

Kelly L. Murdock's Autodesk®

3ds Max® 2019

COMPLETE REFERENCE GUIDE



Better Textbooks. Lower Prices.
www.SDCpublications.com



ACCESS CODE
UNIQUE CODE INSIDE

Visit the following websites to learn more about this book:

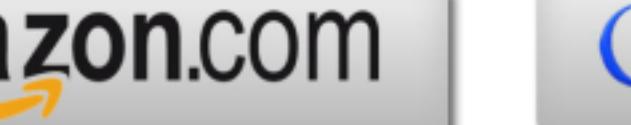


Table of Contents

PART I	1
GETTING STARTED WITH AUTODESK 3DS MAX 2019	1
CHAPTER 1	3
EXPLORING THE INTERFACE.....	3
Learning the Interface Elements	4
Using the Menus.....	6
Using the Toolbars.....	8
Using the Viewports	14
Using the Command Panel.....	14
Using the Lower Interface Bar Controls.....	18
Interacting with the Interface	19
Using Workspaces	22
Getting Help.....	24
Summary.....	27
CHAPTER 2	29
CONTROLLING AND CONFIGURING THE VIEWPORTS.....	29
Understanding 3D Space	30
Using the Navigation Gizmos	32
Controlling Viewports with a Scroll Wheel Mouse.....	37
Using the Viewport Navigation Controls	37
Changing the Viewport Display.....	43
Enhancing the Viewport	46
Displaying Materials, Lighting, and Shadows in the Viewport	50
Working with Viewport Backgrounds	54
Setting Viewport Visual Style and Appearance	57
Altering the Viewport Layout	62
Using Safe Frames	64
Setting Display Performance.....	66
Defining Regions.....	67
Viewing Statistics	69
Configuring the ViewCube and SteeringWheels	70
Summary.....	70
CHAPTER 3	71
WORKING WITH FILES, IMPORTING AND EXPORTING.....	71
Working with 3ds Max Scene Files.....	71
Importing and Exporting	79
Using the File Utilities.....	89
Accessing File Information	91
Working with Asset Tracking.....	93
Summary.....	97
CHAPTER 4	99
SETTING PREFERENCES	99
Setting General Preferences	99
Setting File Preferences.....	103
Configuring Paths	106
Setting Interaction Mode	112
Setting Gamma and Look-Up Table (LUT) Preferences.....	113

Table of Contents

Setting Rendering and Radiosity Preferences.....	115
Setting Animation Preferences.....	120
Setting Inverse Kinematics Preferences.....	121
Setting Gizmo Preferences	123
Setting Global Container Preferences	124
Setting Help Preferences	125
Summary	126
PART II	127
MANIPULATING OBJECTS	127
CHAPTER 5	129
CREATING AND EDITING PRIMITIVE OBJECTS.....	129
Selecting System Units.....	129
Creating Primitive Objects	131
Using Modeling Helpers.....	141
Summary	144
CHAPTER 6	147
SELECTING OBJECTS AND USING LAYERS.....	147
Selecting Objects.....	147
Setting Object Properties	158
Hiding and Freezing Objects.....	160
Using the Scene Explorer	164
Using Layers in the Scene Explorer.....	168
Setting Object Properties	172
Setting Display Properties.....	174
Summary	177
CHAPTER 7	179
TRANSFORMING OBJECTS, PIVOTING, ALIGNING, AND SNAPPING.....	179
Translating, Rotating, and Scaling Objects.....	179
Working with the Transformation Tools.....	182
Using Pivot Points	191
Using the Align Commands.....	195
Using Grids	198
Using Snap Options.....	201
Summary	206
CHAPTER 8	209
CLONING OBJECTS AND CREATING OBJECT ARRAYS	209
Cloning Objects	209
Understanding Cloning Options	212
Mirroring Objects.....	215
Cloning over Time	217
Spacing Cloned Objects	219
Using the Clone and Align Tool.....	222
Creating Arrays of Objects	224
Summary	230
CHAPTER 9	231
GROUPING, LINKING, AND PARENTING OBJECTS	231
Working with Groups.....	231
Understanding Parent, Child, and Root Relationships.....	233
Building Links between Objects.....	234
Displaying Links and Hierarchies	236
Working with Linked Objects.....	237

Summary.....	240
CHAPTER 10	241
ORGANIZING SCENES WITH CONTAINERS, XREFS AND THE SCHEMATIC VIEW	241
Working with Containers.....	241
Referencing External Objects.....	245
Using the File Link Manager	256
Using the Schematic View Window	258
Working with Hierarchies.....	266
Setting Schematic View Preferences	270
Using List Views	274
Summary.....	275
PART III	277
MODELING 3D ASSETS	277
CHAPTER 11	279
ACCESSIONG SUBOBJECTS AND MODIFIERS AND USING THE MODIFIER STACK.....	279
Exploring the Model Types.....	280
Understanding Normals	282
Working with Subobjects	284
Introducing Modifiers.....	288
Exploring the Modifier Stack	290
Summary.....	300
CHAPTER 12	301
DRAWING AND EDITING 2D SPLINES AND SHAPES	301
Drawing in 2D	301
Editing Splines.....	314
Summary.....	336
CHAPTER 13	337
MODELING WITH POLYGONS	337
Understanding Poly Objects.....	337
Creating Editable Poly Objects	338
Editing Poly Objects.....	339
Summary.....	369
CHAPTER 14	371
USING THE GRAPHITE MODELING TOOLS AND PAINTING WITH OBJECTS	371
Working with the Graphite Modeling Tools	371
Using the Freeform Tools	387
Using the Selection Tools	393
Using the Object Paint Tools	396
Summary.....	404
CHAPTER 15	405
WORKING WITH COMPOUND OBJECTS.....	405
Understanding Compound Object Types.....	405
Morphing Objects	406
Modeling with Boolean Objects.....	409
Creating a Terrain Object	412
Working with BlobMesh Objects	415
Working with ProBoolean and ProCutter Objects.....	416
Summary.....	422

CHAPTER 16	423
DEFORMING SURFACES AND USING THE MESH MODIFIERS	423
Using Selection Modifiers	423
Using Primitive Maintenance Modifiers.....	425
Using Spline Modifiers	426
Using Edit Geometry Modifiers	435
Using Parametric Deformer Modifiers	444
Using Free Form Deformer Modifiers	459
Miscellaneous Modifiers.....	461
Subdivision Surface Modifiers	463
The Basics of Deformation Painting	465
Using the Deformation Brushes	468
Setting Painter Options.....	469
Summary	471
PART IV	473
APPLYING MATERIALS AND TEXTURES	473
CHAPTER 17	475
CREATING AND APPLYING STANDARD MATERIALS WITH THE SLATE MATERIAL EDITOR	475
Understanding Material Properties	475
Working with the Slate Material Editor	478
Using the Standard Material.....	486
Using Shading Types	486
Accessing Other Parameters	493
Using the Material/Map Browser.....	497
Using the Material Explorer.....	500
Summary	503
CHAPTER 18	505
ADDING MATERIAL DETAILS WITH MAPS.....	505
Understanding Maps	505
Working with Maps.....	506
Creating Textures with External Tools	518
Summary	522
CHAPTER 19	523
USING SPECIALIZED MATERIAL TYPES	523
Using the Ink 'n Paint Material	523
Using Architectural, Autodesk and Physical Materials	526
Using the DirectX Material	529
Selecting and Applying Substance Textures.....	531
Randomizing Substance Textures.....	535
Summary	537
CHAPTER 20	539
CREATING COMPOUND MATERIALS AND USING MATERIAL MODIFIERS.....	539
Using Compound Materials	539
Applying Multiple Materials	547
Using the Matte/Shadow Material.....	549
Material Modifiers	551
Summary	555
CHAPTER 21	557
CREATING SHADERS IN THE SHADERFX EDITOR	557
Accessing the ShaderFX Editor	557

Summary.....	561
CHAPTER 22	563
UNWRAPPING UVS AND MAPPING TEXTURES.....	563
Mapping Modifiers	563
Using the Unwrap UVW Modifier	567
Using the Edit UVWs Interface.....	569
Summary.....	587
CHAPTER 23	589
PAINTING IN THE VIEWPORT CANVAS AND RENDERING SURFACE MAPS.....	589
Using the Viewport Canvas	589
Using Vertex Colors	599
Rendering Surface Maps	603
Using Surface Maps	605
Summary.....	607
CHAPTER 24	609
CREATING BAKED TEXTURES AND NORMAL MAPS	609
Using Channels	609
Rendering to a Texture.....	611
Creating Normal Maps	615
Summary.....	620
PART V	621
WORKING WITH CAMERAS AND LIGHTS	621
CHAPTER 25	623
CONFIGURING AND AIMING CAMERAS.....	623
Learning to Work with Cameras	623
Setting Camera Parameters	631
Using the Camera Sequencer.....	638
Loading a Background Image and Camera	639
Perspective Matching the Background Image.....	640
Summary.....	644
CHAPTER 26	645
USING LIGHTS AND BASIC LIGHTING TECHNIQUES.....	645
Understanding the Basics of Lighting.....	645
Getting to Know the Light Types.....	648
Creating and Positioning Light Objects	651
Viewing a Scene from a Light	654
Altering Light Parameters.....	656
Summary.....	662
CHAPTER 27	663
POSITIONING THE SUN AND SETTING THE LIGHTING ENVIRONMENT	663
Positioning the Sun and Setting the Lighting Environment.....	663
Summary.....	668
CHAPTER 28	669
WORKING WITH ADVANCED LIGHTING, LIGHT TRACING, AND RADIOSITY	669
Selecting Advanced Lighting.....	669
Using Local Advanced Lighting Settings	675
Understanding Radiosity	677
Working with Advanced Lighting Materials.....	683
Using Lighting Analysis	684

Table of Contents

Summary	686
PART VI	687
RENDERING A SCENE	687
CHAPTER 29	689
RENDERING A SCENE AND ENABLING QUICKSILVER	689
Working with Render Parameters	689
Using the Rendered Frame Window	700
Summary	703
CHAPTER 30	705
MANAGING RENDER STATES	705
Using State Sets	705
Summary	712
CHAPTER 31	713
BATCH AND NETWORK RENDERING	713
Batch Rendering Scenes	713
Using the A360 Cloud Rendering System	714
Understanding Network Rendering	715
Setting Up a Network Rendering System	716
Starting the Network Rendering System	723
Configuring the Network Manager and Servers	728
Logging Errors	730
Using the Monitor	731
Summary	734
CHAPTER 32	735
RENDERING WITH ART AND ARNOLD	735
Enabling ART and Arnold	735
Working with Autodesk RayTracer (ART)	736
Working with Arnold	739
Summary	754
CHAPTER 33	755
COMPOSITING WITH RENDER ELEMENTS AND THE VIDEO POST INTERFACE	755
Using External Compositing Packages	756
Using Render Elements	760
Completing Post-Production with the Video Post Interface	762
Working with Sequences	764
Adding and Editing Events	765
Working with Ranges	773
Summary	776
PART VII	777
ANIMATING OBJECTS AND SCENES	777
CHAPTER 34	779
UNDERSTANDING ANIMATION AND KEYFRAMES	779
Using the Time Controls	779
Working with Keys	782
Using the Track Bar	785
Viewing and Editing Key Values	787
Using the Motion Panel	788
Using Ghosting	791
Animating Objects	792

Working with Previews.....	796
Using the RAM Player.....	798
Summary.....	801
CHAPTER 35	803
ANIMATING WITH CONSTRAINTS AND SIMPLE CONTROLLERS.....	803
Restricting Movement with Constraints.....	803
Understanding Controller Types	814
Assigning Controllers	814
Examining Some Simple Controllers	817
Summary.....	822
CHAPTER 36	823
EXPLORING THE COMPLEX CONTROLLERS	823
Examining Complex Controllers	823
Working with Expressions in Spinners	844
Understanding the Expression Controller Interface.....	845
Using Expression Controllers.....	851
Summary.....	854
CHAPTER 37	855
USING ANIMATION LAYERS AND ANIMATION MODIFIERS	855
Using the Animation Layers Toolbar	855
Working with Animation Layers.....	857
Saving and Loading Animation Files.....	859
Using the Animation Modifiers	863
Using More Animation Modifiers	868
Summary.....	875
CHAPTER 38	877
WIRING PARAMETERS	877
Wiring Parameters.....	877
Collecting Parameters	881
Adding Custom Parameters	883
Summary.....	885
CHAPTER 39	887
EDITING ANIMATION CURVES IN THE TRACK VIEW.....	887
Learning the Track View Interface	887
Working with Keys.....	896
Editing Time	901
Editing Curves	903
Filtering Tracks and Creating Track Sets	912
Working with Controllers	914
Using the ProSound Plug-in.....	915
Summary.....	918
PART VIII	919
WORKING WITH CHARACTERS	919
CHAPTER 40	921
UNDERSTANDING RIGGING, KINEMATICS, AND WORKING WITH BONES	921
Understanding Rigging	921
Building a Bones System.....	923
Using the Bone Tools.....	927
Forward Kinematics versus Inverse Kinematics.....	930
Creating an Inverse Kinematics System	930

Table of Contents

Summary	938
CHAPTER 41	939
SKINNING CHARACTERS	939
Understanding Your Character	939
Animated Skin Modifiers	940
Using Character Animation Techniques	955
Summary	955
CHAPTER 42	957
ANIMATING CHARACTERS WITH CAT	957
Character Creation Workflow	957
Creating a CAT Rig	958
Animating a CAT Rig	967
Summary	975
CHAPTER 43	977
CREATING CROWDS AND USING POPULATE	977
Creating Crowds	977
Creating a Crowd of Bipeds	982
Using Populate	984
Summary	988
PART IX	989
ADDING SPECIAL EFFECTS	989
CHAPTER 44	991
CREATING PARTICLES AND PARTICLE FLOW	991
Understanding the Various Particle Systems	991
Creating a Particle System	992
Using the Spray and Snow Particle Systems	993
Using the Super Spray Particle System	995
Using the Blizzard Particle System	1007
Using the PArray Particle System	1007
Using the PCloud Particle System	1010
Using Particle System Maps	1010
Controlling Particles with Particle Flow	1012
Working with Actions	1014
Using Particle Flow Helpers	1016
Debugging Test Actions	1018
Summary	1022
CHAPTER 45	1023
USING SPACE WARPS	1023
Creating and Binding Space Warps	1023
Understanding Space Warp Types	1024
Combining Particle Systems with Space Warps	1041
Summary	1044
CHAPTER 46	1045
USING ATMOSPHERIC AND RENDER EFFECTS	1045
Adding an Environment Background	1045
Using Exposure Controls	1047
Creating Atmospheric Effects	1051
Using the Fire Effect	1052
Using the Fog Effect	1057
Adding Render Effects	1060

Using Render Effects	1062
Summary.....	1066
CHAPTER 47	1067
CREATING VOLUME LIGHTS EFFECTS	1067
Using Volume Lights	1067
Summary.....	1072
CHAPTER 48	1073
ADDING LENS EFFECTS.....	1073
Creating Lens Effects	1073
Working with Lens Effects Filters	1085
Summary.....	1090
PART X	1091
USING DYNAMIC ANIMATION SYSTEMS	1091
CHAPTER 49	1093
SIMULATING PHYSICS-BASED MOTION WITH MASSFX	1093
Understanding Dynamics	1093
Using MassFX.....	1094
Setting Object Properties	1098
Using Constraints and Baking Keys	1103
Working with mCloth and Ragdolls.....	1107
Summary.....	1110
CHAPTER 50	1111
WORKING WITH HAIR AND CLOTH.....	1111
Understanding Hair	1111
Working with Hair.....	1112
Styling Hair	1117
Rendering Hair	1122
Using Hair Dynamics.....	1123
Understanding Cloth	1125
Creating Cloth	1126
Simulating Cloth Dynamics.....	1131
Summary.....	1134
PART XI	1149
EXTENDING 3DS MAX	1149
CHAPTER 51	1135
CREATING FLUID SIMULATIONS	1135
Understanding Fluids.....	1135
Getting Started with Fluids.....	1136
Setting Fluid Simulation Parameters.....	1139
Adding Foam.....	1141
Controlling Fluids with Motion Fields	1142
Using a Guide System	1144
Rendering Fluids	1146
Summary.....	1147
CHAPTER 52	1151
CUSTOMIZING THE INTERFACE	1151
Using the Customize User Interface Window.....	1151
Customizing the Ribbon	1163
Customizing Modify and Utilities Panel Buttons	1165

Table of Contents

Working with Custom Interfaces.....	1166
Summary	1170
CHAPTER 53	1171
CREATING PROCEDURAL CONTENT WITH MAX CREATION GRAPHS	1171
Installing a Max Creation Graph	1171
Creating a Max Creation Graph.....	1172
Summary	1178
CHAPTER 54	1179
EXPLORING 3DS MAX INTERACTIVE	1179
Installing 3ds Max Interactive.....	1179
Learning the 3ds Max Interactive Interface	1179
Creating a Live Link	1180
Building a Level	1181
Working with Assets	1184
Adding Interactions.....	1187
Deploying the Level	1190
Summary	1191
CHAPTER 55	1193
AUTOMATING WITH MAXSCRIPT	1193
What Is MAXScript?	1193
MAXScript Tools.....	1194
Setting MAXScript Preferences	1206
Types of Scripts	1207
Writing Your Own MAXScripts	1208
Learning the Visual MAXScript Editor Interface.....	1222
Laying Out a Rollout.....	1225
Summary	1230
CHAPTER 56	1231
EXPANDING 3DS MAX WITH THIRD-PARTY PLUG-INS	1231
Working with Plug-Ins.....	1231
Using the Autodesk Creative Market	1237
Locating Plug-Ins	1238
Summary	1238
APPENDIX A	1239
WHAT'S NEW WITH AUTODESK 3DS MAX 2019	1239
Major Improvements.....	1239
Minor Improvements	1240
APPENDIX B	1241
INSTALLING AND CONFIGURING AUTODESK 3DS MAX 2019	1241
Choosing an Operating System	1241
Hardware Requirements	1242
Installing 3ds Max 2019	1242
Registering and Activating the Software.....	1243
Setting the Display Driver	1244
Updating 3ds Max.....	1245
Moving 3ds Max to Another Computer	1245
APPENDIX C	1247
KEYBOARD SHORTCUTS	1247
Using Keyboard Shortcuts	1247

Using the Keyboard Shortcut Map	1247
Using the Search Command Field	1248
Main Interface Shortcuts.....	1248
Dialog Box Shortcuts.....	1257
Character Studio Shortcuts	1261
Miscellaneous Shortcuts	1262
INDEX.....	1265