

Kelly L. Murdock

Autodesk® Maya® 2015

Basics Guide



Visit the following websites to learn more about this book:



amazon.com

Google books

BARNES&NOBLE

Table of Contents

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.....	3
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.....	20
Setting an Animation Range	20
Playing an Animation.....	21
Accessing the Animation Preferences.....	21
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	23
Lesson 1.6: Use the Toolbox and Quick Layout Buttons	24
Selecting Objects	24
Using the Transform Tools	24
Understanding Manipulators	25
Switching Layouts	26
Customizing Layouts	26
Resizing and Editing View Panels	26
Lesson 1.6-Tutorial 1: Select an Object	27
Lesson 1.6-Tutorial 2: Transform an Object	28
Lesson 1.6-Tutorial 3: Change the Interface Layout	29
Lesson 1.7: Discover the Secret Menus	30
Accessing the Marking Menus	30
Customizing Marking Menus	31
Using the Hotbox	32
Customizing the Hotbox	32
Lesson 1.7-Tutorial 1: Access a Marking Menu	32
Lesson 1.7-Tutorial 2: Use the Hotbox	32
Chapter Summary	33
What You Have Learned	33
Key Terms From This Chapter	34
 CHAPTER 2	35
Controlling the View Panel.....	35
Lesson 2.1: Change the View	35
Using the Tumble, Track, Dolly, and Camera Tools	35
Framing an Object	36
Using the ViewCube	37
Moving Through Views	37
Tearing Off Panels	38
Using Heads-Up Displays	38
Opening Other Interfaces Within a Panel	39
Lesson 2.1-Tutorial 1: Change the Object's View	40
Lesson 2.2: Change Display Options	43
Changing Resolution	43
Changing Shading	44
Displaying Textures	45
Enabling Backface Culling and Improving Wireframes	45
Isolating Objects	46
Hiding and Showing Objects	46
Changing Object Name and Color	46
Lesson 2.2-Tutorial 1: Change the Object's Resolution	46
Lesson 2.2-Tutorial 2: Change the Object's Name and Color	48
Chapter Summary	48
What You Have Learned	49
Key Terms From This Chapter	49
 CHAPTER 3	51

Working with Objects	51
Lesson 3.1: Select Objects and Components	51
Selecting Multiple Objects	52
Understanding the Key Object	52
Using Selection Masks	53
Selecting by Menu	53
Saving a Selection Set	53
Switching to Component Mode	53
Selecting Components	54
Lesson 3.1-Tutorial 1: Select Multiple Objects	55
Lesson 3.1-Tutorial 2: Select Components	55
Lesson 3.2: Transform, Group, and Parent Objects	56
Understanding Pivot Points	56
Transforming Objects Along an Axis	57
Transforming Objects Within a Plane	57
Constrained Rotations	58
Grouping Objects Together	59
Parenting Objects	59
Lesson 3.2-Tutorial 1: Move Pivot Point	59
Lesson 3.2-Tutorial 2: Transform Car Wheels	60
Lesson 3.2-Tutorial 3: Parent an Object	61
Lesson 3.3: Snap and Align Objects	62
Using Grids	62
Duplicating with Transform	63
Snapping Objects	63
Snapping to a Live Object	64
Aligning Objects	64
Aligning Points	65
Snapping Surfaces Together	65
Lesson 3.3-Tutorial 1: Snap Objects to Grid Points	66
Lesson 3.3-Tutorial 2: Snap to a Curve	67
Lesson 3.3-Tutorial 3: Snap to a Live Object	68
Lesson 3.3-Tutorial 4: Align Letters	69
Lesson 3.4: Understand Nodes and Attributes	70
Understanding the Various Node Types	70
Working with Nodes	70
Viewing Nodes as a Scene Hierarchy in the Outliner	72
Viewing Dependency with Hypergraph	73
Editing Attributes	74
Using Undo, Redo, and Repeat	75
Deleting construction history	75
Lesson 3.4-Tutorial 1: Explore Dependent Nodes	75
Lesson 3.4-Tutorial 2: Delete Construction History	77
Chapter Summary	77
What You Have Learned	77
Key Terms From This Chapter	78
 CHAPTER 4	 79
Drawing and Editing Curves	79
Lesson 4.1: Create Curves	80

Creating Circles and Squares	80
Creating Arcs	80
Creating Smooth Curves	81
Creating Straight Line Curves	82
Drawing Freehand Curves	83
Simplifying and Smoothing Curves	83
Lesson 4.1-Tutorial 1: Create an Eye Using Arcs and Primitive Shapes	84
Lesson 4.1-Tutorial 2: Draw and Compare CV, EP, and Freehand Curves	85
Lesson 4.1-Tutorial 3: Simplify Freehand Curves	86
Lesson 4.2: Edit Curve Details	88
Using the Curve Editing Tool	88
Altering Tangents	89
Adding Sharp Points to a Curve	89
Adding Points to the End of a Curve	90
Closing and Opening Curves	90
Lesson 4.2-Tutorial 1: Create and Edit a Star Shape	91
Lesson 4.2-Tutorial 2: Use the Curve Editing Tool	92
Lesson 4.2-Tutorial 3: Create Sharp Points	93
Lesson 4.2-Tutorial 4: Close a Curve	94
Lesson 4.3: Modify Curves	95
Locking Length	95
Straightening Curves	95
Smoothing Curves	95
Curling and Bending Curves	96
Scaling Curvature	97
Lesson 4.3-Tutorial 1: Curl a Curve	97
Lesson 4.4: Apply Curve Operators	99
Attaching Curves	100
Aligning Curves	101
Detaching and Cutting Curves	102
Finding Curve Intersections	102
Offsetting Curves	102
Filletting Curves	102
Lesson 4.4-Tutorial 1: Connect Cursive Letters	103
Lesson 4.4-Tutorial 2: Align Flower Petals	104
Lesson 4.4-Tutorial 3: Offset Curves	105
Lesson 4.4-Tutorial 4: Fillet Curves	106
Lesson 4.5: Create Simple Surfaces from Curves	107
Revolving a Curve	108
Lofting a Set of Curves	108
Creating Planar Curves	108
Creating a Surface from Boundary Curves	109
Extruding Curves	109
Using the Birail Tools	109
Lesson 4.5-Tutorial 1: Revolve a Baseball Bat	110
Lesson 4.5-Tutorial 2: Loft a Banana	110
Lesson 4.5-Tutorial 3: Create a Planar Surface	111
Lesson 4.5-Tutorial 4: Extrude a Circle	112
Lesson 4.5-Tutorial 5: Create a Birail Surface	113
Lesson 4.6: Create Text	114
Creating a Beveled Surface	115
Lesson 4.6-Tutorial 1: Create and Bevel Text	115

Lesson 4.6-Tutorial 2: Create a Sign	116
Chapter Summary	118
What You Have Learned.....	118
Key Terms From This Chapter	119
CHAPTER 5	121
Working with NURBS Surfaces	121
Lesson 5.1: Learn the NURBS Primitives	122
Creating Spheres and Cubes.....	123
Creating Cylinders and Cones.....	123
Creating a Plane and a Torus	123
Inserting Isoparms.....	123
Lesson 5.1-Tutorial 1: Create a Candle from Primitives.....	124
Lesson 5.1-Tutorial 2: Add Isoparms.....	125
Lesson 5.2: Edit NURBS Surfaces	126
Selecting Components.....	126
Using the Surface Editing Tool.....	127
Using the Sculpt Geometry Tool.....	128
Simplifying Surfaces.....	129
Breaking and Smoothing Tangents	129
Lesson 5.2-Tutorial 1: Edit NURBS Components	129
Lesson 5.2-Tutorial 2: Use the Surface Editing Tool	130
Lesson 5.2-Tutorial 3: Use the Sculpt Geometry Tool.....	131
Lesson 5.2-Tutorial 4: Create a Hard Edge	132
Lesson 5.3: Apply Surface Operators	133
Attaching and Detaching Surfaces	133
Aligning Surfaces.....	134
Closing and Opening NURBS Surfaces.....	135
Extending Surfaces	136
Offsetting a Surface	136
Filleting Surfaces	136
Blending Surfaces	137
Lesson 5.3-Tutorial 1: Attach Surfaces	138
Lesson 5.3-Tutorial 2: Detach Surfaces	139
Lesson 5.3-Tutorial 3: Open and Close a Surface.....	140
Lesson 5.3-Tutorial 4: Offset Surface	141
Lesson 5.3-Tutorial 5: Add a Circular Fillet	142
Lesson 5.3-Tutorial 6: Blend Two Surfaces.....	143
Lesson 5.4: Trim NURBS Surfaces.....	144
Drawing Curves on a NURBS Surface	144
Projecting Curves onto a NURBS Surface.....	144
Marking Intersecting Surfaces	145
Trimming a Surface	146
Lesson 5.4-Tutorial 1: Draw and Trim a Surface.....	147
Lesson 5.4-Tutorial 2: Project and Trim a Curve.....	148
Lesson 5.5: Use Boolean Tools	149
Combining Surfaces with the Union Tool.....	150
Removing Surface Parts with the Subtract Tool	150
Creating a Surface Intersection with the Intersect Tool	150
Lesson 5.5-Tutorial 1: Create Boolean Union Surfaces.....	150

Lesson 5.5-Tutorial 2: Create Boolean Subtract Surfaces	151
Lesson 5.5-Tutorial 3: Create Boolean Intersect Surfaces	152
Lesson 5.6: Stitch Surfaces Together	153
Applying Global Stitch	154
Stitching Surface Points Together.....	154
Stitching Surface Edges Together.....	154
Lesson 5.6-Tutorial 1: Apply Global Stitch	154
Lesson 5.7: Convert Objects.....	155
Converting NURBS to Polygons	156
Converting to Subdivision Surfaces.....	156
Converting Subdivision Surfaces to NURBS and Polygons	156
Lesson 5.7-Tutorial 1: Convert NURBS to Polygons	157
Lesson 5.7-Tutorial 2: Convert NURBS to Polygons and Back	158
Chapter Summary	159
What You Have Learned.....	159
Key Terms From This Chapter	160
 CHAPTER 6	161
 Creating and Editing Polygon Objects	161
Lesson 6.1: Create Polygon Objects	162
Creating Polygon Primitives	162
Creating Polygon Objects by Hand.....	163
Appending to a Polygon.....	163
Combining Polygons.....	164
Mirroring Polygon Objects	164
Duplicating Faces.....	165
Cleaning Up and Reducing Polygons.....	166
Lesson 6.1-Tutorial 1: Create Polygon Primitives	167
Lesson 6.1-Tutorial 2: Create a Polygon.....	168
Lesson 6.1-Tutorial 3: Append to a Polygon.....	169
Lesson 6.1-Tutorial 4: Mirror an Object	170
Lesson 6.1-Tutorial 5: Offset Faces	171
Lesson 6.2: Edit Polygons	172
Selecting Polygon Components	172
Subdividing and Splitting Polygon Faces	173
Cutting Faces	175
Merging Vertices	176
Merging Edges	177
Deleting Components.....	178
Lesson 6.2-Tutorial 1: Create a Mushroom.....	178
Lesson 6.2-Tutorial 2: Split Faces.....	179
Lesson 6.2-Tutorial 3: Merge Vertices and Edges	180
Lesson 6.3: Use Polygon Operations.....	181
Extruding Vertices	181
Extruding Edges and Faces	182
Chamfer a Vertex	183
Beveling an Edge	184
Poking a Face.....	185
Creating a Wedge.....	186
Lesson 6.3-Tutorial 1: Extrude Cube Vertices	187

Lesson 6.3-Tutorial 2: Extrude Cube Edges and Faces	188
Lesson 6.3-Tutorial 3: Chamfer Vertices	189
Lesson 6.3-Tutorial 4: Bevel Edges	190
Lesson 6.3-Tutorial 5: Poke Faces	191
Lesson 6.3-Tutorial 6: Wedge Faces	192
Lesson 6.4: Smooth Polygon Edges	193
Showing Normals.....	193
Reversing and Controlling Normals.....	194
Softening and Hardening Edges.....	194
Smoothing Polygons with Subdivisions.....	194
Creating a Smooth Proxy	195
Adding a Crease to a Smoothed Polygon.....	195
Smoothing Polygons with Vertex Averaging.....	196
Lesson 6.4-Tutorial 1: Conform Normals	196
Lesson 6.4-Tutorial 2: Smooth Faces.....	197
Lesson 6.4-Tutorial 3: Smooth Faces.....	197
Lesson 6.4-Tutorial 4: Smooth Faces with Vertex Averaging	198
Lesson 6.5: Use Polygon Booleans and Triangulate Polygons.....	199
Combining Polygon Objects	200
Finding the Difference Between Objects	200
Creating an Intersection Object.....	200
Triangulating Polygon Faces.....	200
Switching Polygon Faces to Rectangles.....	201
Flipping Triangle Edges.....	201
Lesson 6.5-Tutorial 1: Create a Button from Booleans.....	201
Lesson 6.5-Tutorial 2: Triangulate Non-Planar Polygons.....	202
Lesson 6.6: Create Holes in Polygons	203
Splitting a Vertex	203
Extracting Faces.....	204
Using the Make Hole Tool.....	205
Filling Holes.....	206
Lesson 6.6-Tutorial 1: Add Holes to a Cube.....	206
Lesson 6.7: Work with Edge Loops, Rings, and Borders	207
Selecting Edge Loops, Rings, and Borders	208
Converting Selections	208
Using the Duplicate Edge Loop Tool.....	208
Using the Split Edge Ring Tool	209
Lesson 6.7-Tutorial 1: Add Edge Loops to a Face	210
Chapter Summary	211
What You Have Learned.....	212
Key Terms From This Chapter	212
 CHAPTER 7	 215
Assigning Materials and Textures	215
Lesson 7.1: Apply Materials.....	216
Applying New Materials.....	216
Renaming Materials	217
Applying Existing Materials	217
Changing Material Attributes.....	217
Moving Between Nodes.....	219

Rendering Materials	219
Lesson 7.1-Tutorial 1: Apply a Material	220
Lesson 7.1-Tutorial 2: Apply and Render a Texture	221
Lesson 7.2: Use the Hypershade	222
Using the Create Bar	223
Using the tabbed panes	224
Using the Work Area	225
Working with Nodes	226
Connecting Nodes	226
Using the Connection Editor	227
Dragging Materials to Objects	228
Lesson 7.2-Tutorial 1: Create a Custom Material	228
Lesson 7.2-Tutorial 2: Use the Connection Editor	229
Lesson 7.3: Work with Materials	230
Learning the Surface Materials	231
Changing Material Color	232
Changing Material Transparency	232
Using Other Material Attributes	232
Layering Materials	233
Using the Ramp Shader	234
Using the Shading Map	235
Lesson 7.3-Tutorial 1: Change Color and Transparency	236
Lesson 7.3-Tutorial 2: Layer Materials	237
Lesson 7.3-Tutorial 3: Use a Shading Map	238
Lesson 7.4: Work with Textures	239
Connecting Texture Nodes	241
Applying Textures as Color	241
Mapping Textures to Attributes	242
Adding Relief	243
Loading File Textures	243
Layering Textures	244
Lesson 7.4-Tutorial 1: Apply Textures	245
Lesson 7.4-Tutorial 2: Load an Image Texture	246
Lesson 7.5: Position Textures	247
Understanding Mapping Methods	247
Using Normal Mapping	247
Using Projection Mapping	248
Using Stencil Mapping	248
Placing 2D Textures	249
Placing 3D Textures	250
Controlling Polygon Textures	251
Lesson 7.5-Tutorial 1: Position 2D Textures	251
Lesson 7.5-Tutorial 2: Position 3D Textures	252
Lesson 7.6: Use Utilities Nodes	253
Using the General Utilities	253
Using the Color Utilities	254
Using the Switch Utilities	254
Lesson 7.6-Tutorial 1: Blend Colors	254
Lesson 7.7: Paint in 3D	255
Assigning a Paint Texture	255
Selecting a Brush	256
Applying Color	257

Using Different Paint Operations	257
Painting Other Attributes	258
Lesson 7.7-Tutorial 1: Use the 3D Paint Tool.....	259
Chapter Summary	260
What You Have Learned.....	260
Key terms From This Chapter.....	261
 CHAPTER 8	 263
Adding Paint Effects	263
Lesson 8.1: Use the Preset Brushes	263
Accessing the Paint Effects Panel.....	264
Using the Paint Effects Tool	264
Using Preset Brushes	265
Introducing the Visor	265
Blending Presets.....	266
Redrawing the View.....	266
Clearing the View	267
Lesson 8.1-Tutorial 1: Use a Paint Effects Brush	267
Lesson 8.1-Tutorial 2: Use a Visor Brush.....	268
Lesson 8.1-Tutorial 3: Blend Brushes.....	268
Lesson 8.2: Create Custom Brushes	269
Changing Template Brush Settings.....	270
Using the Various Brush Types	270
Changing Brush Size.....	272
Changing Brush Color	273
Enabling Illumination and Shadows	274
Enabling Glows.....	275
Creating and Saving Custom Brushes.....	276
Lesson 8.2-Tutorial 1: Change Brush Size.....	277
Lesson 8.2-Tutorial 2: Change Brush Color.....	277
Lesson 8.2-Tutorial 3: Add Shadows.....	278
Lesson 8.2-Tutorial 4: Add a Glow.....	279
Lesson 8.3: Paint in 2D.....	280
Introducing the Paint Effects Canvas.....	280
Changing the Canvas Size.....	281
Creating Seamless Textures	282
Saving Textures	282
Undoing the Last Stroke	282
Saving the Alpha Channel.....	283
Lesson 8.3-Tutorial 1: Create a Seamless Texture.....	283
Lesson 8.3-Tutorial 2: Save an Image and Alpha Channel	284
Lesson 8.4: Paint on 3D Objects.....	286
Painting in a View Panel.....	286
Painting on Objects	287
Auto-Painting an Object.....	288
Saving Depth as a Grayscale Map	289
Lesson 8.4-Tutorial 1: Paint on Objects.....	289
Lesson 8.4-Tutorial 2: Auto-Paint on Objects.....	290
Lesson 8.5: Edit Paint Effects.....	291
Selecting Strokes.....	291

Editing Strokes	292
Converting Strokes to Polygons	292
Changing the Default Light	293
Lesson 8.5-Tutorial 1: Select and Edit Strokes	293
Lesson 8.5-Tutorial 2: Convert Paint Effects to Polygons	294
Chapter Summary	295
What You Have Learned	295
Key Terms From This Chapter	296
 CHAPTER 9	 297
Using Cameras and Lights	297
Lesson 9.1: Work with Cameras	298
Creating Cameras	298
Changing Camera Settings	299
Selecting a Camera	300
Positioning Cameras	300
Looking Through a New Camera	300
Setting View Guidelines	301
Changing the Depth of Field	302
Lesson 9.1-Tutorial 1: Create a Camera	303
Lesson 9.1-Tutorial 2: Aim a Camera	304
Lesson 9.1-Tutorial 3: Create a Depth-of-Field Effect	305
Lesson 9.2: Create a Background	306
Setting the Background Color	306
Adding an Image Plane	307
Creating a Textured Background	307
Loading a Background Image	308
Positioning the Background	309
Lesson 9.2-Tutorial 1: Change Background Color	309
Lesson 9.2-Tutorial 2: Change Background Texture	310
Lesson 9.2-Tutorial 3: Add and Position a Background Image	311
Lesson 9.3: Create and Position Lights	312
Using Default Lights	312
Understanding the Light Types	312
Creating Lights	313
Manipulating Lights	313
Manipulating Spot Lights	314
Lesson 9.3-Tutorial 1: Create and Manipulate a Light	315
Lesson 9.4: Change Light Settings	317
Changing Light Color	317
Changing Light Intensity and Decay	318
Enabling Shadows	319
Lesson 9.4-Tutorial 1: Change Light Color and Intensity	320
Lesson 9.4-Tutorial 2: Enable Shadows	321
Lesson 9.5: Create Light Effects	322
Creating Light Fog	322
Creating Glows and Halos	323
Creating Lens Flares	324
Lesson 9.5-Tutorial 1: Enable Light Fog	325
Lesson 9.5-Tutorial 2: Enable a Halo Light Effect	327

Chapter Summary	328
What You Have Learned.....	328
Key Terms From This Chapter	329
CHAPTER 10	331
Animating with Keyframes.....	331
Lesson 10.1: Set Keyframes	331
Setting Keys.....	332
Using Auto Key	333
Selecting Keys	333
Copying Keys.....	334
Deleting Keys.....	334
Snapping Keys	334
Lesson 10.1-Tutorial 1: Set Keys	335
Lesson 10.1-Tutorial 2: Use Auto Key	336
Lesson 10.1-Tutorial 3: Move Keys.....	336
Lesson 10.2: View an Animation	338
Previewing Animation	338
Looping an Animation	339
Enabling Ghosting.....	340
Creating Motion Trails.....	342
Using Playblast	342
Lesson 10.2-Tutorial 1: Preview an Animation	343
Lesson 10.2-Tutorial 2: Use Playblast	344
Lesson 10.3: Animate Using Motion Paths	345
Creating Motion Path Keys.....	345
Drawing a Motion Path	346
Attaching an Object to a Motion Path	346
Adjusting an Attached Motion Path	347
Deforming an Object as it Follows a Motion Path	348
Lesson 10.3-Tutorial 1: Create a Motion Path	349
Lesson 10.3-Tutorial 2: Draw a Motion Path and Attach an Object	350
Lesson 10.4: Edit Animation Curves.....	351
Using the Graph Editor	351
Framing Curves.....	352
Editing Keys.....	352
Smoothing and Simplifying Curves	353
Setting Infinity Conditions	354
Working with Tangents.....	354
Adding Keys	355
Lesson 10.4-Tutorial 1: Edit Animation Curves	355
Lesson 10.4-Tutorial 2: Repeat Motion	356
Lesson 10.5: Control Animation Timing	357
Using the Dope Sheet.....	357
Using the Dope Sheet Manipulator	358
Adding Sound	359
Lesson 10.5-Tutorial 1: Use the Dope Sheet.....	360
Lesson 10.5-Tutorial 2: Add Sound	361
Chapter Summary	362
What You Have Learned.....	362

Key Terms From This Chapter	363
CHAPTER 11	365
Working with Characters	365
Lesson 11.1: Build a Skeleton	365
Creating Joints	366
Inserting a Joint	366
Connecting a Joint Chain	367
Removing and Disconnecting Joints	368
Mirroring Joints	368
Resetting the Root Joint	369
Naming Joints	369
Lesson 11.1-Tutorial 1: Create a Skeleton	369
Lesson 11.1-Tutorial 2: Add a Tail to the Skeleton	370
Lesson 11.2: Edit Joint Attributes	371
Inheriting Transforms	371
Orienting Joints	371
Labeling Joints	372
Showing and Hiding Labels	372
Limiting Joints	372
Displaying Joints	373
Lesson 11.2-Tutorial 1: Label Joints	374
Lesson 11.2-Tutorial 2: Limit Joint Motion	375
Lesson 11.3: Add Inverse Kinematics	376
Using the IK Handle Tool	376
Using the IK Spline Handle Tool	377
Using the IK Manipulators	378
Switching Between FK and IK	379
Lesson 11.3-Tutorial 1: Add IK to a Skeleton	379
Lesson 11.3-Tutorial 2: Add IK Spline to the Skeleton Tail	380
Lesson 11.4: Skin a Character	381
Creating Effective Skin	381
Positioning a Skeleton	382
Binding Smooth Skin	382
Binding Rigid Skin	383
Returning to Default Pose	385
Detaching Skin	385
Animating Joints	385
Lesson 11.4-Tutorial 1: Position a Skin	385
Lesson 11.4-Tutorial 2: Bind Skin	386
Lesson 11.4-Tutorial 3: Animate Joints	387
Lesson 11.5: Edit a Skin	389
Adding Influence Objects	389
Understanding Skin Weights	389
Painting Skin Weights	390
Resetting Skin Weights	391
Lesson 11.5-Tutorial 1: Add Influence Object	391
Lesson 11.5-Tutorial 2: Paint Weights	392
Lesson 11.6: Add Hair and Fur	393
Adding preset hair to an object	393

Creating hair.....	394
Style hair.....	395
Making hair dynamic.....	395
Creating and editing a fur description.....	396
Rendering hair and fur.....	397
Lesson 11.6-Tutorial 1: Add hair.....	398
Chapter Summary.....	400
What You Have Learned.....	400
Key Terms From This Chapter.....	400
 CHAPTER 12	403
 Animating with Dynamics	403
Lesson 12.1: Use Particles.....	403
Creating Particles.....	404
Creating Surface Particles.....	404
Viewing Particle Attributes and Count.....	405
Setting Particle Lifespan.....	406
Changing Particle Render Type.....	406
Using Instances.....	407
Cycling Instances.....	408
Lesson 12.1-Tutorial 1: Add Clouds to a Sphere.....	409
Lesson 12.1-Tutorial 2: Use an Instance.....	410
Lesson 12.1-Tutorial 3: Cycle Instances.....	411
Lesson 12.2: Create an Emitter.....	412
Using an Emitter.....	412
Using a Directional Emitter.....	413
Using a Volume Emitter.....	414
Using an Object as an Emitter.....	415
Changing Emitter Attributes.....	416
Lesson 12.2-Tutorial 1: Create an Omni Emitter.....	417
Lesson 12.2-Tutorial 2: Create a Directional Emitter.....	418
Lesson 12.2-Tutorial 3: Create an Object Emitter.....	419
Lesson 12.3: Create Fields and Goals.....	420
Understanding Fields.....	420
Connecting Objects to a Field.....	421
Changing Field Attributes.....	421
Regulating Field Forces.....	422
Establishing Goals.....	422
Lesson 12.3-Tutorial 1: Create a Vortex Field.....	423
Lesson 12.3-Tutorial 2: Create a Goal.....	424
Lesson 12.4: Manage Particle Collisions.....	425
Enabling Particle Collisions.....	425
Defining New Events.....	426
Creating Rigid Body Objects.....	427
Creating Soft Body Objects.....	428
Lesson 12.4-Tutorial 1: Enable Particle Collisions.....	428
Lesson 12.4-Tutorial 2: Add a Collision Event.....	429
Lesson 12.4-Tutorial 3: Create Rigid Body Objects.....	430
Lesson 12.4-Tutorial 4: Create Soft Body Objects.....	431
Lesson 12.5: Constrain Motion.....	432

Adding Constraints	432
Creating Nail and Spring Constraints.....	433
Creating a Pin Constraint	433
Creating a Hinge Constraint.....	434
Creating a Barrier Constraint	434
Creating Springs.....	435
Lesson 12.5-Tutorial 1: Add a Constraint	436
Lesson 12.6: Create Effects	437
Creating Fire and Smoke.....	437
Creating Fireworks.....	439
Creating Lightning	440
Shattering Objects	441
Flowing Along a Curve.....	442
Lesson 12.6-Tutorial 1: Create a Fire Effect.....	443
Lesson 12.6-Tutorial 2: Create Fireworks.....	444
Lesson 12.6-Tutorial 3: Create Lightning	445
Lesson 12.6-Tutorial 4: Create Curve Flow	446
Lesson 12.7: Use Cloth and Fluids	447
Creating Cloth	447
Creating a Cloth Collision Object.....	448
Setting Cloth Object Properties.....	449
Creating a Fluid Container	450
Creating a Fluid Emitter.....	450
Changing Fluid Properties	451
Creating Oceans and Ponds.....	451
Lesson 12.7-Tutorial 1: Drape a Tablecloth.....	452
Lesson 12.7-Tutorial 2: Fill a Container	453
Lesson 12.7-Tutorial 3: Create a Pond with Ripples.....	454
Chapter Summary	455
What You Have Learned.....	455
Key Terms From This Chapter	456
 CHAPTER 13	 457
Rendering a Scene	457
Lesson 13.1: Configure the Render Process	457
Choosing a Renderer	458
Saving Render Presets.....	459
Changing a File Name.....	459
Changing File Format	459
Changing Camera View and Resolution	459
Using render layers	460
Lesson 13.1-Tutorial 1: Set Render Settings.....	460
Lesson 13.1-Tutorial 2: Change the Rendering Path.....	460
Lesson 13.2: Use Special Rendering Features.....	460
Adjusting Render Quality	461
Enabling Raytracing.....	463
Enabling Motion Blur	463
Lesson 13.2-Tutorial 1: Change the Render Quality	464
Lesson 13.2-Tutorial 2: Enable Raytracing.....	464
Lesson 13.2-Tutorial 3: Enable Motion Blur	465

Lesson 13.2-Tutorial 4: Add Environment Fog	466
Lesson 13.3: Use the Render View Window	467
Opening the Render View	467
Rendering a Region	468
Using Interactive Photorealistic Rendering (IPR)	469
Saving Rendered Images	469
Lesson 13.3-Tutorial 1: Render a Region	470
Lesson 13.3-Tutorial 2: Use IPR Rendering	471
Lesson 13.4: Create a Final Render	472
Rendering a Single Frame	472
Rendering an Animation Sequence	472
Using Batch Rendering	472
Lesson 13.4-Tutorial 1: Render an Animation	472
Lesson 13.5: Render with Maya Vector and Mental Ray	473
Using Maya Vector	474
Using Mental Ray	475
Using Mental Ray Materials	477
Lesson 13.5-Tutorial 1: Render Using Vectors	478
Lesson 13.5-Tutorial 2: Render with Mental Ray	479
Chapter Summary	480
What You Have Learned	480
Key Terms From This Chapter	481
 CHAPTER 14	483
Using MEL Scripting	483
Lesson 14.1: Use the Command Line	483
Using MEL in the Command Line	483
Repeating Command Line Commands	483
Using the MEL Scripting Commands	484
Lesson 14.1-Tutorial 1: Enter MEL Commands in the Command Line	485
Lesson 14.2: Use the Script Editor	486
Executing Script Commands	486
Viewing Interface Commands	486
Reusing Interface Commands	487
Saving Scripts	487
Adding Scripts to the Shelf	487
Lesson 14.2-Tutorial 1: Use the Script Editor	488
Lesson 14.2-Tutorial 2: View Interface Commands and Save a Script	488
Lesson 14.2-Tutorial 3: Execute a Custom Script	490
Chapter Summary	491
What You Have Learned	491
Key Terms From This Chapter	491
 Glossary	493
 Index	493