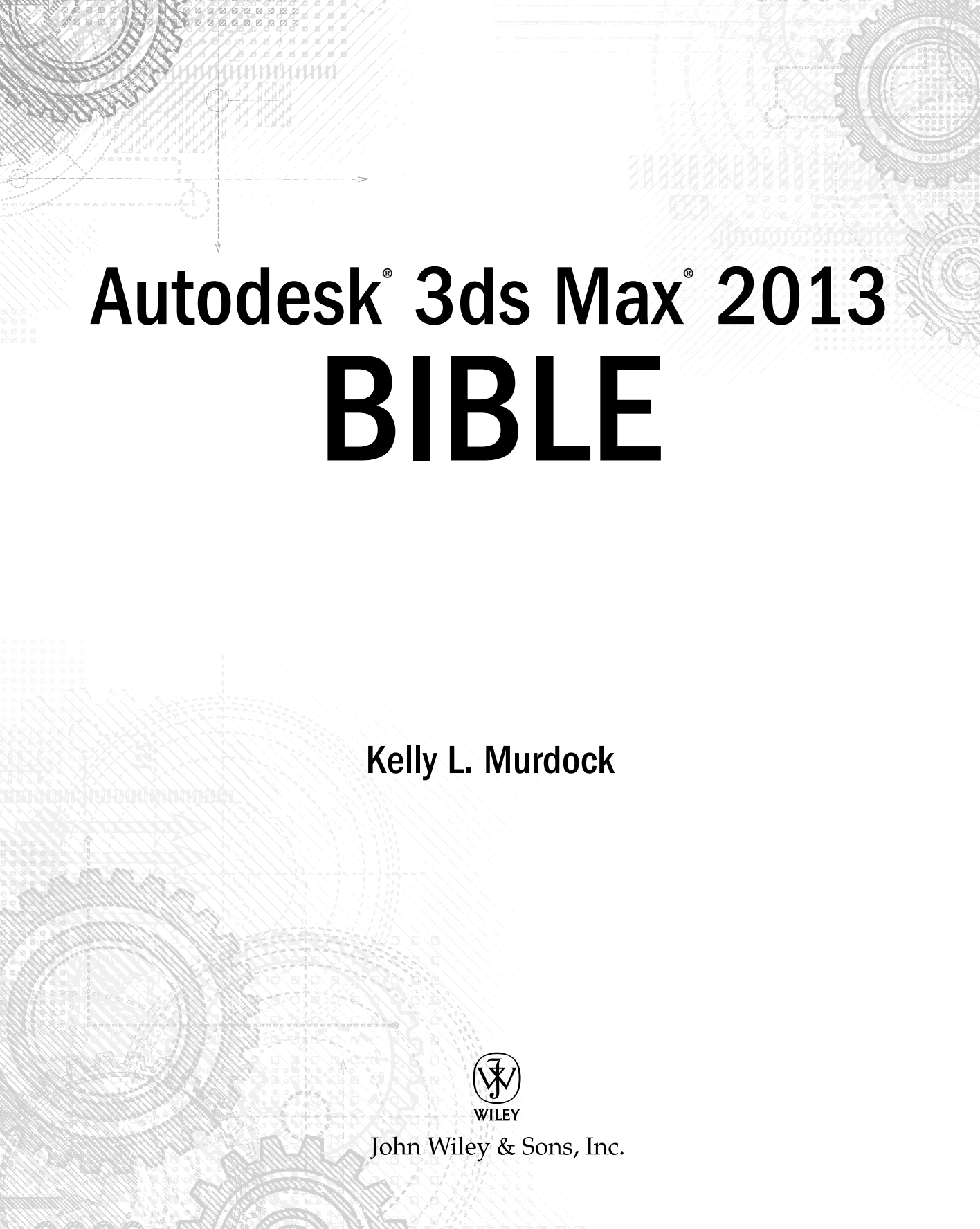
NAVIGATE 3DS MAX
2013 WITH EASE

ANIMATE OBJECTS, SCENES,
AND CHARACTERS

DESIGN FOR FILM, TV,
GAMES, AND VISUALIZATION

Autodesk® 3ds Max® 2013

BIBLE



Autodesk® 3ds Max® 2013 BIBLE

Kelly L. Murdock



John Wiley & Sons, Inc.

Autodesk® 3ds Max® 2013 Bible

Published by
John Wiley & Sons, Inc.
10475 Crosspoint Boulevard
Indianapolis, IN 46256
www.wiley.com

Copyright © 2012 by John Wiley & Sons, Inc., Indianapolis, Indiana

Published by John Wiley & Sons, Inc., Indianapolis, Indiana

Published simultaneously in Canada

ISBN: 978-1-118-32832-3

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

NO PART OF THIS PUBLICATION MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC, MECHANICAL, PHOTOCOPYING, RECORDING, SCANNING OR OTHERWISE, EXCEPT AS PERMITTED UNDER SECTIONS 107 OR 108 OF THE 1976 UNITED STATES COPYRIGHT ACT, WITHOUT EITHER THE PRIOR WRITTEN PERMISSION OF THE PUBLISHER, OR AUTHORIZATION THROUGH PAYMENT OF THE APPROPRIATE PER-COPY FEE TO THE COPYRIGHT CLEARANCE CENTER, 222 ROSEWOOD DRIVE, DANVERS, MA 01923, (978) 750-8400, FAX (978) 646-8600. REQUESTS TO THE PUBLISHER FOR PERMISSION SHOULD BE ADDRESSED TO THE PERMISSIONS DEPARTMENT, JOHN WILEY & SONS, INC., 111 RIVER STREET, HOBOKEN, NJ 07030, 201-748-6011, FAX 201-748-6008, OR ONLINE AT <http://www.wiley.com/go/permissions>. LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND THE AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES OR PROMOTIONAL MATERIALS. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY SITUATION. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING LEGAL, ACCOUNTING, OR OTHER PROFESSIONAL SERVICES. IF PROFESSIONAL ASSISTANCE IS REQUIRED, THE SERVICES OF A COMPETENT PROFESSIONAL PERSON SHOULD BE SOUGHT. NEITHER THE PUBLISHER NOR THE AUTHOR SHALL BE LIABLE FOR DAMAGES ARISING HEREFROM. THE FACT THAT AN ORGANIZATION OR WEBSITE IS REFERRED TO IN THIS WORK AS A CITATION AND/OR A POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE AUTHOR OR THE PUBLISHER ENDORSES THE INFORMATION THE ORGANIZATION OR WEBSITE MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. FURTHER, READERS SHOULD BE AWARE THAT INTERNET WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ.

For general information on our other products and services or to obtain technical support, please contact our Customer Care Department within the U.S. at (877) 762-2974, outside the U.S. at (317) 572-3993 or fax (317) 572-4002.

Library of Congress Control Number is available from the publisher.

Trademarks: Wiley and the Wiley logo are trademarks or registered trademarks of John Wiley & Sons, Inc., in the United States and other countries, and may not be used without written permission. Autodesk and 3ds Max are registered trademarks of Autodesk, Inc. All other trademarks are the property of their respective owners. John Wiley & Sons, Inc. is not associated with any product or vendor mentioned in this book.

Viewpoint 3D models are copyright Digimation, Inc. All rights reserved.

John Wiley & Sons, Inc. also publishes its books in a variety of electronic formats and by print-on-demand. Some content that appears in standard print versions of this book may not be available in other formats. For more information about John Wiley & Sons, Inc. products, visit us at www.wiley.com.

About the Author

Kelly Murdock has been authoring computer books for many years now and still gets immense enjoyment from the completed work. His book credits include various 3D, graphics, multimedia, and Web titles, including eleven previous editions of this book, *3ds Max Bible*. Other major accomplishments include *Google SketchUp Bible*, *Edgeloop Character Modeling for 3D Professionals Only*, *Maya 6 and 7 Revealed*, *LightWave 3D 8 Revealed*, *The Official Guide to Anime Studio*, *Poser 6, 7, and 8 Revealed*, *3D Game Animation For Dummies*, *gmax Bible*, *Adobe Atmosphere Bible*, *Master VISUALLY HTML and XHTML*, *JavaScript Visual Blueprint*, and co-authoring duties on two editions of the *Illustrator Bible* (for versions 9 and 10) and five editions of the *Adobe Creative Suite Bible*.

With a background in engineering and computer graphics, Kelly has been all over the 3D industry and still finds it fascinating. He's used high-level CAD workstations for product design and analysis, completed several large-scale visualization projects, created 3D models for feature films and games, worked as a freelance 3D artist, and even did some 3D programming. Kelly's been using 3D Studio since version 3 for DOS. Kelly has also branched into training others in 3D technologies. He currently works as a freelance graphic artist and video game producer.

In his spare time, Kelly enjoys playing basketball and collecting video games.

Credits

Senior Acquisitions Editor

Stephanie McComb

Project Editor

Martin V. Minner

Technical Editor

Jon McFarland

Copy Editor

Gwenette Gaddis

Editorial Director

Robyn Siesky

Business Manager

Amy Knies

Senior Marketing Manager

Sandy Smith

**Vice President and Executive Group
Publisher**

Richard Swadley

Vice President and Executive Publisher

Barry Pruett

Project Coordinator

Patrick Redmond

Graphics and Production Specialists

Carrie A. Cesavice

Jennifer Creasey

Joyce Haughey

Sennett Vaughan Johnson

Quality Control Technician

Melissa Cossell

Proofreading

Evelyn Wellborn

Indexing

BIM Indexing & Proofreading Services

Vertical Websites Project Manager

Laura Moss-Hollister

Vertical Websites Associate Producer

Marilyn Hummel

*We all have a brother or some crazy aunt,
whose movie obsession, understand we just can't.
Be it Star Wars, or Star Trek, or Lord of the Rings,
The movie's praises they loudly do sing.
They keep a count of the times they've seen each show,
and to see the latest movies, they'll wait hours in the snow.
They live as their heroes and quote famous movie lines,
and they cover their rooms with posters and signs.
They play all the games and chat with other fans online,
and their bathroom is decorated to look like a shrine.
They have boxes that are filled with collectibles galore,
with so much stuff you can't even open the door.
They look forward all year for the time of Halloween,
Because the costumes they wear are straight off the screen.
I can't understand all these the super fan views,
Just don't touch my limited edition basketball shoes.*

*To Kerry and Donna, the obsession rages on
2013*

Contents

About the Author	V
Preface	xxxv
The Growth of 3ds Max?	xxxv
About This Book	xxxvi
Tutorials aplenty	xxxvi
Twelfth time around	xxxvii
How this book is organized	xxxvii
Using the book's icons	xxxix
The book's CD	xxxix
Acknowledgments	xli
 Part I: Getting Started with Autodesk 3ds Max 2013	 1
 Quick Start: Falling from a Tightrope	 3
Planning the Production	3
Setting Up the Scene	4
Tutorial: Creating the objects	4
Tutorial: Balancing the biped	5
Tutorial: Adding a balance pole	6
Adding a Camera and Light	7
Tutorial: Adding a camera and light	7
Tutorial: Rendering a test preview	8
Animating the Great Fall	9
Tutorial: Creating animation keys	9
Tutorial: Linking objects	10
Tutorial: Animating with MassFX	11
Tutorial: Rendering the final animation	13
Summary	14
 Chapter 1: Exploring the Interface	 15
Learning the Interface Elements	16
Using the Menus	18
Using the Toolbars	20
Docking and floating toolbars	20
Using tooltips and flyouts	21

Using the Quick Access toolbar	21
Learning the main toolbar.....	21
Using the Modeling Ribbon	24
Using the Viewports.....	25
Using the Command Panel	26
Working with rollouts.....	27
Increasing the Command Panel's width	28
Tutorial: Rearranging the interface for lefties.....	28
Using the Lower Interface Bar Controls	30
Interacting with the Interface.....	31
Gaining quick access with the right-click quad menus.....	31
Using Caddy controls.....	32
Understanding the button color cues.....	32
Using drag-and-drop features	33
Controlling spinners	33
Understanding modeless and persistent dialog boxes.....	33
Using Workspaces	33
Getting Help	34
Using the InfoCenter toolbar	35
Viewing the Essential Skills Movies	35
Using the online reference guides	36
Using the rest of the Help menu	37
Summary	38
Chapter 2: Controlling the Viewports	39
Understanding 3D Space.....	39
Learning Axonometric versus Perspective.....	40
Learning orthographic and isometric views	40
Discovering the viewports in 3ds Max.....	41
Using the Navigation Gizmos.....	42
Working with the ViewCube.....	42
Using the SteeringWheels.....	43
Tutorial: Navigating the active viewport	45
Controlling Viewports with a Scroll Wheel Mouse.....	46
Using the Viewport Navigation Controls.....	47
Zooming a view.....	48
Panning a view	48
Walking through a view.....	48
Rotating a view.....	49
Maximizing the active viewport	49
Controlling camera and spotlight views	51
Setting the navigation controls to match Maya	52
Changing the Viewport Display.....	53
Undoing and saving viewport changes	53
Disabling and refreshing viewports.....	54

Setting the viewport visual style.....	54
Viewing stylized scenes.....	56
Enhancing the Viewport	57
Changing the viewport layout.....	57
Displaying Safe Frames	58
Using clipping planes	58
Tutorial: Viewing the interior of a heart with clipping planes.....	58
Locating mesh problems with xView	58
Displaying Materials, Lighting, and Shadows in the Viewport.....	61
Viewing materials in the viewports.....	61
Displaying lighting and shadows in the viewports.....	62
Working with Viewport Backgrounds.....	64
Changing the viewport background	64
Loading viewport background images	65
Loading viewport background animations	66
Tutorial: Loading reference images for modeling.....	66
Summary	68
Chapter 3: Working with Files.	69
Working with 3ds Max Scene Files	69
Using the Application Button	69
Using the Welcome Screen	71
Starting new.....	72
Saving files	72
Archiving files	74
Opening files	74
Setting a Project Folder	75
Merging and replacing objects	76
Getting out	77
Importing and Exporting	77
Importing supported formats.....	77
Import preference	78
Exporting supported formats	78
Moving files to other Suite packages	79
Manually moving files to and from Maya.....	79
Using the File Utilities	80
Using the Asset Browser utility.....	80
Finding files with the Max File Finder utility.....	81
Collecting files with the Resource Collector utility	82
Accessing File Information.....	83
Displaying scene information.....	83
Viewing file properties.....	84
Viewing files.....	84
Summary	86

Part II: Manipulating Objects	87
Chapter 4: Creating and Editing Primitive Objects.	89
Selecting System Units.....	89
Using Custom and Generic units.....	90
Handling mismatched units.....	91
Rescaling world units	92
Creating Primitive Objects.....	92
Using the Create menu.....	92
Using the Create panel.....	92
Naming and renaming objects.....	94
Assigning colors.....	95
Using the Color Clipboard.....	97
Using different creation methods.....	98
Using the Keyboard Entry rollout for precise dimensions	100
Altering object parameters.....	100
Recovering from mistakes and deleting objects.....	100
Tutorial: Exploring the Platonic solids	101
Using Modeling Helpers	102
Using Dummy and Point objects.....	102
Measuring coordinate distances	103
Using the Measure Distance tool.....	103
Using the Tape helper	103
Using the Protractor helper.....	103
Using the Compass helper	104
Using the Measure utility	104
Tutorial: Testing the Pythagorean Theorem.....	104
Summary	106
Chapter 5: Selecting Objects and Using Layers.	107
Selecting Objects	107
Selection filters	108
Select buttons	109
Selecting with the Edit menu	110
Select by Name.....	111
Select by Layer.....	111
Select by Color	111
Select by Region.....	112
Selecting multiple objects	113
Using the Paint Selection Region tool.....	114
Tutorial: Selecting objects.....	115
Using named selection sets	116
Editing named selection Sets	116
Locking selection sets.....	117

Isolating the current selection.....	117
Selecting objects in other interfaces.....	118
Setting Object Properties	119
Hiding and Freezing Objects.....	120
Using the Display Floater dialog box.....	120
Using the Display panel	121
Tutorial: Hidden toothbrushes	122
Using Layers	123
Using the Layer Manager.....	123
Using the layer list.....	126
Tutorial: Dividing a scene into layers.....	127
Using the Scene Explorer	128
Selecting and filtering objects	129
Finding objects	130
Editing in the Scene Explorer	131
Summary	132
Chapter 6: Transforming Objects, Pivoting, Aligning, and Snapping.	133
Translating, Rotating, and Scaling Objects.....	133
Translating objects	134
Rotating objects.....	134
Scaling objects.....	134
Non-uniform scaling	134
Squashing objects.....	134
Using the transform buttons	135
Working with the Transformation Tools.....	135
Working with the Transform Gizmos	136
Using the interactive gizmos.....	136
Using the Transform Toolbox.....	137
Using the Transform Type-In dialog box	138
Using the Status Bar Type-In fields	139
Understanding the Transform Managers.....	140
Understanding reference coordinate systems	140
Using a transform center	141
Selecting Axis Constraints	143
Locking axes transformations.....	144
Tutorial: Landing a spaceship in port.....	145
Using Pivot Points	146
Positioning pivot points.....	147
Aligning pivot points.....	147
Using the Working Pivot	148
Transform adjustments	148
Using the Reset XForm utility.....	149
Tutorial: A bee buzzing about a flower	149

Using the Align Commands	150
Aligning objects.....	151
Using the Quick Align tool	151
Aligning normals.....	151
Tutorial: Aligning a kissing couple	152
Aligning to a view.....	153
Using Grids	154
The Home Grid.....	154
Creating and activating new grids	155
Using AutoGrid	155
Tutorial: Creating a spyglass.....	156
Using Snap Options.....	157
Tutorial: Creating a 2D outline of an object.....	158
Setting snap points	159
Setting snap options	160
Using the Snaps toolbar.....	160
Tutorial: Creating a lattice for a methane molecule	161
Summary	162
Chapter 7: Cloning Objects and Creating Object Arrays.	163
Cloning Objects	163
Using the Clone command.....	164
Using the Shift-clone method.....	164
Tutorial: Cloning dinosaurs.....	165
Using Quick Clone	166
Understanding Cloning Options	166
Working with copies, instances, and references	166
Tutorial: Creating instanced doughnuts	167
Tutorial: Working with referenced apples	168
Mirroring Objects	169
Using the Mirror command.....	169
Tutorial: Mirroring a robot's leg	170
Cloning over Time.....	171
Using the Snapshot command.....	171
Tutorial: Creating a path through a maze.....	172
Spacing Cloned Objects.....	173
Using the Spacing tool.....	173
Tutorial: Stacking a row of dominoes.....	174
Using the Clone and Align Tool	175
Aligning source objects to destination objects.....	176
Tutorial: Cloning and aligning trees on a beach	177
Creating Arrays of Objects.....	178
Linear arrays	178
Tutorial: Building a white picket fence	179
Circular arrays	180

Tutorial: Building a Ferris wheel	180
Working with a Ring Array	182
Tutorial: Using Ring Array to create a carousel	182
Summary	183
Chapter 8: Grouping, Linking, and Parenting Objects	185
Working with Groups.....	185
Creating groups.....	185
Ungrouping objects	186
Opening and closing groups.....	186
Attaching and detaching objects.....	186
Tutorial: Grouping a plane's parts together	186
Alternatives to grouping.....	187
Understanding Parent, Child, and Root Relationships.....	188
Building Links between Objects	188
Linking objects	188
Unlinking objects.....	189
Tutorial: Linking a family of ducks.....	189
Displaying Links and Hierarchies	190
Displaying links in the viewport	190
Viewing hierarchies	191
Working with Linked Objects.....	191
Locking inheriting transformations	192
Using the Link Inheritance utility	192
Selecting hierarchies	192
Linking to dummies.....	192
Tutorial: Circling the globe.....	193
Summary	194
Part III: Modeling 3D Assets	195
Chapter 9: Introducing Subobjects and Modifiers and Using the Modifier Stack	197
Exploring the Model Types.....	198
Parametric objects versus editable objects	198
Converting to editable objects	200
Understanding Normals	201
Viewing normals	201
Tutorial: Cleaning up imported meshes	201
Working with Subobjects	202
Using Soft Selection	203
Tutorial: Soft selecting a heart shape from a plane	205
Introducing Modifiers.....	207
Exploring the Modifier Stack.....	208
Understanding Base Objects.....	208
Applying modifiers.....	208

Tutorial: Bending a tree	208
Other Modifier Stack entities	209
Using the Modifier Stack	210
Copying and pasting modifiers	211
Using instanced modifiers	212
Identifying instances and references in the Modifier Stack	212
Disabling and removing modifiers	213
Reordering the Stack	213
Tutorial: Creating a molecular chain	213
Holding and fetching a scene	214
Collapsing the Stack	214
Using the Collapse utility	215
Using gizmo subobjects	216
Tutorial: Squeezing a plastic bottle	216
Applying modifiers to subobject selections	217
Tutorial: Applying damage to a car	217
Topology dependency	219
Summary	219
Chapter 10: Drawing and Editing 2D Splines and Shapes	221
Drawing in 2D	221
Working with shape primitives	222
Rendering rollout	223
Interpolation rollout	224
Creation Method and Keyboard Entry rollouts	224
Line	226
Rectangle	227
Circle	227
Ellipse	227
Arc	227
Donut	227
NGon	228
Star	228
Text	229
Helix	231
Egg	231
Section	231
Tutorial: Drawing a company logo	232
Tutorial: Viewing the interior of a heart	233
Editing Splines	234
Editable Splines versus the Edit Spline modifier	234
Making splines renderable	235
Selecting spline subobjects	235
Controlling spline geometry	238
Create line	238
Break	239

Attach and Attach Multiple	239
Cross Section.....	239
Auto Welding end points.....	239
Insert.....	240
Tutorial: Working with cross sections to create a doorknob	240
Editing vertices.....	241
Refine	242
Weld and Fuse.....	243
Connect.....	243
Make First.....	243
Cycle.....	244
CrossInsert.....	244
Fillet.....	244
Chamfer.....	245
Tangent Copy and Tangent Paste	245
Hide/Unhide All	245
Bind/Unbind.....	246
Delete	246
Show Selected Segments.....	246
Tutorial: Making a ninja star.....	246
Editing segments	247
Connect Copy	248
Divide	248
Detach	248
Tutorial: Using Connect Copy to create a simple flower	248
Surface Properties.....	249
Editing Spline subobjects	250
Reverse	250
Outline	250
Boolean.....	250
Mirror.....	251
Trim and Extend.....	252
Close	253
Explode	253
Tutorial: Spinning a spider's web	253
Summary	254
Chapter 11: Modeling with Polygons	255
Understanding Poly Objects	255
Creating Editable Poly Objects	256
Converting objects	257
Collapsing to a mesh object.....	257
Applying the Edit Poly modifier.....	257

Editing Poly Objects	257
Editable Poly Subobject modes	258
Subobject selection	259
Tutorial: Modeling a clown head	261
Editing geometry	261
Repeat Last	263
Enabling constraints	263
Tutorial: Creating a quick flying saucer	263
Preserve UVs	263
Create	265
Collapse	265
Attach and Detach	265
Slicing and cutting options	266
Tutorial: Combining, cutting, and separating a car model	267
MSmooth	268
Tessellate	269
Make Planar	270
View and Grid Align	270
Relax	270
Hide, Copy, and Paste	270
Editing Vertex subobjects	270
Remove	271
Break	271
Extrude	271
Weld and Chamfer	273
Connect	274
Remove Isolated and Unused Map Vertices	274
Weight and Crease	274
Editing Edge subobjects	274
Split and Insert Vertex	275
Bridge Edges	275
Create Shape from Selection	275
Edit Triangulation	276
Turn	276
Editing Border subobjects	277
Cap	277
Bridge	278
Tutorial: Bridging a forearm	278
Editing Polygon and Element subobjects	279
Insert Vertex	279
Outline and Inset	280
Bevel	280
Flip	280
Retriangulate	280

Hinge From Edge	281
Extrude Along Spline	282
Tutorial: Building an octopus	282
Surface properties	283
Vertex Surface properties.....	283
Polygon and Element Surface properties.....	284
Subdivision Surface.....	285
Tutorial: Modeling a tooth	286
Summary	287
Chapter 12: Using the Graphite Modeling Tools	289
Working with the Graphite Modeling Tools	289
Using the Polygon Modeling panel	290
Generate Topology.....	292
Using the Symmetry tools.....	293
Tutorial: Building a Skateboard wheel.....	294
Using the Modify Selection panel	294
Editing geometry	296
Preserve UVs	296
Cutting holes with Paint Connect (PConnect)	297
NURMS	297
Tutorial: Smoothing an Ice Cube.....	297
Quadrify All	299
Subdivision panel	299
Use Displacement	299
Editing Vertex subobjects.....	300
Editing Edge and Border subobjects.....	300
Editing Polygon and Element subobjects	301
GeoPoly.....	302
Hinge	302
Tutorial: Adding a handle to a mug	302
Mirroring elements	302
Surface properties	303
Using the Freeform Tools	303
Drag.....	304
Conform	304
Step Build.....	305
Extend	305
Optimize.....	305
Draw On and Pick	306
Tutorial: Matching a road to a rolling terrain	306
Shapes and Solve Surface	307
Splines	307
Surface, Topology, Strips, and Branches	307
Tutorial: Carving a pumpkin.....	307

Using the Paint Deform tools.....	308
Shift/Shift Rotate/Shift Scale.....	308
Push/Pull	309
Relax/Soften.....	309
Flatten and Pinch/Spread	310
Smudge, Noise, and Exaggerate	310
Constrain to Spline	310
Revert	310
Tutorial: Sculpting a head model.....	310
Using the Selection Tools	311
Selecting Tops, Open, and Non-Quads	312
Copying and pasting selections.....	312
Selecting by criteria	312
By Surface, Normal, and Perspective	312
By Random, Half, and Pivot Distance	313
By View, Symmetry, and Numeric	313
By Color	313
Using the Object Paint Tools	314
Selecting an object to paint with	314
Painting with objects.....	315
Painting with multiple objects.....	317
Painting on objects	317
Using the Paint Fill mode.....	318
Painting with animated objects.....	319
Tutorial: Painting a scar.....	319
Summary	320
Chapter 13: Working with Compound Objects.	321
Understanding Compound Object Types	321
Morphing Objects.....	322
Creating Morph keys.....	323
Morph objects versus the Morpher modifier	323
Tutorial: Morphing a woman's face	324
Creating a Terrain Object	325
Coloring elevations.....	325
Tutorial: Creating an island with the Terrain compound object	326
Working with BlobMesh Objects.....	327
Setting BlobMesh parameters.....	328
Tutorial: Creating icy geometry with BlobMesh	328
Working with ProBoolean and ProCutter Objects.....	329
Using ProBoolean	329
Tutorial: Creating a keyhole	332
Using ProCutter.....	332
Tutorial: Creating a jigsaw puzzle.....	333
Summary	334

Part IV: Applying Materials and Textures 335

Chapter 14: Creating and Applying Standard Materials with the Slate Material Editor . . . 337

Understanding Material Properties	337
Colors	338
Opacity and transparency.....	339
Reflection and refraction	339
Shininess and specular highlights	339
Other properties.....	340
Working with the Slate Material Editor.....	340
Using the Slate Material Editor controls.....	340
Loading the Material Node View panel	342
Navigating the Material Node View panel	343
Selecting and applying materials	344
Changing the material preview	345
Selecting objects by material.....	346
Setting Slate Material Editor preferences.....	346
Removing materials and maps.....	346
Using utilities.....	347
Using the Fix Ambient utility	347
Tutorial: Coloring Easter eggs	347
Using the Standard Material.....	348
Using Shading Types	348
Blinn shader.....	349
Phong shader.....	351
Anisotropic shader	352
Multi-Layer shader	352
Oren-Nayar-Blinn shader	353
Metal shader.....	353
Strauss shader	354
Translucent shader	354
Tutorial: Making curtains translucent	354
Accessing Other Parameters	355
Extended Parameters rollout.....	355
SuperSampling rollout	357
Maps rollout	358
mental ray Connection rollout	358
Tutorial: Coloring a dolphin.....	358
Summary	359

Chapter 15: Adding Material Details with Maps 361

Understanding Maps	361
Different map types.....	361
Enabling the global viewport rendering setting	362
Using Real-World maps	362

Working with Maps	362
Connecting maps to materials.....	363
Using the Maps rollout.....	365
Tutorial: Aging objects for realism	368
Understanding map types	368
Accessing Map parameters.....	370
The Coordinates rollout	370
The Noise rollout	373
The Time rollout.....	373
The Output rollout.....	373
Creating Textures with External Tools	374
Creating material textures using Photoshop	375
Capturing digital images	377
Avoiding specular highlights.....	377
Adjusting brightness.....	377
Scanning images	377
Tutorial: Creating a fishing net.....	378
Summary	379
Chapter 16: Creating Compound Materials and Using Material Modifiers	381
Using Compound Materials.....	381
Blend.....	382
Composite	383
Double Sided	383
Multi/Sub-Object.....	384
Tutorial: Creating a patchwork quilt	385
Morpher	386
Shellac.....	386
Top/Bottom.....	387
Tutorial: Surfing the waves	387
Applying Multiple Materials	388
Using material IDs.....	388
Tutorial: Mapping die faces	389
Using the Clean MultiMaterial utility	390
Using the Matte/Shadow Material.....	390
Matte/Shadow Basic Parameters rollout	391
Tutorial: Adding 3D objects to a scene.....	391
Material Modifiers.....	392
Material modifier.....	393
MaterialByElementmodifier.....	393
Tutorial: Creating random marquee lights with the MaterialByElement modifier	393
Comparing Displacement maps and Displace modifiers	394
Tutorial: Displacing geometry with a bitmap	395
Summary	396

Chapter 17: Unwrapping UVs	397
Mapping Modifiers	397
UVW Map modifier	397
Tutorial: Using the UVW Map modifier to apply decals	398
UVW Mapping Add and Clear modifiers	400
UVW XForm modifier	401
Map Scaler modifier	401
Camera Map modifier	401
Using the Unwrap UVW Modifier	401
Selecting UVW subobjects	402
Accessing the Edit UVWs interface	402
Tweaking vertices in the viewport	403
Using the Quick Planar Map	403
Saving and loading mapping coordinates	403
Using the Edit UVWs Interface	403
Selecting subobjects within the dialog box	405
Navigating the main view	407
Using the Quick Transform buttons	408
Straightening and Relaxing UV clusters	409
Stitching and welding	410
Separating into clusters using flattening methods	411
Arranging and grouping clusters	412
Accessing the Unwrap Options	415
Tutorial: Controlling the mapping of a covered wagon	415
Rendering UV templates	416
Mapping multiple objects	418
Tutorial: Creating a mapping for a fighter plane	418
Summary	421
 Part V: Working with Cameras, Lighting, and Rendering	 423

Chapter 18: Configuring and Aiming Cameras	425
Learning to Work with Cameras	425
Creating a camera object	426
Free camera	426
Target camera	426
Creating a camera view	426
Tutorial: Setting up an opponent's view	427
Controlling a camera	428
Aiming a camera	429
Tutorial: Watching a rocket	430
Aligning cameras	430
Tutorial: Seeing the dinosaur's good side	431

Setting Camera Parameters	432
Lens settings and field of view	433
Camera type and display options.....	433
Environment ranges and clipping planes.....	433
Camera Correction modifier	434
Creating multi-pass camera effects	435
Using the Depth of Field effect	435
Tutorial: Applying a Depth of Field effect to a row of windmills	437
Using the Motion Blur effect	438
Tutorial: Using a Motion Blur multi-pass camera effect	438
Summary	439
Chapter 19: Using Lights and Basic Lighting Techniques.	441
Understanding the Basics of Lighting.....	441
Natural and artificial light.....	441
A standard lighting method	442
Shadows.....	443
Getting to Know the Light Types	444
Default lighting	445
Ambient light	445
Standard lights	445
Omni light	446
Spotlight	446
Direct light	446
Skylight	446
mr Area Omni and mr Area Spot	446
Photometric lights.....	446
Creating and Positioning Light Objects	447
Transforming lights	447
Viewing lights and shadows in the viewport.....	447
Listing lights	448
Placing highlights	449
Tutorial: Lighting the snowman's face	449
Viewing a Scene from a Light	450
Light viewport controls.....	450
Manipulating Hotspot/Beam and Falloff/Field cones	451
Tutorial: Lighting a lamp	452
Altering Light Parameters.....	453
General parameters.....	453
The Intensity/Color/Attenuation rollout.....	454
Spotlight and directional light parameters	455
Advanced Effects.....	455
Shadow parameters	456
Optimizing lights	457

Photometric light parameters	457
Distribution options.....	457
Color options	458
Intensity and Attenuation options	459
Light shapes	459
Summary	459
Chapter 20: Rendering a Scene and Enabling Quicksilver	461
Working with Render Parameters.....	461
Initiating a render job	462
Common parameters	463
Specifying range and size	464
Render options.....	465
Bitmap Proxies	466
Choosing a Render Output option	466
E-mail notifications	467
Adding pre-render and post-render scripts	467
Assigning renderers.....	468
Default Scanline Renderer	468
Anti-alias filters	469
SuperSampling	469
Motion Blur	470
Other options.....	470
Quicksilver Hardware Renderer	470
Rendering stylized scenes	471
Using the Rendered Frame Window.....	472
Using the Render Types	473
Previewing with ActiveShade.....	475
Summary	475
Chapter 21: Using Atmospheric and Render Effects	477
Adding an Environment Background.....	477
Defining the rendered environment.....	478
Setting a background color	478
Using a background image	478
Setting global lighting	479
Using Exposure Controls	480
Automatic, Linear, and Logarithmic Exposure Control	480
Pseudo Color Exposure Control.....	481
Photographic Exposure Control	482
Tutorial: Using the Logarithmic Exposure Control	482
Creating Atmospheric Effects	483
Working with the Atmospheric Apparatus	483
Adding effects to a scene	484
Using the Fire Effect	484
Tutorial: Creating the sun	487
Tutorial: Creating clouds.....	487

Using the Fog Effect.....	489
Using the Volume Fog effect.....	491
Tutorial: Creating a swamp scene	491
Using the Volume Light effect	492
Adding Render Effects.....	493
Using Render Effects	494
Blur render effect.....	494
Brightness and Contrast render effect.....	496
Color Balance render effect	496
File Output render effect.....	496
Film Grain render effect.....	497
Motion Blur render effect.....	498
Depth of Field render effect	498
Summary	499
Chapter 22: Rendering with mental ray and iray	501
Enabling mental ray and iray	502
Working with iray.....	503
Tutorial: Starting iray	504
Working with mental ray	505
Using mental ray Lights and Shadows.....	506
Enabling mental ray area lights.....	506
Enabling mental ray Shadow Maps.....	506
Using mental ray Sky Portal.....	507
Using mental ray Sun & Sky.....	508
Understanding Caustics and Photons	509
Enabling caustics and global illumination for objects	510
Tutorial: Using Caustic Photons to create a disco ball.....	511
Controlling Indirect Illumination	512
Rendering control.....	513
Advanced mental ray	515
Using mental ray proxies.....	515
Using mental ray materials.....	516
Using the Autodesk Material Library and the Arch & Design materials	516
Using the Car Paint material	518
Using the Subsurface Scattering materials	518
Summary	519
Chapter 23: Compositing with Render Elements and the Video Post Interface	521
Using External Compositing Packages.....	522
Compositing with Photoshop	522
Video editing with Premiere Pro.....	523
Video compositing with After Effects.....	524
Tutorial: Adding animation effects using After Effects.....	525
Using Render Elements.....	526

Using State Sets	527
Recording states	528
Using templates and nesting states	528
Rendering states	529
Tutorial: Presenting several stylized rendered options	529
Accessing Compositor View	530
Changing node parameters	531
Adding new nodes	531
Exporting to Photoshop	532
Linking data to After Effects	532
Completing Post-Production with the Video Post Interface	533
The Video Post toolbar	534
The Video Post Queue and Range panes	535
The Video Post status bar	535
Working with Sequences	536
Adding and Editing Events	537
Adding an image input event	538
Adding scene events	539
Adding image filter events	539
Contrast filter	540
Fade filter	540
Image Alpha filter	540
Negative filter	540
Pseudo Alpha filter	541
Simple Wipe filter	541
Starfield filter	541
Tutorial: Creating space backdrops	542
Adding image layer events	543
Simple Wipe compositor	543
Other layer filters	544
Adding external events	544
Using loop events	544
Adding an image output event	545
Working with Ranges	545
Adding backgrounds and filters using Video Post	546
Summary	547

Part VI: Animating Objects and Scenes 549

Chapter 24: Understanding Animation and Keyframes 551

Using the Time Controls	551
Setting frame rate	552
Setting speed and direction	553
Using Time Tags	554

Working with Keys.....	554
Auto Key mode	555
Set Key mode	555
Tutorial: Rotating a windmill's blades	555
Copying parameter animation keys.....	557
Deleting all object animation keys	557
Using the Track Bar	558
Viewing and Editing Key Values.....	559
Using the Motion Panel	560
Setting parameters	560
Using trajectories.....	561
Tutorial: Making an airplane follow a looping path	562
Using the Follow/Bank utility	563
Using Ghosting.....	563
Animating Objects	564
Animating cameras.....	564
Tutorial: Animating darts hitting a dartboard	565
Animating lights	566
Animating materials	566
Tutorial: Dimming lights	567
Working with Previews	568
Creating previews.....	568
Viewing previews	570
Renaming previews.....	570
Using the RAM Player.....	570
Tutorial: Using the RAM Player to Combine Rendered Images into a Video File.....	572
Summary	573
Chapter 25: Animating with Constraints and Simple Controllers	575
Restricting Movement with Constraints	576
Using constraints	576
Working with the constraints	576
Attachment constraint	576
Tutorial: Attaching eyes to a melting snowman.....	577
Surface constraint	578
Tutorial: Rolling a tire down a hill with the Surface constraint	578
Path constraint	580
Tutorial: Creating a spaceship flight path	580
Position constraint	581
Link constraint.....	582
Tutorial: Skating a figure eight	583
LookAt constraint.....	584
Orientation constraint.....	585
Using the Walkthrough Assistant	586