

Kelly L. Murdock

Autodesk® Maya® 2016

BASICS GUIDE



Better Textbooks. Lower Prices.
www.SDCpublications.com



ACCESS CODE
UNIQUE CODE INSIDE

Visit the following websites to learn more about this book:



Contents

Contents	i
CHAPTER 1	1
Learning the Maya Interface	1
Lesson 1.1: Work with Menus	2
Changing Menu Sets.....	2
Viewing Keyboard Hotkeys.....	2
Accessing Option Dialog Boxes.....	3
Using Tear-Off Menus.....	4
Understanding Tools versus Actions	4
Lesson 1.1-Tutorial 1: Use a Menu Command to Create a Polygon Sphere.....	5
Lesson 1.2: Use the Status Line Buttons.....	6
Using Pop-up Help	7
Watching for Cursor Clues.....	7
Expanding and Collapsing Icon Button Groups.....	8
Opening and Saving a Scene.....	8
Opening Editors.....	9
Showing and Hiding Interface Elements.....	9
Lesson 1.2-Tutorial 1: Open a File	9
Lesson 1.2-Tutorial 2: Save a File	10
Lesson 1.2-Tutorial 3: Maximize the Workspace Interface	11
Lesson 1.3: Access the Shelf	11
Using the Shelf Menu	12
Creating and Deleting Shelves.....	12
Adding Icons and Menu Commands to a Shelf.....	12
Adding Layouts and Scripts to a Shelf.....	13
Using the Shelf Editor	13
Lesson 1.3-Tutorial 1: Create a New Shelf	14
Lesson 1.3-Tutorial 2: Populate a New Shelf.....	14
Lesson 1.4: Explore the Channel Box and Layer Editor.....	15
Selecting Attributes	16
Using Channel Sliders	16
Locking Attributes.....	17
Adding and Deleting Layers	17
Adding Objects to a Layer.....	18
Hiding All Layer Objects.....	18
Freezing All Layer Objects	18
Lesson 1.4-Tutorial 1: Change Channel Box Attributes	19
Lesson 1.4-Tutorial 2: Create and Rename a New Layer.....	20
Lesson 1.4-Tutorial 3: Add Objects to a New Layer	20
Lesson 1.5: Identify the Animation Controls, the Command Line, and the Help Line	20
Selecting an Animation Frame.....	21
Setting an Animation Range	21

Table of Contents

Playing an Animation.....	21
Accessing the Animation Preferences	22
Using the Command Line.....	22
Viewing the Help Line.....	23
Lesson 1.5-Tutorial 1: Play an Animation	23
Lesson 1.5-Tutorial 2: Enter a Command	24
Lesson 1.6: Use the Toolbox and Quick Layout Buttons.....	24
Selecting Objects	25
Using the Transform Tools	25
Understanding Manipulators	26
Switching Layouts	27
Customizing Layouts.....	27
Resizing and Editing View Panels.....	27
Lesson 1.6-Tutorial 1: Select an Object.....	28
Lesson 1.6-Tutorial 2: Transform an Object.....	29
Lesson 1.6-Tutorial 3: Change the Interface Layout.....	30
Lesson 1.7: Discover the Secret Menus.....	31
Accessing the Marking Menus.....	31
Customizing Marking Menus	32
Using the Hotbox.....	33
Customizing the Hotbox	33
Lesson 1.7-Tutorial 1: Access a Marking Menu.....	33
Lesson 1.7-Tutorial 2: Use the Hotbox	33
Chapter Summary.....	34
What You Have Learned	34
Key Terms From This Chapter.....	35
 CHAPTER 2	 37
 Controlling the View Panel	 37
Lesson 2.1: Change the View	37
Using the Tumble, Track, Dolly, and Camera Tools	37
Framing an Object	38
Using the ViewCube	39
Moving Through Views.....	40
Tearing Off Panels	40
Using Heads-Up Displays	40
Opening Other Interfaces Within a Panel.....	41
Lesson 2.1-Tutorial 1: Change the Object's View.....	42
Lesson 2.2: Change Display Options	45
Changing Resolution.....	45
Changing Shading	46
Displaying Textures	47
Enabling Backface Culling and Improving Wireframes	47
Isolating Objects	48
Hiding and Showing Objects.....	48
Changing Object Name and Color	48
Lesson 2.2-Tutorial 1: Change the Object's Resolution.....	49

Lesson 2.2-Tutorial 2: Change the Object's Name and Color.....	50
Chapter Summary.....	50
What You Learned	51
Key Terms From This Chapter.....	51
CHAPTER 3	53
Working with Objects	53
Lesson 3.1: Select Objects and Components.....	53
Selecting Multiple Objects.....	54
Understanding the Key Object	54
Using Selection Masks	55
Selecting by Menu	56
Saving a Selection Set	56
Switching to Component Mode.....	56
Selecting Components.....	57
Lesson 3.1-Tutorial 1: Select Multiple Objects.....	57
Lesson 3.1-Tutorial 2: Select Components	58
Lesson 3.2: Transform, Group, and Parent Objects.....	59
Understanding Pivot Points	59
Transforming Objects Along an Axis.....	60
Transforming Objects Within a Plane.....	60
Constrained Rotations.....	61
Grouping Objects Together	62
Parenting Objects	62
Lesson 3.2-Tutorial 1: Move Pivot Point	62
Lesson 3.2-Tutorial 2: Transform Car Wheels	63
Lesson 3.2-Tutorial 3: Parent an Object	64
Lesson 3.3: Snap and Align Objects	65
Using Grids.....	65
Duplicating with Transform	66
Snapping Objects	66
Snapping to a Live Object	67
Aligning Objects.....	67
Aligning Points	68
Snapping Surfaces Together	68
Lesson 3.3-Tutorial 1: Snap Objects to Grid Points	69
Lesson 3.3-Tutorial 2: Snap to a Curve.....	70
Lesson 3.3-Tutorial 3: Snap to a Live Object	71
Lesson 3.3-Tutorial 4: Align Letters	72
Lesson 3.4: Understand Nodes and Attributes.....	73
Understanding the Various Node Types.....	73
Working with Nodes	73
Viewing Nodes as a Scene Hierarchy in the Outliner	75
Viewing Dependency with Hypergraph	76
Editing Attributes.....	77
Using Undo, Redo, and Repeat.....	78
Deleting construction history	78

Lesson 3.4-Tutorial 1: Explore Dependent Nodes	78
Lesson 3.4-Tutorial 2: Delete Construction History	80
Chapter Summary	80
What You Have Learned	80
Key Terms From This Chapter	81
CHAPTER 4	83
Drawing and Editing Curves	83
Lesson 4.1: Create Curves	84
Creating Circles and Squares	84
Creating Arcs	85
Creating Smooth Curves	85
Creating Straight Line Curves	86
Drawing Freehand Curves	87
Simplifying and Smoothing Curves	87
Lesson 4.1-Tutorial 1: Create an Eye Using Arcs and Primitive Shapes	88
Lesson 4.1-Tutorial 2: Draw and Compare CV, EP, and Freehand Curves	89
Lesson 4.1-Tutorial 3: Simplify Freehand Curves	90
Lesson 4.2: Edit Curve Details	92
Using the Curve Editing Tool	92
Altering Tangents	93
Adding Sharp Points to a Curve	93
Adding Points to the End of a Curve	94
Closing and Opening Curves	94
Lesson 4.2-Tutorial 1: Create and Edit a Star Shape	95
Lesson 4.2-Tutorial 2: Use the Curve Editing Tool	96
Lesson 4.2-Tutorial 3: Create Sharp Points	97
Lesson 4.2-Tutorial 4: Close a Curve	98
Lesson 4.3: Modify Curves	99
Locking Length	99
Straightening Curves	99
Smoothing Curves	99
Curling and Bending Curves	100
Scaling Curvature	101
Lesson 4.3-Tutorial 1: Curl a Curve	101
Lesson 4.4: Apply Curve Operators	103
Attaching Curves	104
Aligning Curves	105
Detaching and Cutting Curves	106
Finding Curve Intersections	106
Offsetting Curves	106
Filletting Curves	107
Lesson 4.4-Tutorial 1: Connect Cursive Letters	107
Lesson 4.4-Tutorial 2: Align Flower Petals	108
Lesson 4.4-Tutorial 3: Offset Curves	109
Lesson 4.4-Tutorial 4: Fillet Curves	110
Lesson 4.5: Create Simple Surfaces from Curves	111

Revolving a Curve	112
Lofting a Set of Curves.....	112
Creating Planar Curves	112
Creating a Surface from Boundary Curves	113
Extruding Curves.....	113
Using the Birail Tools	113
Lesson 4.5-Tutorial 1: Revolve a Baseball Bat.....	114
Lesson 4.5-Tutorial 2: Loft a Banana	114
Lesson 4.5-Tutorial 3: Create a Planar Surface	115
Lesson 4.5-Tutorial 4: Extrude a Circle	116
Lesson 4.5-Tutorial 5: Create a Birail Surface.....	117
Lesson 4.6: Create Text.....	118
Creating a Beveled Surface.....	119
Lesson 4.6-Tutorial 1: Create and Bevel Text	119
Lesson 4.6-Tutorial 2: Create a Sign	120
Chapter Summary.....	121
What You Have Learned	122
Key Terms From This Chapter.....	122
CHAPTER 5	123
Working with NURBS Surfaces	123
Lesson 5.1: Learn the NURBS Primitives.....	124
Creating Spheres and Cubes.....	125
Creating Cylinders and Cones.....	125
Creating a Plane and a Torus	125
Inserting Isoparms	125
Lesson 5.1-Tutorial 1: Create a Candle from Primitives	126
Lesson 5.1-Tutorial 2: Add Isoparms	127
Lesson 5.2: Edit NURBS Surfaces	128
Selecting Components.....	128
Using the Surface Editing Tool.....	129
Using the Sculpt Geometry Tool.....	130
Simplifying Surfaces.....	131
Breaking and Smoothing Tangents.....	131
Lesson 5.2-Tutorial 1: Edit NURBS Components	131
Lesson 5.2-Tutorial 2: Use the Surface Editing Tool.....	132
Lesson 5.2-Tutorial 3: Use the Sculpt Geometry Tool.....	133
Lesson 5.2-Tutorial 4: Create a Hard Edge	134
Lesson 5.3: Apply Surface Operators.....	135
Attaching and Detaching Surfaces.....	135
Aligning Surfaces	136
Closing and Opening NURBS Surfaces	137
Extending Surfaces	138
Offsetting a Surface	138
Filletting Surfaces.....	139
Blending Surfaces	140
Lesson 5.3-Tutorial 1: Attach Surfaces	141

Table of Contents

Lesson 5.3-Tutorial 2: Detach Surfaces	142
Lesson 5.3-Tutorial 3: Open and Close a Surface	143
Lesson 5.3-Tutorial 4: Offset Surface	144
Lesson 5.3-Tutorial 5: Add a Circular Fillet.....	145
Lesson 5.3-Tutorial 6: Blend Two Surfaces.....	146
Lesson 5.4: Trim NURBS Surfaces	147
Drawing Curves on a NURBS Surface.....	147
Projecting Curves onto a NURBS Surface	148
Marking Intersecting Surfaces.....	148
Trimming a Surface.....	149
Lesson 5.4-Tutorial 1: Draw and Trim a Surface	150
Lesson 5.4-Tutorial 2: Project and Trim a Curve	151
Lesson 5.5: Use Boolean Tools	152
Combining Surfaces with the Union Tool	153
Removing Surface Parts with the Subtract Tool.....	153
Creating a Surface Intersection with the Intersect Tool.....	153
Lesson 5.5-Tutorial 1: Create Boolean Union Surfaces	153
Lesson 5.5-Tutorial 2: Create Boolean Subtract Surfaces	154
Lesson 5.5-Tutorial 3: Create Boolean Intersect Surfaces.....	155
Lesson 5.6: Stitch Surfaces Together	156
Applying Global Stitch	157
Stitching Surface Points Together	157
Stitching Surface Edges Together	157
Lesson 5.6-Tutorial 1: Apply Global Stitch.....	157
Lesson 5.7: Convert Objects	158
Converting NURBS to Polygons	159
Converting to Subdivision Surfaces	159
Converting Subdivision Surfaces to NURBS and Polygons.....	159
Lesson 5.7-Tutorial 1: Convert NURBS to Polygons	160
Lesson 5.7-Tutorial 2: Convert NURBS to Polygons and Back	161
Chapter Summary	162
What You Have Learned	162
Key Terms From This Chapter.....	163
CHAPTER 6	165
Creating and Editing Polygon Objects.....	165
Lesson 6.1: Create Polygon Objects.....	166
Creating Polygon Primitives.....	166
Creating Polygon Objects by Hand	167
Appending to a Polygon	167
Combining Polygons	168
Mirroring Polygon Objects.....	168
Duplicating Faces.....	169
Cleaning Up and Reducing Polygons	170
Lesson 6.1-Tutorial 1: Create Polygon Primitives.....	171
Lesson 6.1-Tutorial 2: Create a Polygon.....	172
Lesson 6.1-Tutorial 3: Append to a Polygon.....	173

Lesson 6.1-Tutorial 4: Mirror an Object	174
Lesson 6.1-Tutorial 5: Offset Faces	175
Lesson 6.2: Edit Polygons.....	176
Selecting Polygon Components	176
Subdividing and Splitting Polygon Faces	178
Cutting Faces	179
Merging Vertices	180
Merging Edges	181
Deleting Components	182
Lesson 6.2-Tutorial 1: Create a Mushroom.....	182
Lesson 6.2-Tutorial 2: Split Faces	183
Lesson 6.2-Tutorial 3: Merge Vertices and Edges	184
Lesson 6.3: Use Polygon Operations	185
Extruding Vertices	185
Extruding Edges and Faces	186
Chamfer a Vertex.....	187
Beveling an Edge	188
Poking a Face.....	189
Creating a Wedge	190
Lesson 6.3-Tutorial 1: Extrude Cube Vertices	191
Lesson 6.3-Tutorial 2: Extrude Cube Edges and Faces	192
Lesson 6.3-Tutorial 3: Chamfer Vertices	193
Lesson 6.3-Tutorial 4: Bevel Edges	194
Lesson 6.3-Tutorial 5: Poke Faces	195
Lesson 6.3-Tutorial 6: Wedge Faces.....	196
Lesson 6.4: Smooth Polygon Edges	197
Showing Normals.....	197
Reversing and Controlling Normals.....	198
Softening and Hardening Edges	198
Smoothing Polygons with Subdivisions	198
Creating a Smooth Proxy	199
Adding a Crease to a Smoothed Polygon	199
Smoothing Polygons with Vertex Averaging	200
Lesson 6.4-Tutorial 1: Conform Normals	200
Lesson 6.4-Tutorial 2: Smooth Faces.....	200
Lesson 6.4-Tutorial 3: Smooth Faces.....	201
Lesson 6.4-Tutorial 4: Smooth Faces with Vertex Averaging	202
Lesson 6.5: Use Polygon Booleans and Triangulate Polygons	203
Combining Polygon Objects.....	204
Finding the Difference Between Objects.....	204
Creating an Intersection Object.....	204
Triangulating Polygon Faces	204
Switching Polygon Faces to Rectangles	205
Flipping Triangle Edges	205
Lesson 6.5-Tutorial 1: Create a Button from Booleans	205
Lesson 6.5-Tutorial 2: Triangulate Non-Planar Polygons	206
Lesson 6.6: Create Holes in Polygons	207
Splitting a Vertex	207
Extracting Faces.....	208

Table of Contents

Using the Make Hole Tool	209
Filling Holes	210
Lesson 6.6-Tutorial 1: Add Holes to a Cube	210
Lesson 6.7: Work with Edge Loops, Rings, and Borders	211
Selecting Edge Loops, Rings, and Borders	212
Converting Selections	212
Using the Duplicate Edge Loop Tool.....	212
Using the Split Edge Ring Tool	213
Lesson 6.7-Tutorial 1: Add Edge Loops to a Face	214
Chapter Summary.....	215
What You Have Learned.....	216
Key Terms From This Chapter.....	216
CHAPTER 7	219
Assigning Materials and Textures	219
Lesson 7.1: Apply Materials.....	220
Applying New Materials	220
Renaming Materials.....	221
Applying Existing Materials	221
Changing Material Attributes	221
Moving Between Nodes	223
Rendering Materials	223
Lesson 7.1-Tutorial 1: Apply a Material	224
Lesson 7.1-Tutorial 2: Apply and Render a Texture	225
Lesson 7.2: Use the Hypershade.....	226
Using the Create Bar.....	227
Using the tabbed panes.....	228
Using the Work Area	229
Working with Nodes.....	230
Connecting Nodes	230
Using the Connection Editor.....	231
Dragging Materials to Objects	232
Lesson 7.2-Tutorial 1: Create a Custom Material.....	232
Lesson 7.2-Tutorial 2: Use the Connection Editor.....	233
Lesson 7.3: Work with Materials	234
Learning the Surface Materials.....	235
Changing Material Color	236
Changing Material Transparency.....	236
Using Other Material Attributes.....	236
Layering Materials	237
Using the Ramp Shader	238
Using the Shading Map.....	239
Lesson 7.3-Tutorial 1: Change Color and Transparency.....	240
Lesson 7.3-Tutorial 2: Layer Materials	241
Lesson 7.3-Tutorial 3: Use a Shading Map	242
Lesson 7.4: Work with Textures	243
Connecting Texture Nodes	245

Applying Textures as Color	245
Mapping Textures to Attributes	246
Adding Relief	247
Loading File Textures.....	247
Layering Textures	248
Lesson 7.4-Tutorial 1: Apply Textures	249
Lesson 7.4-Tutorial 2: Load an Image Texture	250
Lesson 7.5: Position Textures	251
Understanding Mapping Methods	251
Using Normal Mapping.....	251
Using Projection Mapping	252
Using Stencil Mapping	253
Placing 2D Textures	253
Placing 3D Textures	254
Controlling Polygon Textures	255
Lesson 7.5-Tutorial 1: Position 2D Textures.....	255
Lesson 7.5-Tutorial 2: Position 3D Textures.....	256
Lesson 7.6: Use Utilities Nodes.....	257
Using the General Utilities.....	257
Using the Color Utilities.....	258
Using the Switch Utilities.....	258
Lesson 7.6-Tutorial 1: Blend Colors.....	258
Lesson 7.7: Paint in 3D.....	259
Assigning a Paint Texture	259
Selecting a Brush	260
Applying Color	261
Using Different Paint Operations	261
Painting Other Attributes	262
Lesson 7.7-Tutorial 1: Use the 3D Paint Tool.....	263
Chapter Summary.....	264
What You Have Learned	264
Key terms From This Chapter	265
CHAPTER 8	267
Adding Paint Effects	267
Lesson 8.1: Use the Preset Brushes	267
Accessing the Paint Effects Panel	267
Using the Paint Effects Tool.....	268
Using Preset Brushes	268
Introducing the Visor	269
Blending Presets	270
Redrawing the View	271
Clearing the View.....	271
Lesson 8.1-Tutorial 1: Use a Paint Effects Brush	271
Lesson 8.1-Tutorial 2: Use a Visor Brush	272
Lesson 8.1-Tutorial 3: Blend Brushes	273
Lesson 8.2: Create Custom Brushes.....	274

Table of Contents

Changing Template Brush Settings.....	274
Using the Various Brush Types	275
Changing Brush Size.....	277
Changing Brush Color	278
Enabling Illumination and Shadows	279
Enabling Glows	280
Creating and Saving Custom Brushes	281
Lesson 8.2-Tutorial 1: Change Brush Size.....	282
Lesson 8.2-Tutorial 2: Change Brush Color	282
Lesson 8.2-Tutorial 3: Add Shadows	283
Lesson 8.2-Tutorial 4: Add a Glow.....	284
Lesson 8.3: Paint in 2D.....	285
Introducing the Paint Effects Canvas.....	285
Changing the Canvas Size	286
Creating Seamless Textures.....	287
Saving Textures.....	287
Undoing the Last Stroke	287
Saving the Alpha Channel.....	288
Lesson 8.3-Tutorial 1: Create a Seamless Texture.....	288
Lesson 8.3-Tutorial 2: Save an Image and Alpha Channel.....	289
Lesson 8.4: Paint on 3D Objects	291
Painting in a View Panel	291
Painting on Objects.....	292
Auto-Painting an Object	293
Saving Depth as a Grayscale Map.....	294
Lesson 8.4-Tutorial 1: Paint on Objects.....	294
Lesson 8.4-Tutorial 2: Auto-Paint on Objects.....	295
Lesson 8.5: Edit Paint Effects.....	296
Selecting Strokes	296
Editing Strokes.....	297
Converting Strokes to Polygons.....	297
Changing the Default Light	298
Lesson 8.5-Tutorial 1: Select and Edit Strokes	298
Lesson 8.5-Tutorial 2: Convert Paint Effects to Polygons.....	299
Chapter Summary.....	300
What You Have Learned	300
Key Terms From This Chapter.....	301
 CHAPTER 9	 303
 Using Cameras and Lights	 303
Lesson 9.1: Work with Cameras	304
Creating Cameras	304
Changing Camera Settings.....	304
Selecting a Camera	305
Positioning Cameras	305
Looking Through a New Camera	305
Setting View Guidelines.....	306

Changing the Depth of Field	307
Lesson 9.1-Tutorial 1: Create a Camera	308
Lesson 9.1-Tutorial 2: Aim a Camera.....	309
Lesson 9.1-Tutorial 3: Create a Depth-of-Field Effect	310
Lesson 9.2: Create a Background.....	311
Setting the Background Color.....	311
Adding an Image Plane	312
Creating a Textured Background	312
Loading a Background Image.....	313
Positioning the Background.....	314
Lesson 9.2-Tutorial 1: Change Background Color.....	314
Lesson 9.2-Tutorial 2: Change Background Texture.....	315
Lesson 9.2-Tutorial 3: Add and Position a Background Image	316
Lesson 9.3: Create and Position Lights	317
Using Default Lights.....	317
Understanding the Light Types.....	317
Creating Lights.....	318
Manipulating Lights	318
Manipulating Spot Lights.....	319
Lesson 9.3-Tutorial 1: Create and Manipulate a Light	320
Lesson 9.4: Change Light Settings.....	322
Changing Light Color.....	322
Changing Light Intensity and Decay	323
Enabling Shadows.....	324
Lesson 9.4-Tutorial 1: Change Light Color and Intensity	325
Lesson 9.4-Tutorial 2: Enable Shadows.....	326
Lesson 9.5: Create Light Effects.....	327
Creating Light Fog	327
Creating Glows and Halos.....	328
Creating Lens Flares.....	329
Lesson 9.5-Tutorial 1: Enable Light Fog.....	330
Lesson 9.5-Tutorial 2: Enable a Halo Light Effect	332
Chapter Summary	333
What You Have Learned	333
Key Terms From This Chapter.....	334
 CHAPTER 10	 335
 Animating with Keyframes	 335
Lesson 10.1: Set Keyframes	335
Setting Keys	336
Using Auto Key	337
Selecting Keys.....	337
Copying Keys.....	338
Deleting Keys	338
Snapping Keys.....	338
Lesson 10.1-Tutorial 1: Set Keys.....	339
Lesson 10.1-Tutorial 2: Use Auto Key.....	340

Table of Contents

Lesson 10.1-Tutorial 3: Move Keys.....	340
Lesson 10.2: View an Animation.....	342
Previewing Animation	342
Looping an Animation	342
Enabling Ghosting.....	343
Creating Motion Trails	345
Using Playblast.....	345
Lesson 10.2-Tutorial 1: Preview an Animation.....	346
Lesson 10.2-Tutorial 2: Use Playblast.....	347
Lesson 10.3: Animate Using Motion Paths.....	348
Creating Motion Path Keys.....	348
Drawing a Motion Path.....	349
Attaching an Object to a Motion Path.....	349
Adjusting an Attached Motion Path	350
Deforming an Object as it Follows a Motion Path.....	351
Lesson 10.3-Tutorial 1: Create a Motion Path	352
Lesson 10.3-Tutorial 2: Draw a Motion Path and Attach an Object.....	353
Lesson 10.4: Edit Animation Curves	354
Using the Graph Editor	354
Framing Curves.....	355
Editing Keys	355
Smoothing and Simplifying Curves	356
Setting Infinity Conditions	357
Working with Tangents	357
Adding Keys	358
Lesson 10.4-Tutorial 1: Edit Animation Curves	358
Lesson 10.4-Tutorial 2: Repeat Motion.....	359
Lesson 10.5: Control Animation Timing.....	360
Using the Dope Sheet	360
Using the Dope Sheet Manipulator.....	361
Adding Sound	362
Lesson 10.5-Tutorial 1: Use the Dope Sheet	363
Lesson 10.5-Tutorial 2: Add Sound.....	364
Chapter Summary.....	365
What You Have Learned	365
Key Terms From This Chapter.....	366
CHAPTER 11	367
Working with Characters	367
Lesson 11.1: Build a Skeleton	367
Creating Joints	368
Inserting a Joint	368
Connecting a Joint Chain	369
Removing and Disconnecting Joints	370
Mirroring Joints	370
Resetting the Root Joint	371
Naming Joints	371

Lesson 11.1-Tutorial 1: Create a Skeleton.....	371
Lesson 11.1-Tutorial 2: Add a Tail to the Skeleton.....	372
Lesson 11.2: Edit Joint Attributes	373
Inheriting Transforms	373
Orienting Joints.....	373
Labeling Joints	374
Showing and Hiding Labels.....	374
Limiting Joints.....	374
Displaying Joints	375
Lesson 11.2-Tutorial 1: Label Joints	376
Lesson 11.2-Tutorial 2: Limit Joint Motion.....	377
Lesson 11.3: Add Inverse Kinematics.....	378
Using the IK Handle Tool	378
Using the IK Spline Handle Tool.....	379
Using the IK Manipulators	380
Switching Between FK and IK	381
Lesson 11.3-Tutorial 1: Add IK to a Skeleton.....	381
Lesson 11.3-Tutorial 2: Add IK Spline to the Skeleton Tail.....	382
Lesson 11.4: Skin a Character	383
Creating Effective Skin	383
Positioning a Skeleton	384
Binding Smooth Skin.....	384
Binding Rigid Skin	385
Returning to Default Pose	387
Detaching Skin	387
Animating Joints	387
Lesson 11.4-Tutorial 1: Position a Skin.....	387
Lesson 11.4-Tutorial 2: Bind Skin	388
Lesson 11.4-Tutorial 3: Animate Joints	389
Lesson 11.5: Edit a Skin.....	390
Adding Influence Objects	390
Understanding Skin Weights	391
Painting Skin Weights	392
Resetting Skin Weights	393
Lesson 11.5-Tutorial 1: Add Influence Object	393
Lesson 11.5-Tutorial 2: Paint Weights.....	394
Lesson 11.6: Add Hair and Fur	395
Adding preset hair to an object.....	395
Creating hair	396
Style hair	397
Making hair dynamic	397
Creating and editing a fur description.....	398
Rendering hair and fur.....	399
Lesson 11.6-Tutorial 1: Add hair	400
Chapter Summary.....	402
What You Have Learned.....	402
Key Terms From This Chapter.....	402

CHAPTER 12	405
Animating with Dynamics	405
Lesson 12.1: Use Particles	405
Creating Particles.....	406
Creating Surface Particles.....	406
Viewing Particle Attributes and Count	407
Setting Particle Lifespan	408
Changing Particle Render Type.....	408
Using Instances.....	409
Cycling Instances	410
Lesson 12.1-Tutorial 1: Add Clouds to a Sphere.....	411
Lesson 12.1-Tutorial 2: Use an Instance.....	412
Lesson 12.1-Tutorial 3: Cycle Instances.....	413
Lesson 12.2: Create an Emitter.....	414
Using an Emitter	414
Using a Directional Emitter.....	415
Using a Volume Emitter.....	416
Using an Object as an Emitter	417
Changing Emitter Attributes.....	418
Lesson 12.2-Tutorial 1: Create an Omni Emitter.....	419
Lesson 12.2-Tutorial 2: Create a Directional Emitter	420
Lesson 12.2-Tutorial 3: Create an Object Emitter	421
Lesson 12.3: Create Fields and Goals	422
Understanding Fields.....	422
Connecting Objects to a Field.....	423
Changing Field Attributes	423
Regulating Field Forces.....	424
Establishing Goals.....	424
Lesson 12.3-Tutorial 1: Create a Vortex Field	425
Lesson 12.3-Tutorial 2: Create a Goal	426
Lesson 12.4: Manage Particle Collisions.....	427
Enabling Particle Collisions	427
Defining New Events	428
Creating Rigid Body Objects	429
Creating Soft Body Objects.....	430
Lesson 12.4-Tutorial 1: Enable Particle Collisions	430
Lesson 12.4-Tutorial 2: Add a Collision Event	431
Lesson 12.4-Tutorial 3: Create Rigid Body Objects	432
Lesson 12.4-Tutorial 4: Create Soft Body Objects.....	433
Lesson 12.5: Constrain Motion.....	434
Adding Constraints	434
Creating Nail and Spring Constraints.....	435
Creating a Pin Constraint.....	435
Creating a Hinge Constraint.....	436
Creating a Barrier Constraint.....	436
Creating Springs.....	437
Lesson 12.5-Tutorial 1: Add a Constraint	438
Lesson 12.6: Create Effects.....	439

Creating Fire and Smoke.....	439
Creating Fireworks.....	441
Creating Lightning.....	442
Shattering Objects.....	443
Flowing Along a Curve	444
Lesson 12.6-Tutorial 1: Create a Fire Effect	445
Lesson 12.6-Tutorial 2: Create Fireworks.....	446
Lesson 12.6-Tutorial 3: Create Lightning.....	447
Lesson 12.6-Tutorial 4: Create Curve Flow.....	448
Lesson 12.7: Use Cloth and Fluids	449
Creating Cloth.....	449
Creating a Cloth Collision Object	450
Setting Cloth Object Properties.....	451
Creating a Fluid Container.....	452
Creating a Fluid Emitter.....	452
Changing Fluid Properties.....	453
Creating Oceans and Ponds.....	453
Lesson 12.7-Tutorial 1: Drape a Tablecloth.....	454
Lesson 12.7-Tutorial 2: Fill a Container	455
Lesson 12.7-Tutorial 3: Create a Pond with Ripples.....	456
Chapter Summary.....	457
What You Have Learned	457
Key Terms From This Chapter.....	458
CHAPTER 13	459
Rendering a Scene	459
Lesson 13.1: Configure the Render Process	459
Choosing a Renderer	460
Saving Render Presets	461
Changing a File Name	461
Changing File Format.....	461
Changing Camera View and Resolution.....	461
Using render layers.....	462
Lesson 13.1-Tutorial 1: Set Render Settings.....	462
Lesson 13.1-Tutorial 2: Change the Rendering Path	462
Lesson 13.2: Use Special Rendering Features.....	463
Adjusting Render Quality.....	463
Enabling Raytracing	465
Enabling Motion Blur.....	465
Lesson 13.2-Tutorial 1: Change the Render Quality.....	466
Lesson 13.2-Tutorial 2: Enable Raytracing	466
Lesson 13.2-Tutorial 3: Enable Motion Blur.....	467
Lesson 13.2-Tutorial 4: Add Environment Fog	468
Lesson 13.3: Use the Render View Window	469
Opening the Render View	469
Rendering a Region.....	470
Using Interactive Photorealistic Rendering (IPR).....	471

Table of Contents

Saving Rendered Images	472
Lesson 13.3-Tutorial 1: Render a Region.....	472
Lesson 13.3-Tutorial 2: Use IPR Rendering	473
Lesson 13.4: Create a Final Render.....	474
Rendering a Single Frame.....	474
Rendering an Animation Sequence	474
Using Batch Rendering	475
Lesson 13.4-Tutorial 1: Render an Animation.....	475
Lesson 13.5: Render with Maya Vector and Mental Ray.....	476
Using Maya Vector	477
Using Mental Ray.....	478
Using Mental Ray Materials	480
Lesson 13.5-Tutorial 1: Render Using Vectors	481
Lesson 13.5-Tutorial 2: Render with Mental Ray	482
Chapter Summary.....	483
What You Have Learned	483
Key Terms From This Chapter.....	484
CHAPTER 14	485
Using MEL Scripting	485
Lesson 14.1: Use the Command Line.....	485
Using MEL in the Command Line.....	485
Repeating Command Line Commands	486
Using the MEL Scripting Commands.....	486
Lesson 14.1-Tutorial 1: Enter MEL Commands in the Command Line	487
Lesson 14.2: Use the Script Editor	488
Executing Script Commands.....	489
Viewing Interface Commands	489
Reusing Interface Commands.....	489
Saving Scripts.....	490
Adding Scripts to the Shelf	490
Lesson 14.2-Tutorial 1: Use the Script Editor	490
Lesson 14.2-Tutorial 2: View Interface Commands and Save a Script	491
Lesson 14.2-Tutorial 3: Execute a Custom Script	492
Chapter Summary.....	493
What You Have Learned	493
Key Terms From This Chapter.....	493
Glossary.....	495