Lumberyard

Getting Started Guide

Version 1.10
# Table of Contents

Introduction to Lumberyard Editor .............................................................................. 1
  Running Lumberyard Setup Assistant ........................................................................ 2
Preview and Legacy Tools ........................................................................................ 3
  Preview Tools .......................................................................................................... 3
  Legacy Tools ........................................................................................................... 4
Accessing Documentation and Support .................................................................. 4
Working with Lumberyard Editor ............................................................................ 5
  Levels ..................................................................................................................... 5
  Lumberyard Objects ............................................................................................... 6
  Editor Layout ......................................................................................................... 6
  Essential Tools ...................................................................................................... 7
    Select .................................................................................................................. 9
    Move ................................................................................................................... 10
    Rotate ............................................................................................................... 11
    Scale .................................................................................................................. 11
  Snap Features ....................................................................................................... 12
    Snap to Grid ....................................................................................................... 12
    Snap Angle ......................................................................................................... 13
    Follow Terrain and Snap to Objects .................................................................. 13
  3D Level Navigation ............................................................................................. 14
Editors ...................................................................................................................... 14
  Display Options and Settings ............................................................................... 16
    Perspective Viewport Options .......................................................................... 16
    Show/Hide Helpers ......................................................................................... 16
    Toggle Display Information ............................................................................. 17
    Navigation Speed Settings ............................................................................. 17
  Layers ................................................................................................................... 17
    Using Layers Icons .......................................................................................... 18
    Working with Layers and Their Files .............................................................. 18
    Collaborating with Multiple Users ................................................................. 19
    Moving Assets Between Layers ..................................................................... 19
  Auto Backup ......................................................................................................... 19
Building the Terrain ............................................................................................... 21
  Painting the Terrain ............................................................................................. 21
    Terrain Texture Layers Editor ...................................................................... 21
    Material Editor ................................................................................................. 22
    Building the Surrounding Environment ........................................................ 22
  Adjusting Terrain Height ..................................................................................... 26
  Adding Terrain Vegetation .................................................................................. 30
Lighting the Scene ................................................................................................... 36
  Placing Environment Probes ............................................................................. 36
  Adjusting Time of Day ......................................................................................... 40
  Adding Lights ....................................................................................................... 42
Using Materials ....................................................................................................... 46
  Creating a New Material ....................................................................................... 46
  Creating Multimaterial ......................................................................................... 49
  Assigning Material to Objects ............................................................................ 52
  Working with the FBX Importer ......................................................................... 53
Lumberyard Blog, Forums, and Feedback .............................................................. 57
Welcome to the *Getting Started Guide for Amazon Lumberyard Editor*.

Lumberyard is a free, cross-platform, 3D game engine for creating high-quality games, connecting your games to the vast AWS Cloud of computing and storage, and engaging fans on Twitch.

This *Getting Started Guide* familiarizes you with the basics of Lumberyard Editor. You'll be guided through tutorials that describe the most commonly used tools and features of this editor.

After completing this tutorial, you'll be knowledgeable enough to explore Lumberyard's wide range of tools and features. You can complete additional tutorials to help you learn more about specific tools and features and put you well on your way to building your next game.

To access Lumberyard's library of written and video tutorials, see Amazon GameDev Tutorials
Running Lumberyard Setup Assistant

Download and run the Lumberyard executable from Lumberyard Downloads.

The following procedure guides you through Lumberyard's basic Express Install option. More advanced users may want to use the Custom Install process, or create a new project and install gems. See Running Lumberyard Setup Assistant and Using Project Configurator in the Amazon Lumberyard User Guide.

To use Lumberyard Setup Assistant

1. Do one of the following:
   - Double-click the Setup Assistant desktop shortcut.
   - Click Setup Assistant in the Start menu.
   - Open the directory where you extracted Lumberyard and run SetupAssistant.bat.
2. Under Express Install, click Launch.
3. Log in to your existing Amazon account or create a new account to access the editor.
   If you have both an Amazon account and an AWS account, use your Amazon account.

To select Starter Game as a project

After Lumberyard Setup Assistant is finished, it should have placed several shortcuts to tools on your
desktop.
1. Open the Project Configurator shortcut.
2. Select Starter Game as your default project as described in Using Project Configurator in the
   Amazon Lumberyard User Guide.

Preview and Legacy Tools

Lumberyard continues to create new tools to help simplify workflows and improve your iteration speed.
Tools in Lumberyard Editor that are marked Preview will eventually replace the tools that are marked
Legacy.

To learn more about these new Lumberyard features, see the Lumberyard Tutorials page.

Preview Tools

New tools are marked PREVIEW in Lumberyard Editor. These preview tools are stable and usable. These
tools offer a high quality, functional, and consistent experience, but may not be perfect.

The preview tools include the following:

- Lua Scripting – This script-based alternative to the Flow Graph editor improves runtime performance,
is easy to troubleshoot, and allows scripts to be reloaded within the engine. In a future release,
  Lumberyard will provide a tool called Script Canvas, a visual scripting replacement for flow graph.

- Entities – The new entity system consists of entities and components. You can add components to an
  entity to give specific capabilities to that entity. The preview tools in the component entity system
  include Entity Inspector and Entity Outliner. You can add components from the following categories
to your entities:
  - AI
  - Animation
  - Audio
  - Camera
  - Editor
  - Game
  - Gameplay
  - Network
  - Physics
  - Rendering
  - Scripting
  - Shape
  - UI
• VR

• **Slices** – Similar to the capability of prefabs, slices are reusable, easily updatable component entity templates. You can modify slices individually or push all changes to all instances of the slice. A major advantage of slices over prefabs is that slice hierarchies can contain other slice hierarchies without flattening them. This allows for robust slice layering.

• **Entity Outliner** – An alternative to the object selector, this tool provides a hierarchical and collapsible view of slices and entities in the level.

• **Entity Inspector** – This tool provides a comprehensive view and customization ability of the components on each entity. You can add, remove, cut, copy, paste, and reorder components on each entity.

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**Legacy Tools**

Tools that are marked **LEGACY** in the editor indicate that we are no longer advancing these tools, and they will eventually be deprecated.

The following tools are marked legacy in the editor:

• Flow graph
• Object selector
• **Rollup Bar** (hidden in the default layout)
• **Layer Editor**

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**Accessing Documentation and Support**

The Lumberyard Documentation team is continuously writing and improving the official documentation to provide a better help experience:

• Lumberyard online documentation
• Lumberyard tutorials

You can also refer to the *docs* directory in the Lumberyard directory for help topics about using Lumberyard.

In addition Amazon Web Services provides a combination of tools and expertise to help support your success with Lumberyard. To learn about the variety of resources we offer, see [Amazon Lumberyard](#).

It's day one and we're just getting started. We look forward to your feedback.
Working with Lumberyard Editor

The Lumberyard Editor provides extensive tools for creating and customizing your game environment including levels, objects, terrain, lighting, animation, layers, and much more. Keyboard controls familiar to gamers make it easy to navigate your levels in 3D. Customize your display so that you can focus on what's important to you. Read the topics in this section to learn the Lumberyard Editor's most common and essential features.

Topics
- Levels (p. 5)
- Lumberyard Objects (p. 6)
- Editor Layout (p. 6)
- Essential Tools (p. 7)
- Snap Features (p. 12)
- 3D Level Navigation (p. 14)
- Editors (p. 14)
- Display Options and Settings (p. 16)
- Layers (p. 17)
- Auto Backup (p. 19)

Levels

A level is a world or map that represents the space or area available to the player during the course of completing a discrete game objective. Most games consist of multiple levels.

To create a level in Lumberyard Editor

1. Start Lumberyard Editor as explained in the Introduction (p. 2).
2. In the Welcome to Lumberyard Editor window, you can create a new level, open a recent level (if one exists), or open a level from within the level directory. You can also choose to stop showing this dialog on startup.
3. Click New level.
4. Type a name for your new level.
5. To generate a terrain for your level, you can specify your **Heightmap Resolution** and **Meters Per Texel**. A heightmap is a grayscale image that stores surface height data with high areas in white and low areas in black. For this tutorial, accept the defaults. Click **OK**.
6. In the **Generate Terrain Texture** dialog box, you can control the appearance of your level's terrain. Click **OK** to accept the default settings.

### Lumberyard Objects

Object-based Entities, Brushes, and Designer objects are in **legacy** mode and are scheduled to be removed in a future release. See version information (p. 3) for replacement system(s).

Lumberyard has the following object types, which encompass every object that can be placed in a level:

**Component Entities**

Lumberyard component entities are building blocks with which you can bring game assets to life. Entities become dynamic and interactive when you add specific components to them in a level.

**Object-based Entities (in Rollup Bar)**

Object-based entities are legacy Lumberyard tools in the Rollup Bar that will soon be discontinued.

### Editor Layout

Rollup Bar and some objects are in **legacy** mode and are scheduled to be removed in a future release. See version information (p. 3) for replacement system(s).

To get the most out of Lumberyard, familiarize yourself with these terms and areas.

Lumberyard Editor window comprises the following areas:

1. **Main menu** – All functions and settings.
2. **Editor toolbar** – Most commonly used tools and editors.
3. **Viewport title bar** – Search bar and display options for **Perspective** viewport.
4. **Perspective viewport** – 3D environment view of level.
5. **Viewport controls** – Controls for selected objects, options for navigation speeds, and other viewport features.
6. **Asset Browser** – Access to assets that can be dragged and instantiated in the viewport.
7. **Entity Inspector** – Access to entities and components that enable users to build and organize interactive content.

8. **Game Info** – The game directory and game DLL that is running in the editor. For this tutorial, the game directory and game DLL should be set to **StarterGame**. If it is not, return to Running Lumberyard Setup Assistant (p. 3). See the section entitled To select Starter Game as a project.

### Essential Tools

Lumberyard Editor features many tools, settings, and options to help you build high quality games. The most essential tools for manipulating objects are **Select**, **Move**, **Rotate**, and **Scale** tools. Note that you can select objects with any of these tools.

You can select these tools with either a keyboard shortcut or from the Lumberyard Editor toolbar, as shown in the following image.

![Toolbox Image](image)

1. **Select**
2. **Move**
3. **Rotate**
4. **Scale**

Each tool provides its own unique 3D handle, called a gizmo, on the selected object. This helps you identify the tool that is currently selected.

**Tip**

If you don’t see the toolbar with these tools, right-click an empty area of the menu or toolbar area and choose **EditMode Toolbar**.

### To use the keyboard to select a tool

Press any of the following numbers on your keyboard:

- **Select** – 1
- **Move** – 2
- **Rotate** – 3
- **Scale** – 4

Place an object in your level to help you follow along and test out the essential tools described in the following sections.

### To place an object

1. To find an object to place, do the following:
a. In the **Asset Browser**, next to the search filter box, click the funnel icon.

b. Click **All** to clear all the check boxes, and then click **Geometry** to select it.

c. In the **Asset Browser**, expand the **StarterGame** directory.

d. Expand the **Objects** directory. Keep expanding directories until you see items with a `.cfg` extension. These are Lumberyard geometry assets.

2. Drag an interesting asset into the viewport.

3. Press **Z** to center the camera on your newly placed object.

4. Try placing other objects.
Select

With the **Select** tool, you can choose any object in the **Perspective** viewport. The gizmo for **Select** is a set of three lines—one for each direction: X, Y, Z.

To select, move your pointer over the object you want to select. When the object is highlighted yellow and the pointer changes to a +, click to select the object.
Move

The Move tool selects and moves an object within the 3D space of the Perspective viewport. The Move gizmo is a set of three lines with arrowheads on the X, Y, and Z lines.

To move your selected object along a fixed line, click the X, Y, or Z line, which appears yellow when selected. You can then drag your object along that line.

The Move gizmo also features three small right angle squares along the XY, ZY, and XZ planes. To move your object along a plane, click to select one of the small squares. You can then drag your object along that plane.
**Rotate**

The **Rotate** tool selects and rotates an object. The **Rotate** gizmo is a set of circles around the object along the X, Y, and Z axes.

To rotate an object, select one of the small inner circles. You can then drag to rotate around that rotational plane.

A larger outer circle also surrounds the entire gizmo. Select and drag this circle to rotate the object in relation to the screen display.

**Scale**

The **Scale** tool can select an object and change its size. The **Scale** gizmo has cubes on the X, Y, and Z lines.

To scale an object, select the X, Y, or Z line, then drag up or down to increase or decrease the scale of the object in the selected direction.
Snap Features

Lumberyard Editor includes snap features to help you precisely position objects.

Topics
- Snap to Grid (p. 12)
- Snap Angle (p. 13)
- Follow Terrain and Snap to Objects (p. 13)

Snap to Grid

When you move an object, you can use Snap to Grid to attract the object to points along a customizable grid. Snap to Grid is on by default.

To use snap grid
1. To turn grid snap off or on, click the Snap to Grid icon on the toolbar.
2. To customize the size of the snap grid, click the arrow to the right of the Snap to Grid icon. Select the preferred value to modify the distance between snap points.
**Snap Angle**

When you rotate an object, you can use **Snap Angle** (on by default) to attract the object to degrees of angle.

To use snap angle

1. To turn snap angle on or off, click the **Snap Angle** icon on the toolbar.
2. To customize the **Snap Angle**, click the arrow to the right of on the icon. Select the preferred value to modify the degree of rotation with each snap.

**Follow Terrain and Snap to Objects**

Use **Follow Terrain and Snap to Objects** to move an object along terrain features rather than along the X, Y, Z axes or planes. With **Follow Terrain and Snap to Objects** on, you can freely move your object in any direction along your terrain, and the object automatically adjusts to terrain features.

In levels with a terrain mesh, this tool can be very useful: You can easily keep your objects sitting directly on the terrain or in whatever relation to the terrain you already have it. This removes the need to adjust your objects manually to peaks and valleys.

To use Follow Terrain and Snap to Objects

- To turn terrain snapping on and off, click the **Follow Terrain and Snap to Objects** icon in the toolbar.
3D Level Navigation

The level navigation in the **Perspective** viewport is similar to that of other 3D modeling tools with first-person shooter (FPS) controls. If you are familiar with FPS games, you should find it easy to navigate within the **Perspective** viewport.

To navigate within your level in the **Perspective** Viewport, use the following click and drag actions:

<table>
<thead>
<tr>
<th>Action</th>
<th>Mouse Buttons (Click and Drag) or Keystroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select multiple objects</td>
<td>Left mouse button</td>
</tr>
<tr>
<td>Turn left or right, look up or down</td>
<td>Right mouse button</td>
</tr>
<tr>
<td>Pan left or right, pan up or down</td>
<td>Middle mouse button</td>
</tr>
<tr>
<td>Zoom in or out</td>
<td>Right mouse + middle mouse button or Mouse wheel</td>
</tr>
<tr>
<td>Strafe forward</td>
<td>W</td>
</tr>
<tr>
<td>Strafe backward</td>
<td>S</td>
</tr>
<tr>
<td>Strafe left</td>
<td>A</td>
</tr>
<tr>
<td>Strafe right</td>
<td>D</td>
</tr>
</tbody>
</table>

Editors

Several of the tools shown in this menu are in legacy mode and are scheduled to be removed in a future release. See [version information (p. 3)] for replacement system(s).

Lumberyard Editor features a collection of editor tools for building specific categories of content.

You can open any editor from the **Tools** menu.
You can also open the most commonly used editors from the editors toolbar.

Display Options and Settings

You can use Lumberyard Editor's display options and settings to customize your view to see the most useful tools and options.

Topics
- Perspective Viewport Options (p. 16)
- Show/Hide Helpers (p. 16)
- Toggle Display Information (p. 17)
- Navigation Speed Settings (p. 17)

Perspective Viewport Options

To configure display options for the Perspective viewport, right-click the viewport title bar. Select or clear options to suit your individual workflow preferences.

Show/Hide Helpers

The right side of the viewport title bar has additional display settings. Click the ? icon to show or hide entity icons and their visual guidelines. Hiding these elements can declutter your view when you want to focus on other components.
Toggle Display Information

To change the amount of debug/display information that appears in the Perspective viewport, click the i (information) icon. Click this icon multiple times to choose the level of information you’d like to see.

Navigation Speed Settings

You can adjust your Perspective viewport navigation speed. The Speed setting displays the current movement speed setting. Type a number into the Speed field, or click .1 (slow), 1 (normal), or 10 (fast).

Layers

The Layers tool is in legacy mode and is scheduled to be removed in a future release. See version information (p. 3) for replacement system(s).

The Layers tab in the Rollup Bar helps you organize the large amount of content that is created when you build a level.
**Note**
You can place or assign objects (p. 6) (object-based entities from the Rollup Bar) to layers, as described in Assigning Objects to Layers. Entities, however, cannot be placed in layers. Even if it appears to work initially, all entities revert to the base layer when you exit the level file.

**Topics**
- Using Layers Icons (p. 18)
- Working with Layers and Their Files (p. 18)
- Collaborating with Multiple Users (p. 19)
- Moving Assets Between Layers (p. 19)

**Using Layers Icons**
You can use the toolbar on the **Layers** tab to create new layers or delete, rename, save, and export your existing layers:

Additionally, each layer has its own eye and arrow icons to help you manage your objects:

- **Eye icon** – Temporarily hides a layer to help you focus on a specific layer. Click the eye icon on each layer that you want to hide. Click it again to make the layer visible.

- **Arrow icon** – Disables the ability to select objects in that layer. This can be useful if you are having trouble selecting an object that is overlapped by objects in other layers.

Furthermore, you can organize your layers into nested groups by holding **Ctrl** and dragging each layer to your preferred location.

**Working with Layers and Their Files**
When you create a new layer in a level, that layer is stored as a file in the **level\layers** directory with the extension `.lyr`.

To work within a specific layer, click the **Layer** tab and then select the layer. With that layer selected, you can create and add content, all of which is placed in the selected layer.

When working within a specific layer, you don't need to save the level file, but you do need to save the layer file. To save the layer file, click **Save External Layers** icon, as shown in the following image.
Collaborating with Multiple Users

With the **Layers** tab multiple users can work within the same level. To do that, each user can create his or her own layer and build all the content within that layer. Although not required, a source control tool such as Perforce provides a useful way to manage these different layers. Users just check files in or out to get the latest updates from other team members.

Moving Assets Between Layers

Each entity, brush, or designer object that you place in the level is assigned to the currently selected layer. If you have not created any additional layers, objects are placed in the default main layer.

**To assign an object to a different layer**

1. Select the object in the **Perspective** viewport.
2. In the **Rollup Bar** click the **Objects** tab to view the name of the layer that contains the object.
3. Click the **Layers** icon to display a list of the current layers for that level.
4. Select the destination layer from the list.

Auto Backup

Lumberyard's **Auto Backup** feature is on by default. **Auto Backup** saves your level file incrementally. This helps prevent loss of your work in case of unexpected problems.
To customize your Auto Backup settings

1. From the main menu, choose Edit, Editor Settings, Global Preferences.
2. Under General Settings, click Files. From here, you can customize your Auto Backup settings.
Building the Terrain

Adding textures and objects to your level adds realism to your environment. The following tutorial topics teach you how to use Lumberyard Editor to apply materials to the terrain, modify the terrain height, and use the vegetation tool to paint trees.

Topics

• Painting the Terrain (p. 21)
• Adjusting Terrain Height (p. 26)
• Adding Terrain Vegetation (p. 30)

Painting the Terrain

To build the terrain environment, you'll use the Terrain Texture Layers editor and the Material Editor.

Terrain Texture Layers Editor

The Terrain Texture Layers editor defines the materials that you use to paint on the level’s terrain mesh.
The **Terrain Texture Layers** editor has the following features:

1. **Layer Tasks** – Controls for adding, deleting, and reordering layers in the **Layer list**
2. **Layer Info** – Information about the selected layer, including the layer size and surface type count
3. **Layer Texture** – Low-detail texture swatch; displays distant textures and color information for the surface texture
4. **Options** – Settings related to the **Layer list**
5. **Layer list** – Layer textures available for painting onto the terrain (such as dirt, grass, rocks, and more)

**To open the Terrain Texture Layers editor**

Do one of the following:

- On the editor toolbar, click the **Terrain Textures Layers Editor** icon.
- From the main menu, choose **Tools, Other, Terrain Texture Layers**.

---

**Material Editor**

You can use the **Material Editor** to create and apply materials, map textures, set opacity and lighting effects, set shader parameters, create vertex deformations, tessellation, and more.

The **Material Editor** has the following features:

1. **Editor toolbar** – Tools for applying, deleting, saving, and creating materials
2. **Material preview** – Display for the selected material's appearance
3. **Material folder directory** – Folder tree to navigate through the materials available for use in the level
4. **Material properties and settings** – Options for defining the material's appearance

**To open the Material Editor**

Do one of the following:

- On the editor toolbar, click the **Material Editor** icon.
- From the main menu, choose **Tools, Material Editor**.

---

**Building the Surrounding Environment**

Use the **Terrain Texture Layers** editor and the **Material Editor** to paint textures onto your level terrain. The following procedure shows you how to paint mud and grass textures onto your terrain.
To build the surrounding terrain environment

1. Open the **Terrain Texture Layers** editor. In the **Layer Tasks** area, click **Add Layer** twice to add two new layers.

2. In the first new layer, double-click **NewLayer** and rename it **grass**.

3. In the second new layer, double-click **NewLayer** and rename it **mud**.

4. Click the **grass** layer to select it.

5. Open the **Material Editor** and expand **materials\natural\terrain**. Select the material **am_grass_01**.
6. In the **Terrain Texture Layers** editor, the grass layer should still be selected. In the **Layer Tasks** area, click **Assign Material**.

7. Switch back to the **Material Editor** and, in the **terrain** folder, select **am_mud1**.

8. Switch to the **Terrain Texture Layers** editor. Select the **mud** layer and, in the **Layer Tasks** area, click **Assign Material**.

**Note**
Each of the terrain material layers has a small material preview box. This material preview box displays the assigned layer texture, not the material assigned from the **Material Editor**. For this tutorial, we are using the default *grey.dds* file, so both the grass and mud layers appear with the gray layer texture.
9. Close the **Material Editor** and **Terrain Texture Layer** editors. You are now ready to paint grass and mud textures onto the terrain.

10. In the **Rollup Bar**, click the **Terrain** tab, and then click **Layer Painter** to display the terrain layer painting tools.

11. The bottom of the **Layer Painter** section shows a list of the terrain materials that you have created: grass and mud. Select **grass**.

12. Just above the list of terrain materials is **Vertex Coloring** with a **Color** box (white is the default). Click the color box and change the RGB color values to 145, 180, 75 for a grass-green color. Click **OK**.

13. Click **Flood** at the bottom of the **Layer Painter** section to paint grass on the terrain.

14. You can now paint some mud into the scene.

    Select the **mud** material at the bottom of the **Layer Painter** section.

15. Adjust the **Color** box to a brown tone: RGB 115, 95, 50. Click **OK**.

16. For **Brush Settings**, set the **Radius** to 5 and the **Hardness** to 0.5.

17. Click in the **Perspective** viewport. Drag to paint the mud texture on the terrain. Do as little or as much as you like.

    You can paint your terrain so that it looks like similar to the picture below.
18. Save your level file.

**Adjusting Terrain Height**

After you paint your terrain, you can manipulate its height with the **Modify Terrain** settings.

The **Modify Terrain** section includes brush settings and noise settings.

**Brush Settings**

Use the following settings to adjust the rise/lower, smooth, and flatten brushes.

- **Flatten** – Flatten the terrain to the preferred height setting.
- **Smooth** – Soften the terrain down to a smoother surface.
- **Rise/Lower** – Raise or lower the terrain based on brush size settings.
- **Pick Height** – Find and set height based on existing terrain geometry.
- **Outside Radius** – Set brush size for painting.
- **Sync Radius for all Types** – Set the same outer radius value across the flatten, smooth, and rise/lower brushes.
- **Inside Radius** – Set how round or flat the brush is in relation to the outside radius setting.
• **Hardness** – Soften or harden the outer brush settings.
• **Height** – Set the brush height.

**Noise Settings**

Use noise settings to add random terrain variances to the brush.

• **Scale** – Modify the strength of the noise effect. Higher values produce more noise.
• **Frequency** – Set how often the effect is applied.
The following procedure shows you how to create a range of hills and mountains.

**To modify terrain height**

1. In the Rollup Bar, click the Terrain tab and then click Modify.
2. Under **Modify Terrain**, click **Rise/Lower** and use the following settings to create gentle hills in your scene:
   - **Outside Radius** = 25
   - **Inside Radius** = 1
   - **Hardness** = 0.25
   - **Height** = 3

3. In the **Perspective** viewport, navigate towards the outer perimeter of the terrain map and click or drag to paint on the terrain. Experiment with clicking and dragging along the terrain to manipulate the terrain to different heights. Build some larger hills of different sizes and shapes.

4. Modify the brush settings to the following:
   - **Inside Radius** = 20
   - **Hardness** = 1
   - **Height** = 1

5. Paint again on the terrain. Notice how the terrain rises up straight and rigid.

6. Click the **Smooth** tool and use the following settings:
   - **Outside Radius** = 25
   - **Hardness** = 0.2

7. Paint with the smooth brush over the last area of terrain you created. Notice the smoothing of the terrain.

8. Click **Pick Height** and click on a high point on the terrain. Notice that the **Height** setting in the tool adjusts to the height you clicked on.

9. Select a point on the terrain where the height was unchanged. The **Height** setting in the **Modify Terrain** tool changes to 32 (the default terrain height). This tool does not affect your terrain directly but simply adjusts settings for the next step.

10. Click **Flatten**, and use the following settings:
    - **Outside Radius** = 25
    - **Inside Radius** = 0
    - **Hardness** = 1

11. Paint with the **Flatten** tool over the area you just smoothed. The terrain flattens to the same height as the rest of the default terrain height.

12. Using the terrain height tools, create a range of high and long hills that vary to create visual interest.

13. Use the **Smooth** tool to soften where you like. With time and experimentation, you can make your terrain look like the following picture.

Adding Terrain Vegetation

You can use the Vegetation tool to paint 3D mesh objects like trees, shrubs, and grasses onto the terrain. Various settings help you to build organic environments using any type of 3D models you define.

The Vegetation tool offers the following settings:

- **Toolbar** – Tools to create, modify, and organize vegetation types
- **Brush Radius** – Size of the brush used to paint vegetation into the level
- **Paint Objects** – Switch that enables painting in the level
- **Objects** – List of vegetation objects
- **Table of attributes** – List of attributes that can be modified for each vegetation object
In the previous steps, you modified your terrain and added texture. Now you’ll use the Vegetation tool to add some trees.

To add trees

1. In the Rollup Bar, on the Terrain tab, click Vegetation.
2. In the tools list, click Add Vegetation Category.
3. When prompted to name the New Category, type Trees. Click OK.
4. In the Objects list, select the Trees category you just created.
5. In the tool list, click Add Vegetation Object.
6. In the Pick Geometry dialog box, expand StarterGame\Objects\Natural\Vegetation.
7. In the list of .cgf files, use Ctrl+click to select all the .cgf files that refer to trees. Click Open.
If you paint trees into the environment at this point, every tree would appear with the default brush settings, providing no variation on size, rotation, or spread of the trees.

8. To create variation in tree size, rotation, and spread, select all the trees in the list and then change the following settings in the attributes list.

   **Size Var** = 0.2

   Amount of variation in tree size

   **Random Rotation** = Selected (checked)

   Random rotation of trees as they’re placed

   **Density** = 100

   Density of the trees

   **Sprite Distance** = 50

   Distance from the camera view that vegetation transitions from a mesh to a sprite of that object

9. Click the **Trees** group name. Adjust the **Brush Radius** to 50 (this size is appropriate for filling the terrain space quickly).
10. Click **Paint Objects**.

![Paint Objects](image)

11. Place your pointer in the **Perspective** viewport and then click or drag to paint your trees.

Depending on the tree density you want, you can click once to place a random group of trees. Or you can drag through the space and paint them along a path. Adjust the **Brush Radius** and **Density** settings to change the number of trees painted.

You can repeat these steps to place rocks, bushes, flowers, and grass.

![Terrain Vegetation](image)

12. Save your level file.

Congratulations, you have created your first level environment.
Lumberyard Getting Started Guide
Placing Environment Probes

Lighting the Scene

Amazon Lumberyard offers the tools and features used to light a scene, including environment probes, time of day settings, and lights. This tutorial walks you through the use of each.

Topics
- Placing Environment Probes (p. 36)
- Adjusting Time of Day (p. 40)
- Adding Lights (p. 42)

Placing Environment Probes

Before you add lights, it's helpful to learn about environment probes and time of day settings, which affect lighting and appearance in your level. Environment probes are critical to achieving great-looking lighting. For example, you may have noticed that the shadows cast by objects are very dark. Adding an environment probe helps to produce more realistic ambient shadow intensity and reflections.

Environment probes are important for a variety of features including reflections, ambient diffuse values, particle diffuse values, and shadow colors. When you build a level file, place multiple environment probes to achieve the right visual quality for the space. After you place an environment probe, you will use the Generate Cubemap function. Generate Cubemap creates three textures in textures\cubemaps \your_level—one for the diffuse map, one for the specular map, and one for the source .dds file. A cubemap is a set of six squares that represent reflections from the environment. The six squares form the faces of an imaginary cube that surrounds an object. This step adds realism to your level by incorporating object reflections.

This tutorial helps you set up an environment probe.

To add an environment probe

1. Right-click in the Entity Outliner, and then choose Create entity.
2. In the **Entity Inspector**, click in the **Name** box and type **LightProbe**.

3. Click **Add Component**. In the **Rendering** section, click **Environment Probe**.
4. The environment probe appears as a square volume entity.

   Tip
   If you cannot see the environment probe as a square volume entity, click the ? icon in the upper right corner of your viewport to display objects. To quickly focus on a selected object, press Z.

5. Position the probe approximately in the center of the area that you want it to encompass. The following image shows an environment probe in the center of a large room.

You can adjust your environment probe by modifying the following settings:

1. **Color** – The ambient color of the probe. Adjust the color based upon the ambient lighting that you want to achieve. Starter Game, for example, uses a white probe.

2. **Area Dimensions** – The dimensions of the probe. Adjust the dimensions so that the probe boundaries surround the entire volume that you want the ambient light to flood.

3. **Cubemap** – The cubemap for the probe, as described in the introduction to this section.
6. With the probe still selected, zoom out from the level so that you can see the entire area that you want to light. Adjust the position and dimensions of the probe to cover the volume of interest.

In the following picture, which is taken from Starter Game, the environment probe entity’s boundaries encapsulate the interior of the building. You can see the boundary lines of the box, however, only from the exterior of the building.

7. To generate the cubemap, click **Generate**.

8. Save your level file.

### Adjusting Time of Day

Use lighting tools to adjust and animate the time of day. The **Time of Day** editor features a variety of tools to adjust and manage time of day settings. This tutorial focuses only on changing the time of day.
The Time of Day editor has the following features:

1. Editor toolbar – Icon toolbar for most common functions: undo, redo, import, export
2. HDR Settings – Settings to manage HDR (high dynamic range) lighting
3. Time of Day Tasks – Management of basic tasks within the Time of Day editor
4. Current Time – Display of start and end times as well as play speed
5. Update Tasks – Controls to update the play or stop of time of day, based on play speed setting
6. Timeline – Management of light settings along a 24-hour time cycle
7. Parameters – Lighting settings to adjust time of day conditions

To adjust time of day

1. Do one of the following to open the Time of Day editor:
   - On the editor toolbar, click the Time of Day editor icon.
   - From the main menu, choose: Tools, Other, Time of Day.
2. In the Tasks area, choose Import from File. Navigate to StarterGame\Levels\StarterGame and open TimeOfDay.xml.
   This loads a set of time of day settings created for this tutorial. Notice the changes in light, fog, and sky colors.
3. In the timeline, drag the timeline marker (gray bar) to the number 21 (indicating 21:00 or 9:00 p.m.).
   As you drag the timeline marker, you can watch your scene in the Perspective viewport change from day to night.
4. Adjust the timeline marker to different times of day to see the lighting changes in your scene. Observe how this time adjustment also changes the settings in the Parameters area.


Adding Lights

Now that your scene is set to night time, you can more clearly see the lights that you are about to place. In Lumberyard, a light is an entity with a light component added to it.
The lights in Starter Game are legacy lights built with Cry entities. This tutorial, however, shows you how to create lights with the new component entities.

To add lights

1. First, create a new entity: Right-click in Entity Outliner and choose Create entity.
2. In the Entity Inspector, click Add Component. Under Rendering, choose Point Light.

The light appears in the viewport, as shown in the following picture.
3. The default settings of a point light make it too small to see in a large level such as the Starter Game level.

To make your light visible, adjust the following values:

1. **Max Distance** – 50 (meters)
2. **Attenuation Bulb Size** – 5 (meters)

**Tip**

If you have trouble precisely aligning the light, the light is likely snapping to the grid. Turn off **Snap to Grid** in the editor toolbar, as shown in the following image, to move your light more precisely.
4. Save your level file.
Using Materials

With Lumberyard, you can create materials for your level and apply those materials to an object. The tutorials in this section show you how.

Topics
- Creating a New Material (p. 46)
- Creating Multimaterial (p. 49)
- Assigning Material to Objects (p. 52)
- Working with the FBX Importer (p. 53)

Creating a New Material

To create a new material, you use the Material Editor (p. 22). The Material Editor's features are described in Painting the Terrain (p. 21).

To create a new material
1. Do one of the following to open the Material Editor:
   - On the editor toolbar, click the Material Editor icon
   - From the main menu, choose Tools, Material Editor
2. Expand Game\Materials.
3. Select Test. In the toolbar, click Add New Item.
4. Expand `Game\Materials\Test`. For **File name**, type `sphere`. Click **Save**.

5. In the **Material Editor**, select the sphere you just created. Your **Material Editor** should look similar to the following.

6. Under **Texture Maps** (lower right area), find the **Diffuse** line and click the folder.
7. Navigate to Games\Textures\Terrain. Open AMA_White_01.tif. This image file gives the object its material appearance.

8. Under Materials Settings, for Surface Type, select rubber from the list.

This gives the material object the properties of rubber; objects mapped with rubber bounce when hitting another surface.

9. Under Lighting Settings, set Diffuse Color (Tint) to 0, 40, 155.
10. Set Specular Color to 60, 60, 60.
11. Set Smoothness to 175.
12. Save your material setting. To do this, in the toolbar, click the **Save item** icon.

13. Experiment with these various settings to see how adjusting **Diffuse color**, **Specular color**, and **Smoothness** quickly changes your material's appearance.

If you are continuing to the next section, leave the **Material Editor** open.

## Creating Multimaterial

A multimaterial is a single material file that contains multiple materials. With multimaterial, you can map multiple materials onto a single object. Multimaterials are useful for prototyping the internal structure of a scene. For example, to build a neighborhood full of houses, you can build a box with a peaked roof and then cut faces on the side for windows and doors. With a multimaterial, you can create the siding, roof, window, and door textures and then assign the correct material ID to each component to represent a house.

In this tutorial, you'll turn the previously created sphere material into a multimaterial.

### To create a multimaterial

1. Open the **Material Editor** if it is not already open.
2. Right-click the name of the **sphere** material that you previously created.
3. Click **Convert to Multi Material**.
Creating Multimaterial

The image shows the Material Editor in the Lumberyard game engine. The editor is open with a list of materials on the left and a preview of a material on the right. The focus is on converting a single material to a multi-material object.

The screenshot includes the Material Editor's folder structure, which includes various types of materials such as artillery, building, gun, laser, mission, natural, old buildings, road, terrain grass, terrain ground, AM Plinth BG, AM Test Plane, AM Test Plane Material, AM Test Plinth, and Sphere Material. The active menu option is "Convert To Multi Material."
4. Right-click on the sphere material and select **Set Number of Sub-Materials**.

5. When prompted for the number of submaterials, type **3**. Click **OK**.

6. Right-click each submaterial and rename them **sphere_01**, **sphere_02**, and **sphere_03**.

7. Hold down **Ctrl** and select **sphere_01**, **sphere_02**, and **sphere_03**. On the lower right, under **Texture Maps**, find **Diffuse** and click the folder.

8. Navigate to **Game\Textures\Terrain**. Open **AMA_White_01.tif**.

All submaterials now have a diffuse texture map assigned to them.

The material preview window shows the three submaterials on the right; the selected submaterial appears slightly larger on the left.
9. Select submaterial `sphere_01` and, under **Lighting Settings**, set the **Diffuse** color to `35, 100, 35`.
10. Select submaterial `sphere_02` and set **Diffuse** color to `100, 35, 35`.
11. Select submaterial `sphere_03` and set **Diffuse** color to `35, 35, 100`.
12. Under **Material Settings**, set **Surface Type** to rubber for all three submaterials.

Assigning Material to Objects

Now that you have made your materials, you can assign them to any object in your level.

**To assign materials to objects**

1. In the viewport, select an object to which you want to assign a material.
2. In the **Material Editor**, select the `sphere` material that you created.
3. In the **Material Editor** toolbar, click **Assign Item to Selected Objects**. You can also right-click the material name and select **Assign to Selected Objects**.
Working with the FBX Importer

You can use the FBX importer to import static FBX meshes, skeletons, skins, animations, and materials into Lumberyard.

When you export or copy .fbx files into your game project directory, the Asset Processor detects the new or modified .fbx files in the directory. Using the default import settings that are specified in the FBX Importer, the Asset Processor automatically converts the files to the appropriate mesh, skeleton, material, and animation files.

To import an FBX file

1. Use a file managing application, such as Windows Explorer, to copy the .fbx file that you want to import.
2. Paste the .fbx file into your game project directory. For example:
   - C:\Amazon\Lumberyard\1.10.0.0\dev\StarterGame

To further organize your assets, copy the file into a directory within your game project directory, such as Objects. You can also create your own hierarchy of directories, as long as it is within your game project directory.
To use an imported FBX file into your level

1. In the Asset Browser, click the funnel icon to filter your assets. Click All to clear all option selections. Then select Geometry.

   ![Asset Browser filtered for FBX files](image)

   In the search box, type `.fbx`.

2. Expand the filtered directories. Drag any `.fbx` file into the viewport.

You can change the settings on how a particular FBX file is imported when you drag it from the Asset Browser into the viewport.

**To manage FBX import settings on an FBX file**

1. In the Asset Browser, right-click an `.fbx` file, and then click Edit Settings.
2. Modify settings as appropriate in the **Fbx Settings** dialog.

For more information about FBX settings, see [Working with the FBX Importer](#) in the Amazon Lumberyard User Guide.
Lumberyard Blog, Forums, and Feedback

As we continue to improve Lumberyard, we want to thank everyone in our developer community. Without your participation in the forums, your messages, and your bug reports, Lumberyard wouldn't be as strong as it is.

- Keep sending your feedback to <lumberyard-feedback@amazon.com>.
- If you haven't spoken up on the forums yet, we would love to have you.
- You can also keep up with new changes on our blog and leave comments to let us know what you think.