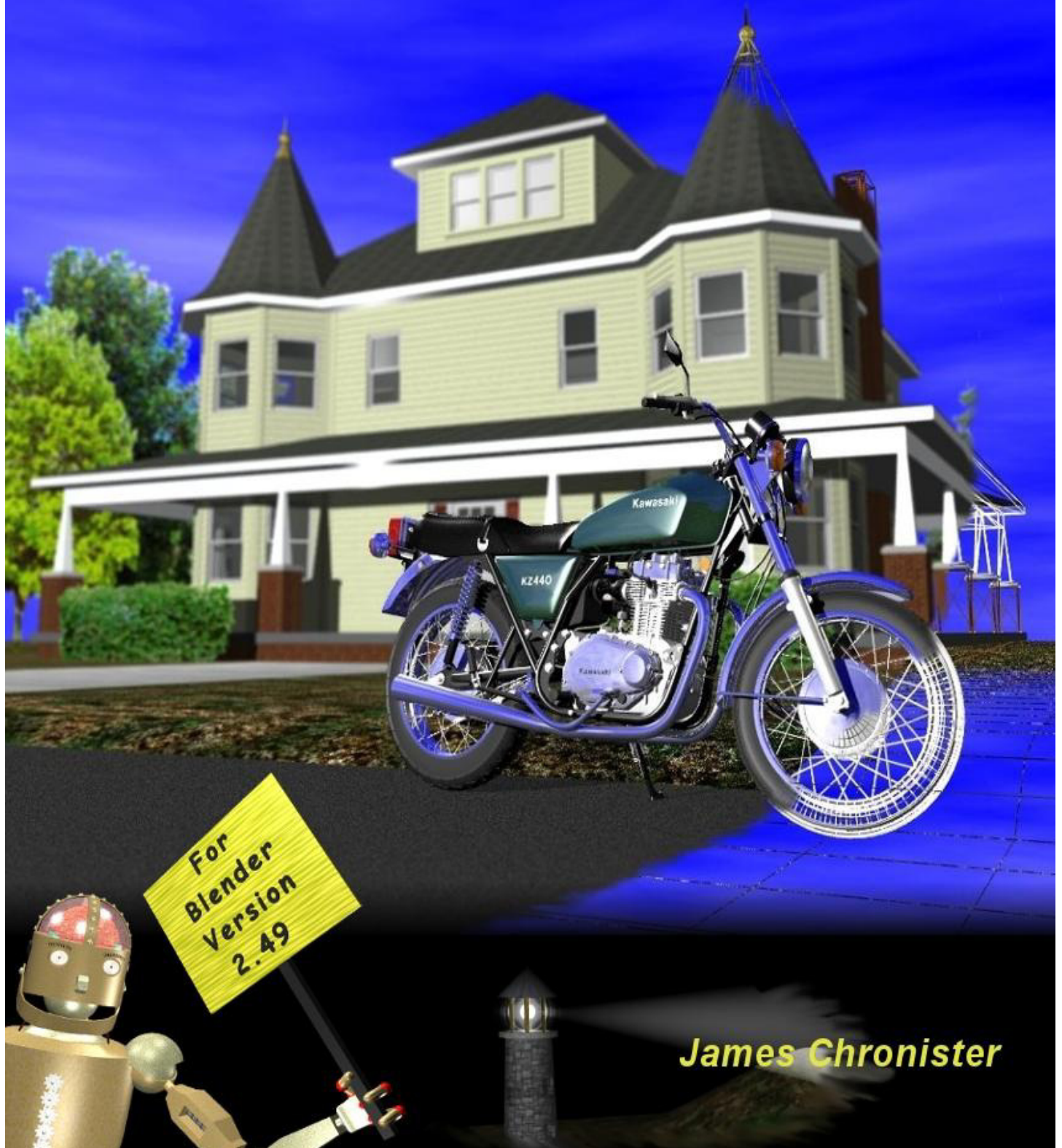


Blender Basics

Classroom Tutorial Book

3rd Edition



For
Blender
Version
2.49

James Chronister



This work is licensed under a [Creative Commons Attribution-Noncommercial-Share Alike 2.5 License](http://creativecommons.org/licenses/by-nc-sa/2.5/).

© 2004, 2006, 2009 third edition by James Chronister. This document may be reproduced in whole or in part without permission from the author. Feel free to use this manual for any and all educational applications. I enjoy emails from other educators, so please let me know how you're using the book. You may not bundle this tutorial with any software or documentation that is intended for commercial applications (marketing for a profit) without expressed written approval from the author. Inquiries and comments can be directed to jchronister@cdschools.org. This document, and other information, can be found at <http://www.cdschools.org/cdhs/site/default.asp>. At this site, look under "Academics" in "Drafting and Design Technology".

Information regarding the Blender program and development can be found at www.blender.org. Blender users can also find information on how to use the program at www.blenderartists.org. Daily Blender news can be found at: www.BlenderNation.com.

<u>Introduction</u>	1
<u>Rendering and Animation Basic Concepts</u>	2
<u>Basic Key Commands</u>	4
<u>Chapter 1- The Blender Interface</u>	6
<i>The Blender Screen</i>	
<i>Window Types</i>	
<i>Open, Saving and Appending Files</i>	
<i>Packing Data</i>	
<i>Importing Objects (from other file formats)</i>	
<u>Chapter 2- Working with Viewports (windows)</u>	12
<i>Creating Viewports</i>	
<i>Changing Window Type</i>	
<i>Moving Around in 3D Space</i>	
<u>Chapter 3- Creating and Editing Objects</u>	17
<i>Working with Basic Meshes</i>	
<i>Using Main Modifiers to Manipilate Meshes</i>	
<i>Edit Mode- Mesh Vertex Editing</i>	
<i>Proportional Vertex Editing</i>	
<i>Joining/Separating Meshes, Boolean Operations</i>	
<u>Chapter 4- Materials and Textures</u>	35
<i>Basic Material Settings</i>	
<i>Halo Settings</i>	
<i>Basic Texture Settings</i>	
<i>Using Images as Textures</i>	
<i>Displacement Mapping</i>	
<u>Chapter 5- Setting Up a World</u>	50
<i>Using Color, Stars and Mist</i>	
<i>Creating a 3D Cloud Background</i>	
<i>Using an Image in the Background</i>	
<u>Chapter 6- Lighting and Cameras</u>	56
<i>Lighting Types and Settings</i>	
<i>Camera Settings and Options</i>	
<u>Chapter 7- Render Window Settings</u>	61
<i>Basic Setup Options</i>	
<i>Rendering a JPEG Image</i>	
<i>Creating an FFMPEG Movie File</i>	
<u>Chapter 8- Raytracing (mirror, transparency, shadows)</u>	65
<i>Lighting and Shadows</i>	
<i>Reflection (mirror) and Refraction (transparency)</i>	
<u>Chapter 9- Animation Basics</u>	68
<i>Timing, Moving, Rotating and Scaling</i>	
<i>Working with the IPO Window & Auto Keyframing</i>	
<i>Animating Materials, Lamps and World Settings</i>	
<u>Chapter 10- Adding 3D Text</u>	76
<i>Blender 3D Text Settings</i>	
<i>Converting to a Mesh</i>	

Table of Contents (continued)

Chapter 11- NURBS and Meta Shape Basics	80
<i>Using NURBS to create lofted shapes</i>	
<i>Liquid and droplet effects using Meta Shapes</i>	
Chapter 12- Modifiers	83
<i>Subsurf (mesh smoothing)</i>	
<i>Build Effect</i>	
<i>Mesh Mirroring</i>	
<i>Wave Effect</i>	
<i>Boolean Operations (cutting and adding)</i>	
Chapter 13- Particle System and Interactions	88
<i>Particle Settings and Material Influence</i>	
<i>Using the Explode Modifier</i>	
<i>Particle Interaction With Objects and Forces</i>	
<i>Using Particles for Hair</i>	
Chapter 14- Child-Parent Relationships	98
<i>Using Child-Parented Objects</i>	
<i>Adjusting Object Centers (pivot points)</i>	
Chapter 15- Working With Constraints	101
<i>Tracking To An Object</i>	
<i>Following Paths and Curves</i>	
Chapter 16- Armatures (bones and skeletons)	106
<i>Using Armatures to Deform Meshes</i>	
<i>Creating Vertex Groups</i>	
<i>Using Inverse Kinematics (IK) and Other Constraints</i>	
Chapter 17- Relative Vertex Keys (shape keys)	112
<i>Creating Mesh Keys</i>	
<i>Using Action Editor Sliders</i>	
Chapter 18- Object Physics	116
<i>Using Soft Bodies</i>	
<i>Creating Cloth Effects</i>	
<i>Creating Fluid Effects</i>	
Chapter 19- Working With Nodes	123
<i>General Node Information</i>	
<i>Using Nodes for Depth-Of-Field Camera Effects</i>	
Chapter 20- Creating Springs, Screws and Gears	128
<i>Duplicating Meshes to Create Screws and Gears</i>	
<i>Using Mesh Editing to Create Revolved Shapes</i>	
Chapter 21- Game Engine Basics (real-time animation)	132
<i>Setting Up The Physics Engine</i>	
<i>Using Logic Blocks</i>	
<i>Applying Materials</i>	
<i>Using Game Physics in Animation</i>	
Chapter 22- Video Sequence Editor	138
<i>Producing a Movie From Individual Clips and Images</i>	
<i>Adding an Audio Track</i>	

1.	<u>Viewports</u>	16
	<i>Chapter 2 Practice Exercise-Multiple Viewport Configuration</i>	
2.	<u>Creating Objects</u>	20
	<i>Chapter 3 Practice Exercise- Create a Sculpture</i>	
3.	<u>Basic Editing</u>	25
	<i>Chapter 3 Practice Exercise- Modeling a Landscape and Lighthouse</i>	
4.	<u>Boolean Editing</u>	33
	<i>Chapter 3 Practice Exercise- Adding Windows to the Lighthouse</i>	
5.	<u>Applying Materials</u>	37
	<i>Chapter 4 Practice Exercise- Adding Materials to the Landscape</i>	
6.	<u>Applying Textures</u>	45
	<i>Chapter 4 Practice Exercise- Texturing the Landscape and Lighthouse</i>	
7.	<u>Adding a World</u>	53
	<i>Chapter 5 Practice Exercise- Creating an Environment for Your Scene</i>	
8.	<u>Lighting and Cameras</u>	59
	<i>Chapter 6 Practice Exercise- Lighting Up the Landscape Scene</i>	
9.	<u>Rendering an Image</u>	64
	<i>Chapter 7 Practice Exercise- Saving a Picture of the Landscape Scene</i>	
10.	<u>Raytracing</u>	67
	<i>Chapter 8 Practice Exercise- Reflection and Refraction</i>	
11.	<u>Creating an Animation</u>	73
	<i>Chapter 9 Practice Exercise- Adding Motion to the Landscape Scene</i>	
12.	<u>Creating 3D Text</u>	79
	<i>Chapter 10 Practice Exercise- Company Logo</i>	
13.	<u>Meta Shapes</u>	82
	<i>Chapter 11 Practice Exercise- Create a Droplet Effect</i>	

Practice Exercises (continued)

14.	<u>Using Modifiers</u>	87
	<i>Chapter 12 Practice Exercise- Common Modifiers Exercise</i>	
15.	<u>Particle Systems</u>	97
	<i>Chapter 13 Practice Exercise- Adding Rain to Your Landscape</i>	
16.	<u>Creating a Robot Arm</u>	100
	<i>Chapter 14 Practice Exercise- Animate a Robotic Arm</i>	
17.	<u>Camera Constraints</u>	102
	<i>Chapter 15 Practice Exercise- Make a Camera That Follows the Arm</i>	
18.	<u>Paths & Curves</u>	105
	<i>Chapter 15 Practice Exercise- Extruding Shapes and Following Paths</i>	
19.	<u>Creating a Skeleton</u>	111
	<i>Chapter 16 Practice Exercise- Create a Hand With Armatures</i>	
20.	<u>Vertex Keys</u>	115
	<i>Chapter 17 Practice Exercise-Cheesy Actor Monkey</i>	
21.	<u>Making A Flag</u>	119
	<i>Chapter 18 Practice Exercise- Using Soft Bodies to Make a Flag</i>	
21.	<u>Water</u>	122
	<i>Chapter 18 Practice Exercise- Splashing Water with Fluids</i>	
22.	<u>Depth-Of-Field</u>	125
	<i>Chapter 19 Practice Exercise- Using Nodes to Show Camera Blur</i>	
23.	<u>Gear Design</u>	131
	<i>Chapter 20 Practice Exercise- Create and Animate a Set of Gears</i>	
24.	<u>Real-Time Animation</u>	137
	<i>Chapter 21 Practice Exercise- Smash an Object Through a Wall</i>	
25.	<u>Movie Producer</u>	140
	<i>Chapter 22 Practice Exercise- Create a Presentation of All Your Work</i>	