Stewart Jones

Full Color

Sams Teach Yourself

3ds Max®

in 24 Hours

SAMS

FREE SAMPLE CHAPTER

SHARE WITH OTHERS

Praise for *Sams Teach Yourself 3ds Max® in 24 Hours*

"*Sams Teach Yourself 3ds Max in 24 Hours* by Stewart Jones is the perfect book to start an artist who has never used 3ds Max and is new to 3D. Stewart has put in enough detail and challenges to give readers a solid grounding in techniques while leaving room to explore on your own. Stewart writes with humor, making something that could be dry interesting and fun to read. I enjoyed going through the book and even picked up a few tips along the way that I didn't know in Max. I would recommend the book without hesitation to students and artists looking for a great start to quickly feel accomplished instead of frustrated with all aspects of 3D production in 3ds Max 2014."

—**Brad Clark**, Cofounder, Rigging Dojo.com

"*Sams Teach Yourself 3ds Max in 24 Hours*—'challenge accepted!' If you are looking for a textbook to guide you through the intricacies of Autodesk 3ds Max, this is the 24 for you. Blending a perfect balance of technical and demonstration, Stewart's witty, stylish, and pointed approach to introducing 3D modeling, animation, and the 3D modeling production environment is well worth staying up all day and night to read."

—**Dr. Tim J. Harrington**, Teaching and Learning Applications Analyst

"*Sams Teach Yourself 3ds Max in 24 Hours* is a great way to learn the basics of working in 3D on a computer. This is a fantastic book for anyone who wants to start in this field."

—**Gregory Scott Johnson**, Professor of Game Development, SCAD

"For anyone looking to get a solid foot into the 3D industry, *Sams Teach Yourself 3ds Max in 24 Hours* is the perfect solution to get you started. Stewart Jones puts his years of experience into 24 simple and concise 'hours' that make learning the basics fun and then build into more advanced steps as you work your way through. *Sams Teach Yourself 3ds Max in 24 Hours* is the perfect guide to putting that first foot forward and opening the door to the exciting world of 3D."

—**Matthew Johnson**, Principal 3D Artist

"*Sams Teach Yourself Teach Yourself 3ds Max in 24 Hours* not only gets the reader started with 3ds Max, it gives a comprehensive survey of all aspects of 3D. Through clear and succinct tutorials, readers will learn to model, rig, skin, animate, create particles, utilize dynamic, fur, and even experience a little scripting. *Sams Teach Yourself 3ds Max in 24 Hours* has everything needed to get the successful digital artist proficient in 3ds Max in a short 24 hours. You'll keep this on your shelf as a go-to resource guide for 3ds Max."

—**Tina O'Hailey**, Dean of Digital Media, SCAD

Stewart Jones

Sams **Teach Yourself**

3ds Max®

in 24 Hours

SAMS 800 East 96th Street, Indianapolis, Indiana, 46240 USA

Sams Teach Yourself 3ds Max® in 24 Hours

Copyright © 2014 by Pearson Education, Inc.

All rights reserved. No part of this book shall be reproduced, stored in a retrieval system, or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission from the publisher. No patent liability is assumed with respect to the use of the information contained herein. Although every precaution has been taken in the preparation of this book, the publisher and author assume no responsibility for errors or omissions. Nor is any liability assumed for damages resulting from the use of the information contained herein.

3ds Max® is a registered trademark or trademark of Autodesk, Inc., in the USA and other countries. This book is independent of Autodesk, Inc., and is not authorized by, endorsed by, sponsored by, affiliated with, or otherwise approved by Autodesk, Inc.

ISBN-13: 978-0-672-33699-7

ISBN-10: 0-672-33699-5

Library of Congress Control Number: 2013916424

Printed in the United States of America

First Printing December 2013

Trademarks

All terms mentioned in this book that are known to be trademarks or service marks have been appropriately capitalized. Sams Publishing cannot attest to the accuracy of this information. Use of a term in this book should not be regarded as affecting the validity of any trademark or service mark.

Warning and Disclaimer

Every effort has been made to make this book as complete and as accurate as possible, but no warranty or fitness is implied. The information provided is on an "as is" basis. The author and the publisher shall have neither liability nor responsibility to any person or entity with respect to any loss or damages arising from the information contained in this book or from the use of the DVD or programs accompanying it.

Special Sales

For information about buying this title in bulk quantities, or for special sales opportunities (which may include electronic versions; custom cover designs; and content particular to your business, training goals, marketing focus, or branding interests), please contact our corporate sales department at corpsales@pearsoned.com or (800) 382-3419.

For government sales inquiries, please contact governmentsales@pearsoned.com.

For questions about sales outside the U.S., please contact international@pearsoned.com.

Editor-in-Chief
Mark Taub

Executive Editor
Laura Lewin

Development Editor
Songlin Qiu

Managing Editor
Kristy Hart

Senior Project Editor
Betsy Gratner

Copy Editor
Kitty Wilson

Indexer
WordWise Publishing Services

Proofreader
Williams Woods Publishing

Technical Editors
Brad Clark
Tim Harrington
Greg Johnson
Matthew Johnson

Publishing Coordinator
Olivia Basegio

Media Producer
Dan Scherf

Cover Designer
Mark Shirar

Compositor
Nonie Ratcliff

Contents at a Glance

Table of Contents

About the Author

Stewart Jones started his visual journey in graphic and multimedia design. He has since moved into the computer graphics industry, where his focus has been on animation and visual effects. Now a company director and freelance VFX/CG/animation consultant for the film, TV, and games industries, he has previously served in multiple roles in media and entertainment, including mentor and course author, animator, technical animator, character technical director, and computer graphics supervisor. Stewart also wrote *Digital Creature Rigging*.

Dedication

For the person who is always there for you. You know who that is.

Acknowledgments

This book would not have been possible without the guidance and support of some amazing people. I hope they all know how thankful I am for their help, and I'd like to take a little time here to mention a few of them as they totally deserve the recognition for their awesomeness!

Kirsty, I love you. You're amazing. Thank you for always making everything better and my life so fantastic; without you, I'd be a wreck—or even more of a wreck than I currently am!

Thanks to my parents, Carol and Keith. Your love and support mean everything to me; I can't thank you enough for always being there for me.

Susan and Nana, thank you for all your support and being there to listen to my random chats. Oh, and of course thank you so much for that first "super-awesome" computer you bought me that allowed me to start my journey into 3D.

Nathan, although your face did not appear in this book (like it did in my last one), thank you for being the one who introduced me to 3ds Max way back in the day. I know that an older version of this series of books helped you start out on your own 3D journey, and I hope my version will do the same for others. Thanks for being a great friend!

A big thank you to everyone in the CG industry, as well as all the friends I've made at so many places throughout the world. Your drive, determination, and incredible talents keep pushing me forward. Keep up the great work, everyone; I'm sure I'll see you around!

Thank you to my technical editors: Brad, Greg, Tim, and Matt. The feedback, notes, comments, critiques, and thoughts you shared with me made this book so much better than it would have been without you.

We Want to Hear from You!

As the reader of this book, *you* are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

We welcome your comments. You can email or write to let us know what you did or didn't like about this book—as well as what we can do to make our books better.

Please note that we cannot help you with technical problems related to the topic of this book.

When you write, please be sure to include this book's title and author as well as your name and email address. We will carefully review your comments and share them with the author and editors who worked on the book.

Email: errata@informit.com

Mail: Sams Publishing
ATTN: Reader Feedback
330 Hudson Street
7th Floor
New York, New York, 10013

Reader Services

Visit our website and register this book at informit.com/register for convenient access to any updates, downloads, or errata that might be available for this book.

Preface

Welcome! Please sit down, make yourself comfortable, and relax. Before you get started on your 24-hour-long journey into the world of 3D and Autodesk 3ds Max, let's take a bit of time to get to know each other.

I'll start. My name is Stewart, and most people call me Stu. I've been doing this kind of thing for a while now.... Well, not typing creepy messages like this one, but you know—3D stuff. Like a lot of other folks, I started out my journey watching cartoons as a kid, and through a series of twists and turns, I ended up in this creatively technically artistic (that's a new term I just created right there) field of 3D and the "entertainment industry."

All right, so I've introduced myself. Who are you? This is probably much easier for you to just tell me, but as there is no one else here, I'm going to take a wild guess, and hopefully I'm somewhere in the right area with it. Right, hang on while I channel my psychic abilities.[1]

You're human. Yes, most definitely. I see someone who is taking the first steps into the world of 3D. I also notice that you want to learn more about Autodesk 3ds Max and what it has to offer as a leading 3D software application. Yes, you are eager to start your adventure, and you're a little bit sick of me rambling on. And you're starting to think that I might be actually a bit crazy. Or maybe you have picked up the wrong book completely!

Am I right? I am, aren't I?

I knew it! Are you impressed?

Of course you're not! That was, obviously, a completely wild guess, and I may have hit a home run, or I could be way off target, but only you and I know which it is! Well, that guy behind you does as well. Just kidding! Or am I?

Enough with this babble! I do know that you're here to expand your mind and learn new and wondrous techniques that will set you on the path to 3D excellence. Thank you for choosing to take the first steps of your journey with me. Let's have some fun.

[1]I have no actual psychic abilities, just so you know!

This page intentionally left blank

HOUR 10

Illuminating Scenes Using Lights

What You'll Learn in This Hour:

- An introduction to lighting in 3ds Max
- Lighting and shadow basics
- Accessing and changing ambient light
- Standard versus photometric lighting
- Lighting scenes in 3ds Max

You are able to see an object because light reflects from the object into your eyes, which send the data to your brain so it can process the data and form an image. You can't see without light—honest! Just as in nature, illumination in 3ds Max happens through a complex interaction of lights and objects.

Light can come from a number of sources, the most obvious being the sun, our source of natural lighting, and from bulbs, which handle our real-world artificial lighting. It makes sense, then, that 3ds Max also provides a number of lighting options that allow you to replicate both natural and artificial lighting within scenes.

This hour, you are going to take a look at the various lighting options available to you and how you can use them to illuminate your 3D worlds and scenes.

3ds Max Lighting Introduction

Lights in the real world allow you to see things, and the lights in 3ds Max do exactly the same thing. In addition, you can assign qualities to the lighting tools available in 3ds Max to enable them to cast shadows, project images, and even manipulate the atmospheric lighting effects.

The basic lighting tools are located in the default creation area in 3ds Max—the *Create* tab of the *Command Panel*. The *Lights* category is the third icon from the left, which looks like a studio spotlight; this category is home to the lighting tools.

Two main subcategories of lights are available: standard lights and photometric lights. You can create lights just as you do any other objects, and you can also transform them by using the *Move*, *Rotate*, and *Scale* tools.

Before you jump in and start creating lights, it's important that you know that 3ds Max automatically provides a default lighting setup when you start the program. Read on to learn more.

Default Lighting

3ds Max provides you with default lighting if you have not specified (created) any lights yourself. This allows you to view any objects you create without having to worry about lighting the scene first. The default lights disappear as soon as another light is created, and they magically reappear if all other lights in the scene are deleted.

Shadows

Shadows are areas where light is obstructed by an object, causing a darker area than its surroundings. 3ds Max supports various types of shadow-casting options, and unlike in real life, you have the ability to make only some lights cast shadows and others not. Work through the following Try It Yourself to get a taste of this.

▼ TRY IT YOURSELF

Casting Shadows Using Default Lighting

Follow these steps to see how the default lighting in 3ds Max casts shadows on objects you create:

1. In a new scene, create a plane (a standard primitive, not an aircraft).
2. Create a sphere.
3. Move the sphere around to see how the default lighting in 3ds Max casts shadows onto objects.

Ambient Light

Ambient light is general lighting that affects an entire scene; it is also called global ambient. It has no source or direction but affects everything in a scene uniformly. Because ambient light has an effect on everything, you can use it to your advantage to create a specific atmosphere or simply to adjust the overall color of a scene.

Figure 10.1 shows the *Environment and Effects* window, where you can manually adjust the ambient light for a scene.

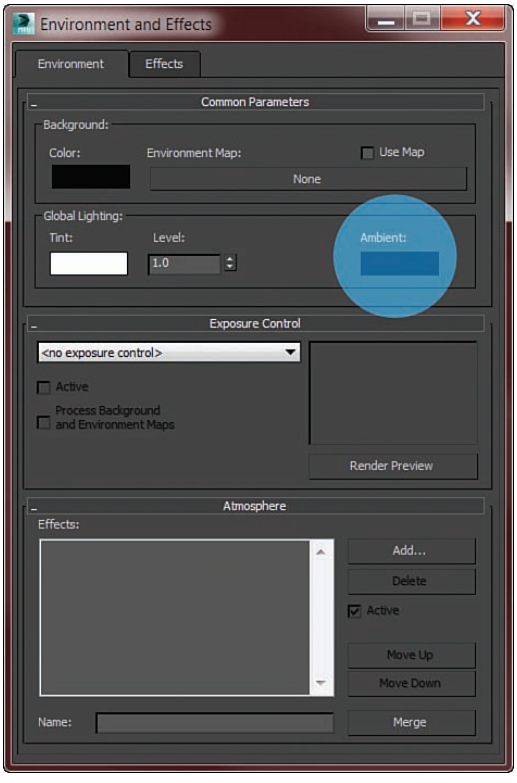

FIGURE 10.1
The *Environment and Effects* window gives you access to the ambient light properties for each scene.

NOTE

Changing the Global Ambient Light Settings

You can press the *8* key to bring up the *Environment and Effects* window, where you can adjust the *Ambient* setting. Alternatively, you can open this window by selecting *Rendering*, *Environment* from the main menu.

TRY IT YOURSELF ▼

Changing and Manipulating the Global Ambient Light Settings

It is incredibly simple to change the *Global Lighting* options in a 3ds Max scene, and these steps show you how to do just that:

1. In a new scene, create some standard primitives or simply open a scene that you have worked on previously that includes some geometry.

2. Open the *Environment and Effects* window by either pressing the *8* key on your keyboard or selecting *Rendering*, *Environment* from the main menu. As shown in Figure 10.1, the *Environment and Effects* window contains two tabs that separate the *Environment and Effects* options. You need to worry about only the first tab (*Environment*) for now.
3. Ensure that the *Environment* tab is open and find the *Common Parameters* rollout, which should be right at the top. The first section of this rollout contains options for changing and affecting the background of the main scene.
4. Scroll down the *Common Parameters* rollout until you come to the *Global Lighting* options.
5. Find the *Tint* option under *Global Lighting* and click the white square to bring up a color picker.
6. Manipulate and choose a color by using the color picker. Notice that your scene objects are tinted in the color you are choosing. As you can see, changing this color can have a dramatic effect on the visual look of a scene.
7. Change the *Level* option in this section to intensify or decrease the effect that the tint has on the scene. Also try out the *Ambient* option, which behaves just like the *Tint* effect. (The effect of the *Ambient* option is hard to see in your viewports, but you can see it in renders quite easily. You'll learn about renders and rendering in Hour 12, "Rendering for Production," so make a note of where this ambient light setting is so you can find it again in a few hours.)

Standard Lights

These standard lights are the "standard" lighting solution available for 3ds Max. Yeah, I know, you kind of worked that one out for yourself, didn't you? These lights are truly "3D" lights—that is, they are created in 3D (of course), but they have no comparison to real-world lighting solutions. Sure, a spotlight is something that you know from the real world, but the spotlight solution available in the *Standard Lights* list doesn't compare to any real-world parameters. This might not seem like a big deal right now, but when you start having to think about realistic lighting solutions and how the temperature of a light affects its color, you'll see that these real-world parameters would come in pretty handy!

To create lights in 3ds Max, you have to head over to the *Create* tab, just as we usually do when you want to create something. In the *Create* tab, under the *Lights* category, we see two subcategories, *Standard* and *Photometric*, as shown in Figure 10.2.

The *Standard* subcategory in 3ds Max give you a few good options to choose from:

- ***Target Spot* and *Free Spot*—**Spotlights cast a resizable beam of light either toward a target or in a general direction.

- ***Target Direct* and *Free Direct*—**Direct lights cast parallel rays of light in a single direction, just like the sun. You can target these rays to a specific direction or simply rotate the *Free Direct* version.
- ***Omni*—**Omni lights cast rays in all directions from a single source, just like a real-world light bulb. In fact, the default lighting uses two of these omni lights in its setup.
- ***Skylight*—**The skylight replicates daytime lighting for your scene.
- ***mr Area Omni* and *mr Area Spot*—**These two lights are similar to the omni and spotlights you've already seen; however, you use them specifically when you're using the Mental Ray (mr) rendering system. If I were you, I would just forget about these lights for the moment, until you dip your feet into Mental Ray rendering in Hour 20, "Mental Ray Rendering."

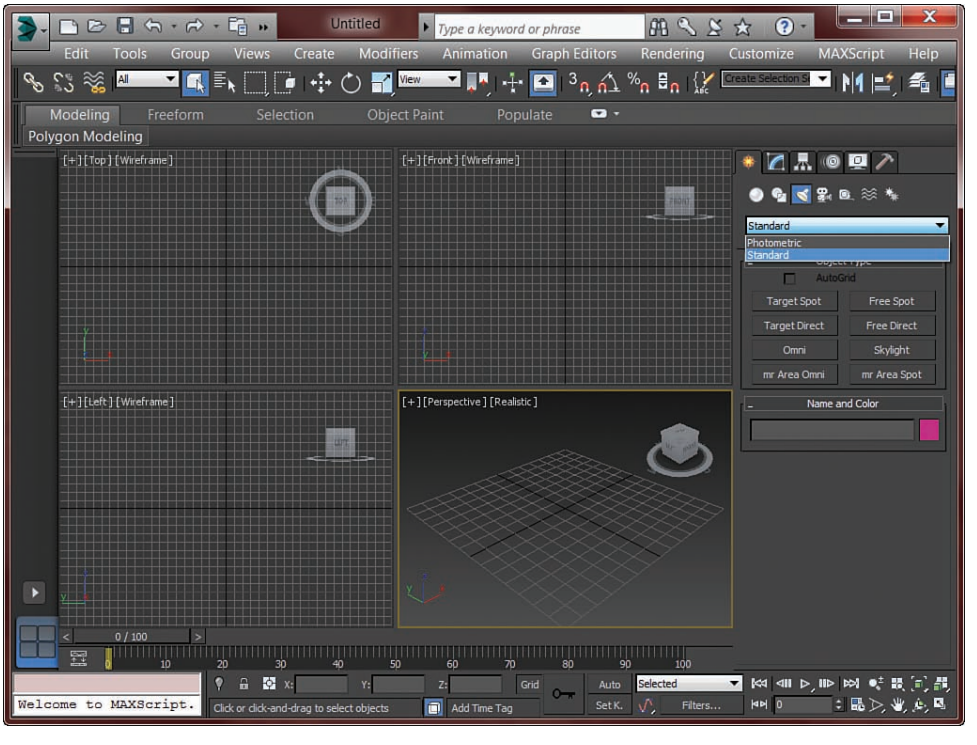

FIGURE 10.2
Standard lighting is available in the *Lights* category on the *Create* tab. There are eight standard lights to choose from!

Figure 10.3 shows the options available in the *Standard* subcategory.

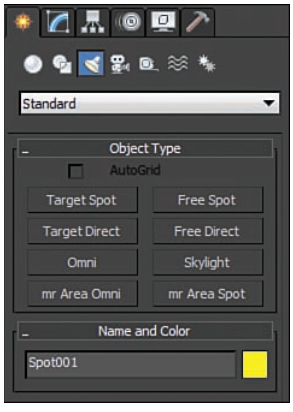

FIGURE 10.3
The *Standard* subcategory offers a total of eight lighting options.

Photometric Lights

Choosing the *Photometric* subcategory limits the number of different lights you can create. However, unlike the lights in the *Standard* subcategory, lights in the *Photometric* subcategory behave like real-world lighting solutions.

The photometric lights have settings that relate directly to real-world light measurement values, such as *Intensity* and *Temperature*. These values are often easiest to understand if you're used to a bit of DIY or just general real-world lighting, although using them can take a little more time to set up correctly than using the standard lighting options. However, 3ds Max comes with a number of templates that can help you out, and they make it as easy as choosing *40W Bulb* for a 40-watt bulb. Nice!

These are the options in the *Photometric* subcategory:

- ***Target Light***—You can aim a target light at a specified target, using the target sub-object provided with this light.
- ***Free Light***—You can aim these lights by using the *Move* and *Rotate* tools.
- ***mr Sky Portal***—Once again, this is a Mental Ray–specific lighting option, and I advise you to leave it alone for now as it's a little too complex for your 3ds Max experience.

Figure 10.4 shows the few options you have available in the *Photometric* subcategory.

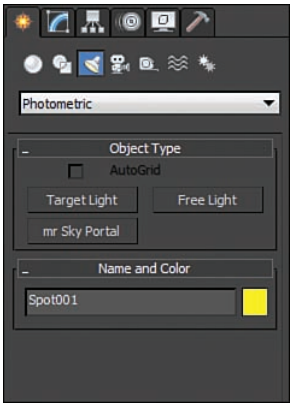

FIGURE 10.4
You have only three options available when you use the *Photometric* subcategory, but they allow you to use real-world lighting measurements.

Adding Lights to a Scene

Now that you know about both the standard and photometric lighting solutions, as well as some background on shadows and ambient light, you can start lighting your scenes. In fact, creating a light is as simple as clicking the button for the light you want, clicking in the scene, and changing some options. Give it a go!

VIDEO 10.1

Creating a Flashlight Beam

This video shows you how to create a flashlight beam, using the *Omni* and *Free Spot* standard lights.

TRY IT YOURSELF ▼

Using Standard Lights to Create a Flashlight Beam

Creating standard lights is incredibly simple. In the following steps, you will use a spotlight to create a beam of light that is emitted from a flashlight:

1. Open the file *SAMS_Hour10_TorchStart.max*. In this scene, a battery-operated flashlight is pointed directly at a gray wall. You need to add lights so that the flashlight illuminates the wall as you would expect.

2. On the *Create* tab, click the *Lights* category, and then move to the *Standard* subcategory. You will use a spotlight for the flashlight.

3. Click the *Free Spot* button and then click once in the scene to create it. Right-click to end the creation process. (If you don't right-click, you'll be creating spotlights.) By adding a spotlight to the scene, you force 3ds Max to remove the default lighting setup that it usually uses. This leaves your scene completely dark. However, if you move and rotate the spotlight around, you should notice that it now casts light. You need to position the spotlight correctly, but it's going to be a little difficult to do that with the scene being in total darkness.

4. Open the *Create* tab once again, and in the *Lights* category, stay in the *Standard* subcategory and click the *Omni* button. Click in the scene to create an omni light. Your scene brightens up once again.

5. Position your spotlight as shown in Figure 10.5.

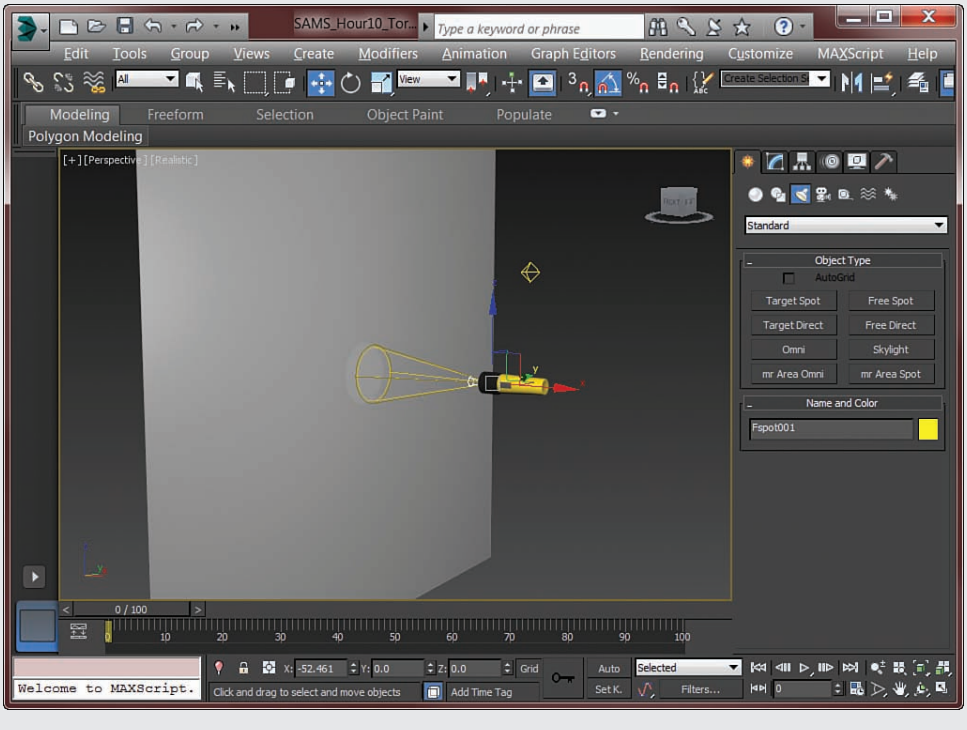

FIGURE 10.5
The spotlight is correctly positioned in the scene so that it illuminates from the flashlight beam.

6. With the lights in place, edit some of their parameters to improve the look of the scene. Click the omni light in the scene and then open the *Modify* tab.

7. Scroll down and expand the *Intensity/Color/Attenuation* rollout so that you have access to the *Multiplier* parameter. Change the *Multiplier* setting to *0.1*. This makes the scene a little darker than it was before.

8. In the viewport, click the spotlight and open the *Modify* tab.

9. Scroll down the *Modify* tab and expand the *Intensity/Color/Attenuation* rollout. Time change the *Multiplier* parameter to *5.0*. This should make the spotlight super bright.

10. Still in the *Modify* tab, find and expand the *Spotlight Parameters* rollout. Change the *Horspot/Beam* parameter to *1.0*. Also change the *Falloff/Field* parameter to 95.0. You should now have something that looks a little like Figure 10.6.

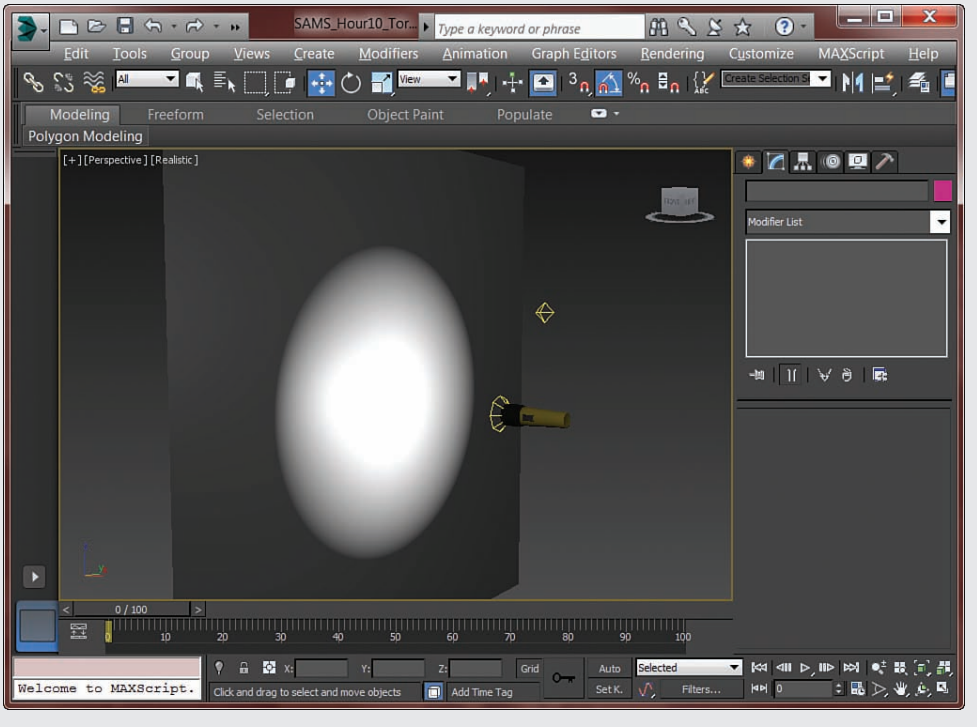

FIGURE 10.6
By editing the lighting parameters, you have enhanced the look of the scene and the spotlight beam of the flashlight.

11. As an optional step, use the *Select and Link* tool (the first button on the main toolbar) to link the spotlight to the yellow section of the flashlight. To do this, you grab hold of the yellow flashlight section and use the *Move* and *Rotate* tools to manipulate the flashlight and the light. Be sure to check out the final flashlight file, *SAMS_Hour10_TorchEnd.max*, for an example.

CAUTION

Don't Go Lighting Crazy!

With each light you add to a scene, the computational costs of the scene increase. Got one or just a few lights in your scene? No problem! Got way too many lights? At best, your scene's performance will suffer. In a worst-case scenario, it could crash 3ds Max or possibly your whole computer system. Adding another light to a scene increases the calculations 3ds Max has to do. I'm not saying you shouldn't use as many lights as you need. Just be aware that there are some limitations in terms of performance at a system level.

Summary

Lighting can really impact the visual appeal of a scene you are working with. This hour covers the lighting options in 3ds Max, and you've even tried out some lighting for yourself. You should be armed with enough skills and information to be able to light your own scenes way better than the default lighting does.

Q&A

Q. **Why is lighting so important in 3D?**

A. In 3D, just like in the real world, lighting can have a dramatic effect on both the look and feel of a scene or environment. It can help set the tone and mood for a whole animation or just a single still frame.

Q. **Why are there two subcategories, *Standard* and *Photometric*, for lighting in 3ds Max?**

A. Photometric lights contain real-world parameters, which can be a little daunting for those new to lighting in 3d Max; however, using them is the preferred method for lighting more realistic or explicitly lit scenes. Standard lights give you non-real-world parameters that are easier to use and can still give great effect, but in a less-daunting way. In general, photometric lights are more complex but give more accuracy, and standard lights are simpler to use but require more trial and error to get something to look exactly how you want it to.

Q. How many lights can you add to a scene?

A. It depends on your computer's hardware. Each light you add increases the calculations that 3ds Max has to perform. The more lights you have in a scene, the longer it takes for the calculations to complete. With better hardware, 3ds Max can do more calculations, but there will always be a limit to the calculations a computer system can do. A good rule of thumb is to use the lowest number of lights possible to achieve the results you are looking for.

Workshop

Lighting can dramatically improve the look and feel of a scene. This workshop asks a few questions that you should now be able to answer, and it includes an exercise that challenges you to create a lighting setup that requires the use of photometric lights.

Quiz

1. When is the 3ds Max default lighting available?
2. What does ambient light do?
3. What are shadows?
4. What two lighting subcategories are available in 3ds Max?

Answers

1. The default lighting is available in 3ds Max when the program starts or when no other lights are in the scene.
2. Ambient light controls the overall lighting for a whole scene.
3. Shadows are areas where light is obstructed by an object, causing an area to be darker than its surroundings.
4. 3ds Max provides standard and photometric lighting options.

Exercise

Getting used to photometric lights can take a little while, and the small number of creation options may seem limiting at first. However, their real-world parameters can make the application of these kinds of lights a better choice for more realistic or precise lighting simulations.

Open the file *SAMS_Hour10_StreetLighting.max* and light the scene using only photometric lights. Try creating a day scene and a night scene, which both have different challenges. This will give you a greater understanding of how lighting can dramatically affect the mood of a scene.

This page intentionally left blank

This page intentionally left blank

Index

Numbers

A

B

C

D

E

F

G

H

I

J-K

L

M

N

O

P

Q-R

S

T

U

V

W

X-Y-Z