

## Lesson 5: Using 3-D Software to Render Golf-Hole Designs

Teach students how to turn their golf-hole designs into cool graphics and animations.

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This lesson takes all the concepts from previous lessons to the next level. Here, students get to show off their stuff using 3-D-modeling software. First, demo the software to the class. Then give students free reign to render their designs digitally. You might want to extend this lesson over several class days during which students can work on their design. Students will present their final design to a group of people, so encourage students to knock out a polished product.

### Engaging Students

Get your students interested in the lesson by asking them

- » If they've ever used a 3-D program (assume many have not), and what they use the program for
- » What they know about using computer programs. For example, what are computer programs designed to do? Explain the universal components found in most programs, including the program interface, tools, and applications.
- » Who might use 3-D programs (e.g., animators, film artists, medical illustrators, architects, interior designers) and for what reason

### Project Application: Using 3-D-Modeling Software

You don't need to be an expert in graphics or 3-D-modeling software to help students use the application. All it really takes is a little playing around with the interface and tools to get comfortable with it. Most software programs come with free help tutorials. (See the "Related Resources" sidebar.) Refer to the tutorials when in doubt. Then explain the main tools and techniques to students and let them experiment with the software. Nowadays, kids usually pick up on this information quickly and don't need much guidance.

Regardless of the program, here are some steps to help teach 3-D and animation software:

1. Explain what 3-D software does.
2. Show a video or graphic made from the software.
3. If available, show a how-to movie about the software (often a part of the software's Help menu).
4. Explain important parts of the software's interface, such as the pointer, move, zoom, pan, and animation tools.
5. Demonstrate how to draw a cylinder or a square. Ask students to do the same.

### LESSON OBJECTIVES AND MATERIALS

#### OBJECTIVES

- » Learn 3-D-modeling software or become more proficient using it

#### MATERIALS

- » 3-D-modeling software or graphics-arts software, such as Autodesk 3ds Max, Google SketchUp (free), or Autodesk AutoCAD
- » computers to demo and work on

### KEY POINTS

Are some students picking up software skills more quickly than others? Ask them to help the students who are having trouble.

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## Project Application: Using 3-D Modeling Software (continued)

6. Present a complex graphic in orthographic views. For example, most graphic programs show the front, side, plan (or top), and perspective views. What can you do in each view that you can't in the others? Often, the front, side, and plan views provide accurate measurements, while the perspective view gives a good lay of the land.
7. Ask students to draw shapes using Boolean logic (the algebra that allows the program to create 3-D graphics). Encourage students to name and save all objects they create.
8. Demo how to integrate animation into the computer program.
9. Let students experiment with the program. Then ask them to begin designing their holes using exact measurements and logic. In addition, they should render a movie that includes the path of the ball from starting position into the hole. Emphasize the following areas when working:
  - » Light
  - » Composition and color
  - » Animation speed
  - » Shapes
  - » Realism
  - » Project requirements (measurements, etc.)
10. Ask students to review and critique each other's designs throughout the assignment using the questions from the previous lesson:
  - » What do you like most about the design?
  - » Is the model well built? Is the design clear and realistic?
  - » Is the hole challenging enough? Too challenging? Would you have fun playing the hole?
  - » Do you think it is possible to build this hole and play it in the designated area (such as in the gymnasium or classroom)?
  - » What areas do you think need improvement? You can base your suggestions on the questions above.
11. As with other lessons, ask students to incorporate feedback into their final product.

## Student Assessment

At the end of this lesson, you should have a good idea of each student's ability to use graphics software, process and apply new skills, and understand Boolean logic. Here are some guiding points to help assess each student.

The student's mastery of the subject matter is:

- » **Excellent:** Students have become familiar with the software. They understand and use Boolean shapes, accurately represent their golf-hole design in 3D, and use the animation features to animate a ball rolling through the course.
- » **Good:** Students have become familiar with the software. They understand and use Boolean shapes and accurately represent their golf-hole design in 3-D.
- » **Fair:** Students have become familiar with the software. They attempt to use Boolean shapes, but do not fully understand them. Students represent their golf-hole design in 3-D, but there are errors in scale or composition. Students do not complete the illustration.
- » **Poor:** Students fail to become familiar with the software and struggle to understand the interface.

## RELATED RESOURCES

For this lesson you'll need 3-D modeling software. Here are two applications you can use:

### AUTODESK 3DS MAX

**usa.autodesk.com:** Autodesk 3ds Max is an industry-standard program that design professionals commonly use for 3-D modeling. Architects use Max to create realistic models of their designs, which they can move around in space and test for structural viability.

### GOOGLE SKETCHUP

**sketchup.google.com:** SketchUp allows you to create, modify, and share 3-D models for free. The software is compatible with Mac or PC operating systems, and students can use it at home and in the classroom.

## Rubric for Assessing Design in 3-D Modeling Software

STUDENT NAME \_\_\_\_\_ DATE \_\_\_\_\_

CATEGORY	EXCELLENT	GOOD	PROFICIENT	NEEDS IMPROVEMENT
<b>ORIGINALITY</b> 10 points	Product shows a large amount of original thought. Ideas are creative and inventive.	Product shows some original thought. Work shows new ideas and insights.	Uses other people's ideas (giving them credit), but there is little evidence of original thinking.	Uses other people's ideas, and does not show original concept.
<b>OBJECTS IN PLACE</b> 10 points	Project has all prescribed elements in place.	Project has most prescribed elements in place.	Project has some prescribed elements in place.	Many elements are lacking.
<b>LIGHTING</b> 10 points	Project makes use of light and shadow for dramatic or artistic effect.	Project uses light and shadow in appropriate angles and directions.	Project uses light to provide enhanced views of objects.	Lighting is random or misplaced. Objects are obscure or overlit.
<b>MATERIALS</b> 10 points	Project uses materials for artistic effect as well as realism.	Project uses materials to achieve realism.	Project makes use of standard materials.	Project uses no materials and relies on flat shading.
<b>COMPOSITION</b> 10 points	Objects achieve dramatic and artistic realism through placement as a total composition.	One or more objects dominate the composition.	Objects are clearly separated and present in view.	Some objects are obscured by others or are out of view.
<b>COLOR CHOICE</b> 10 points	Colors provide dramatic effect or realism.	Colors are appropriate to the mood and effect demanded by the scene.	Project makes use of color to vary the scene.	Colors seem random or they clash.
<b>CAMERA PLACEMENT</b> 10 points	Camera placement provides a dramatic angle and artistic view of the scene.	Camera placement is dramatic or artistic, but not both.	Camera placement provides a complete view of the scene.	Camera does not provide complete or accurate view of the scene.

**TOTAL POINTS** \_\_\_\_\_

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