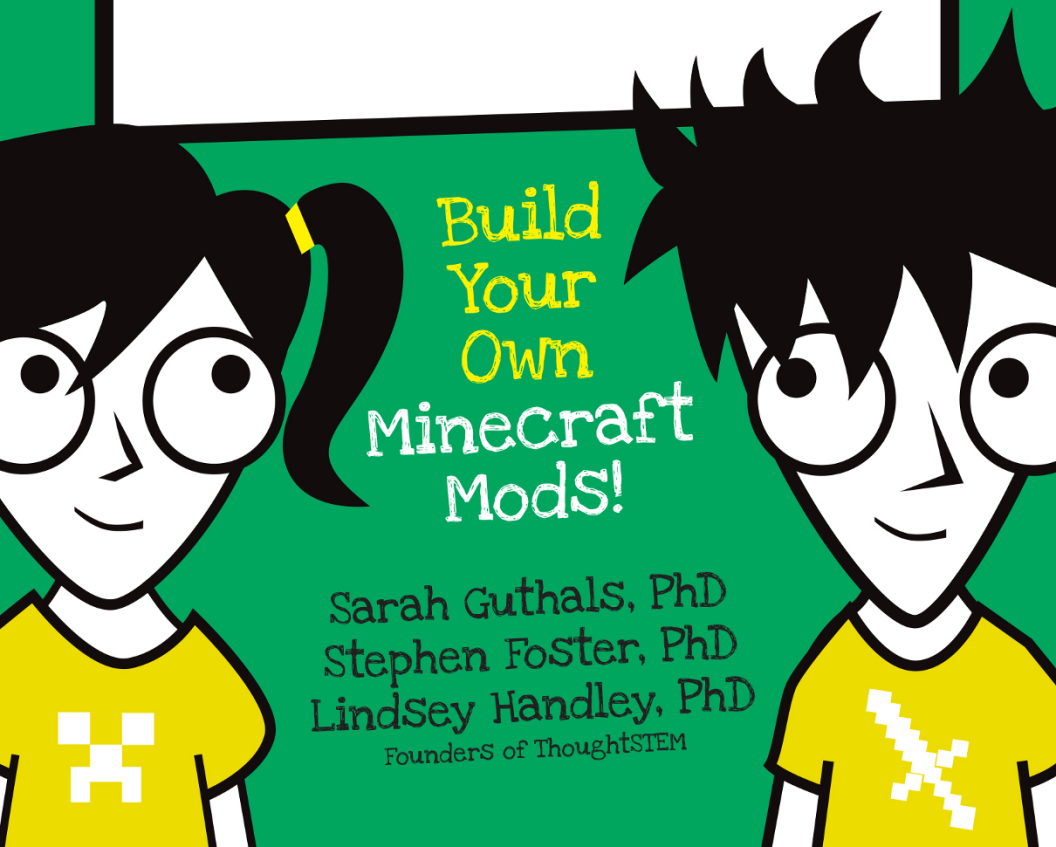
Made by the people who make the FOR DUMMIES® A Wiley Brand books!

MODDING Minecraft®

Build Your Own Minecraft Mods!



Sarah Guthals, PhD
Stephen Foster, PhD
Lindsey Handley, PhD
Founders of ThoughtSTEM

MODDING Minecraft®

Sarah Guthals, PhD
Stephen Foster, PhD
Lindsey Handley, PhD

WILEY

MODDING MINECRAFT®

Published by
John Wiley & Sons, Inc.
111 River Street
Hoboken, NJ 07030-5774

www.wiley.com

Copyright © 2015 by John Wiley & Sons, Inc., Hoboken, NJ

Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without the prior written permission of the Publisher. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at http://www.wiley.com/go/permissions.

Trademarks: Wiley, For Dummies, Dummies.com, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and may not be used without written permission. Minecraft is a registered trademark of Mojang Synergies AB Corp. All other trademarks are the property of their respective owners. John Wiley & Sons, Inc. is not associated with any product or vendor mentioned in this book.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND THE AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES OR PROMOTIONAL MATERIALS. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY SITUATION. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING LEGAL, ACCOUNTING, OR OTHER PROFESSIONAL SERVICES. IF PROFESSIONAL ASSISTANCE IS REQUIRED, THE SERVICES OF A COMPETENT PROFESSIONAL PERSON SHOULD BE SOUGHT. NEITHER THE PUBLISHER NOR THE AUTHOR SHALL BE LIABLE FOR DAMAGES ARISING HEREFROM. THE FACT THAT AN ORGANIZATION OR WEBSITE IS REFERRED TO IN THIS WORK AS A CITATION AND/OR A POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE AUTHOR OR THE PUBLISHER ENDORSES THE INFORMATION THE ORGANIZATION OR WEBSITE MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. FURTHER, READERS SHOULD BE AWARE THAT INTERNET WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ.

For general information on our other products and services or to obtain technical support, please contact our Customer Care Department within the U.S. at 800-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Library of Congress Control Number: 2015947351

ISBN 978-1-119-17727-2 (pbk); ISBN 978-1-119-17728-9 (ebk); ISBN 978-1-119-17729-6 (ebk)

This book was produced using the Myriad Pro typeface for the body text and callouts, and Bangers for the chapter titles and subheads.

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

CONTENTS

INTRODUCTION 2

About Minecraft and LearnToMod 2
About This Book 2
About You 3
About the Icons 4

PROJECT 1: START MODDING 5

Know What Minecraft Modding Is 5
Use the LearnToMod Online Software 6
- Sign up for LearnToMod 7
- Use the LearnToMod badges 8
- Connect your mods to Minecraft 8

Connect to the LearnToMod Server 12
Check Out the Coding Environment 13
Test Your Mod 15
Run Your Mod in Minecraft 19
Get Ready to Write Your Own Minecraft Mods 22
Share a Mod with Friends 24
How Your Friend Finds Your Mod 25
Earn Modding Badges 27
- Earn Scramble badges 27
- Earn the Saying Hello badge: Scramble Edition 29
- Communicate with your computer 30
- Earn Missing badges 31
- Trace code 32
- Earn the Saying Hello badge: Missing Edition 33

PROJECT 2: SPLEEF 36

Introduce the Gameplay Loop 37
Start: Create a basic scene 38
Goal: Add a way to win and lose 38
Challenge: Make it harder to win 39
Reward: Make players want to win 39
Plan and Try Test Cases. 40
Debug Your Code 41
Make Spleef: Iteration 1 42
Explore the ArenaBuilder library 42
Start: Import the ArenaBuilder library 44
Goal: Make a way to win and lose. 48
Challenge: Make blocks disappear one second after touching them 55
Reward: Give the player points 59
Make Spleef: Iteration 2 62
Start: Add a lava platform 63
Goal: Destroy at least 200 blocks 63
Challenge: Add an enemy 64
Reward: Add fireworks 64

PROJECT 3: MONSTER ARENA 67

Draw the Gameplay Loop 67
Iteration 1: Make Monster Arena 68
Start: Create a basic arena with a fence 70
Refactor: Move the arena code to a new function 76
Goal: Add a melon block to break 76
Test: Make sure your game works 78
Challenge: Add monsters to the arena 78
Reward: Replay the first level 80
Test: Iteration 1 completed. 84
Iteration 2: Add Levels 85
Start: Make the arena unique. 86
Goal: Wait until a later iteration 87
Challenge: Add monsters 87

Reward: Add a second level 87
Test: Make sure both levels work 90
Iteration 3: Add Levels to Your Levels 90
Challenge: Switch to Survival mode 91
Reward: Add five more levels. 93
Make More Iterations: Be Creative and Unique 95

PROJECT 4: CAPTURE THE FLAG 97

Use the Capture the Flag Library 97
Make a Basic Capture the Flag 99
Test Your Two-Player Capture the Flag 102
Add Wands 104
Attach Magic to Your Wands 106
Make Your Own Wand 111
Give Each Player Two Wands 115

INTRODUCTION

SO YOU WANT TO MOD MINECRAFT — THAT'S A GREAT IDEA!

You're about to be transformed from a Minecraft *player* into a Minecraft *modder*. To get there, you have to code. You can handle it, because you'll use skills you already have — logic, creativity, math, gaming, and problem solving — to design, build, test, and share Minecraft mods. This book tells you everything, from building a large arena to making a multiplayer game that you can play *inside* Minecraft with your friends.

ABOUT MINECRAFT AND LEARNTOMOD

Minecraft modding used to be only for expert coders. Not anymore. LearnToMod helps students just like you through the challenges of Minecraft modding. It explains coding ideas and shows how much fun it can be to start making mods. LearnToMod has over 200 badges that guide you, but you can make your own mods.

The LearnToMod online software teaches you how to make modifications, or *mods,* that you can run in the multiplayer version of Minecraft on your very own Minecraft server.

Get LearnToMod at mod.learntomod.com. With this book, you get free access to LearnToMod for 60 days. Go to www.dummies.com/go/moddingminecraft for the trial information.

ABOUT THIS BOOK

Modding Minecraft has projects that help you design, build, and test each mod, from start to finish. You can play these minigames *inside* Minecraft. The earlier mods are simpler, so you might want to try the projects in order.

How are you going to see what code to enter if I'm not there with you? I'll show instructions and code examples — actual pictures of my screen.

Code is in `monofont`. If you're reading this as an ebook, you can tap web addresses to visit websites, like this: www.dummies.com.

Some figures will have a magnifying glass, like you see here. The glass is drawing attention to the parts of the screen that you use. The highlighted text draws your attention to the figure.

Working with LearnToMod is super simple: I just give you steps like "Drag a function into the programming environment" or "Click the Minecraft category and then Players." Or I may tell you to click a link or a tab.

ABOUT YOU

Everybody has to start somewhere, right? I had to start writing this book by assuming that you're comfortable doing this stuff:

- **Typing on a computer and using a mouse.** You may know how to use a Windows system or a Mac; either one will do. All coding takes place in a web browser — and on any browser on either platform. This book shows LearnToMod on a Mac using the Chrome browser.
- **Getting around on a website.** You can click a link or find a website easy peasy.

- **Playing Minecraft.** You don't need to be a Minecraft expert and you don't have to know how to code. You can play on Windows or a Macintosh, but you have to use the desktop version. The Pocket Edition, which is played on mobile devices, doesn't work with LearnToMod.
- **Doing basic math.** That includes adding whole numbers (like 2+2), and logical operations (like knowing that 3 is more than 2).

ABOUT THE ICONS

As you read through the projects in this book, you'll see a few icons. The icons point out different things:

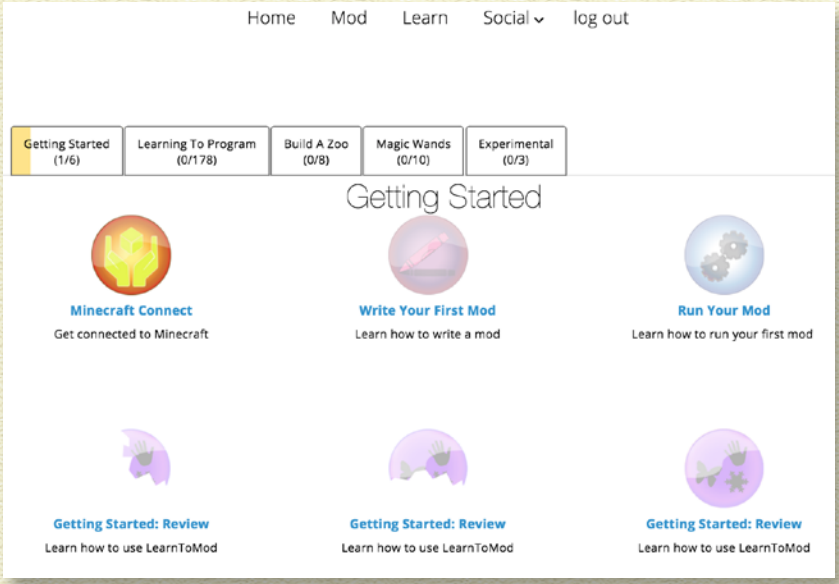
Watch out! This icon comes with important information that may save you from trouble that modders sometimes have.

The Remember icon comes with ideas that you should keep in mind.

The Tip icon marks advice and shortcuts that can make modding easier.

The Fun with Code icon describes how the modding you're doing relates to the bigger picture of coding.

PROJECT 1 START MODDING



IN THIS PROJECT, I EXPLAIN HOW TO USE THE LEARNTOMOD ONLINE SOFTWARE. I also explain how to connect to the LearnToMod multiplayer Minecraft Server, and show you how to use the basic tools, such as invisible robots, that you need in order to make your own, fun-filled mods.

KNOW WHAT MINECRAFT MODDING IS

Video games are made up of code. Thousands of lines of code. Code that lets players — players like you — explore new worlds and interact with characters.

Some games, like Minecraft, let players add their own code to create new worlds, challenges, or characters.

Mods, *which is short for modifications (or changes), can be almost any task. A* task *is something you do, like create a tower or make a mountain explode with TNT.*

You can make these tasks by using mods:

- **Texture:** Change the way the world looks by loading a new texture pack.
- **Block interaction:** Cause an explosion whenever the player destroys a `wood` block type.
- **New block:** Create new blocks, like an `ultra-TNT` block that makes a bigger explosion.
- **Minigame:** Create a minigame within a world. The projects in this book help you do that.
- **Large structure:** Create huge structures (that would take a long time to make by hand but take no time with code).

USE THE LEARNTOMOD ONLINE SOFTWARE

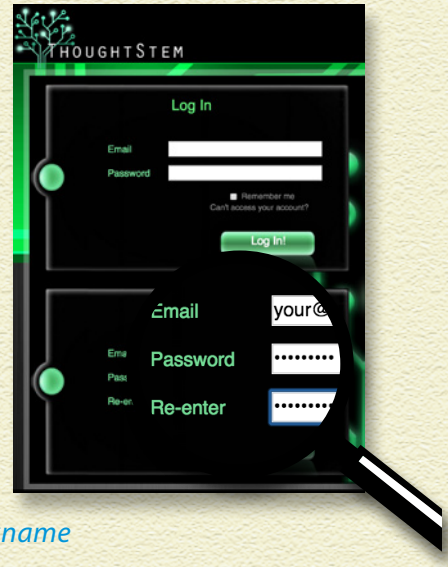
The LearnToMod online software walks you through coding challenges. When you complete a challenge, you earn a badge. Check out the next sections to get started with LearnToMod.

Get the LearnToMod online software at mod.learntomod.com.

This is the software that you'll use for the projects in this book. The badges will lead you through learning coding and different ways to make neat mods.

SIGN UP FOR LEARNTOMOD

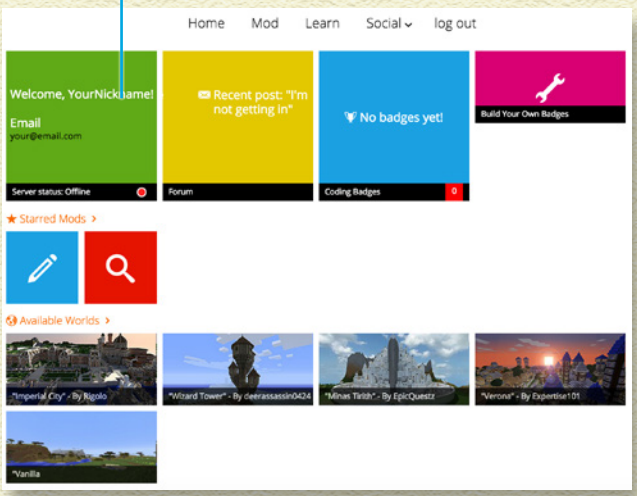
It takes about five minutes to sign up for LearnToMod. To sign up for the software, follow these steps:



1. **In a web browser, go to mod.learntomod.com.**
2. **Fill out the Sign Up form.**

   Another dialog box opens.
3. **In the top of the dialog box, type the access key that you got in this book.**
4. **Make a nickname.**
5. **The *dashboard* (also known as the *home screen*) opens.**

Here's my clever nickname



People will see your nickname anytime you share your mods, so don't use your real name.