

Table of Contents

Preface	1
Chapter 1: Designing Objects for 3D Printing	5
Opportunities to use your 3D printer	6
How a 3D printer works	7
Types of 3D printers	9
Basic parts of a 3D printer	11
How is a 3D printer controlled?	11
The Peachy printer	13
Modeling dimensions	13
File sizes	13
Polygon sizes	14
Factors affecting precision	14
Controlling printing costs	14
Materials for 3D printing	15
3D printing and your health	16
What happens at a 3D printing service?	16
Summary	17
Chapter 2: Measuring and Texturing Techniques for 3D Printing	19
Precision modeling in Blender	19
Using the Ruler/Protractor	21
Using the Protractor	24
Measuring the thickness of an object	25
Preparing the model for coloring	26
Leaving the object uncolored	26
Vertex colors	26
Vertex painting	27

Building texture maps	28
Choosing colors for printing	28
UV unwrapping	29
Painting the texture map	40
Exporting the UV Layout for use in an external paint program	40
Painting your texture in Blender	40
Summary	43
Chapter 3: Making a Blender Model that's Ready to Print	45
What is special about 3D printing?	45
Installing the Print3D toolbox	46
Introducing the Print3D toolbox	47
Introducing the Mesh Analysis panel	47
Setting up the units of the scene	48
Making a 3D model that will print	49
Making a watertight model	49
Making a manifold model	50
Inspecting objects to see if they are manifold or non-manifold	51
Finding problems that make a file non-manifold	52
Fixing noncontiguous edges	53
Typical problem areas with a model	55
Fixing distorted polygons	55
Blunting sharp edges	59
Fixing the junction between blade and hilt	63
Economizing when 3D printing	64
Summary	65
Chapter 4: Making Strong, Light Objects with the Solidify Modifier	67
Optimizing wall thickness	67
Using Solidify for proper wall thickness	68
Analyzing and modifying the inner shell	69
Making the dragon useful	77
Cutting holes for removing extra printing material	79
Precision modeling—fitting two objects together	81
Dealing with overhangs and support	82
If the printer automatically makes supports	83
Making supports for your model	83
Exporting your 3D object	85
Getting the orientation right	86
Making an STL file	86
Making an X3D file with a texture	87
Summary	88

Appendix: 3D Printing References	89
References	89
3D printing services	90
3D printers – hobbyist	90
3D printers – industrial	91
3D objects	92
Index	93

Preface

You know that 3D printing is hot. You wouldn't have bought this book if you didn't. What I hope you will get from this book is an introduction to building a model in Blender so it will make a good object in a 3D printer.

This is fairly simple. Mostly, you need to know what information the 3D printer needs to make an object, what considerations you need to make when designing your object, and which techniques you can use to achieve your goals.

I have tried to avoid being printer-specific. 3D printing is in the phase where new printers are appearing every day. At some point, there will be a shakeout where the best printer makers prevail, but it's too early to guess which companies those will be. But among all kinds of printers, there are basic rules that will work with any printer, and you will learn how to tailor your objects for particular printers.

While I have worked to ensure that you could do each step demonstrated, I assume that you have a general knowledge of operating Blender, such as one would get from my book *Blender 3D Basics*, also available on the Packt website.

Let's get started!

What this book covers

Chapter 1, Designing Objects for 3D Printing, gives you a glimpse into the general issues affecting 3D printing and background on what is going on, so you understand why you may have to do things differently to make an object in Blender for 3D printing than you do for animation or the game engine.

Chapter 2, Measuring and Texturing Techniques for 3D Printing, explains how to prepare a file to be used in 3D printing. We will cover using the Ruler / Protractor tool to measure objects and some methods used in texturing the model.