Quick start guide;

Step 1:

- Create and open up new scene;

Step 2:

- Go to: 3D Pottery Lowpoly Pack → Resources;
- Add DestroyableManager to your scene;

Step 3:

- Go to: 3D Pottery Lowpoly Pack → Prefabs → 02 Items Breakable
- Add selected Breakable Items to your scene;

Step 4:

- Right Click in Hierarchy Tab and go to: 3D Object → Sphere ;
- Add Rigidbody Component to your Sphere;
- Relocate Sphere directly above Breakable Item;

Step 5:

- Hit Play, and enjoy Breakable Item destruction;

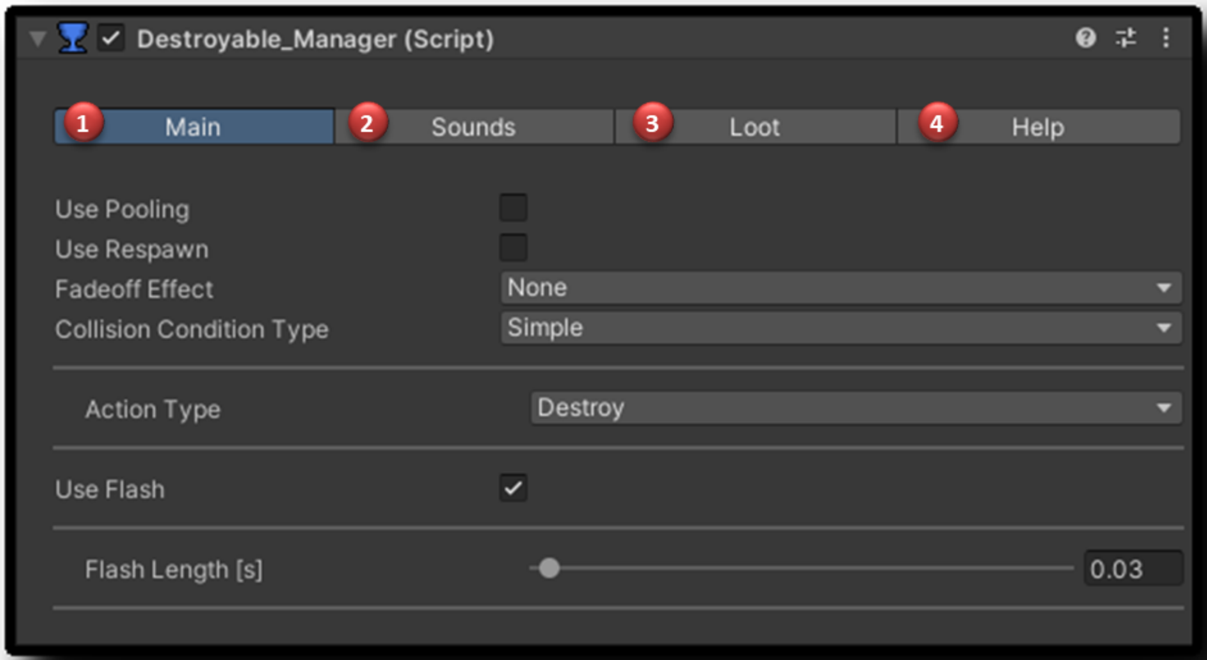
Final Note:

- With default settings of DestroyableManager any object with collider and Rigidbody after hitting Breakable Item will ignite destruction, for more advance usage inspect included Demo Scenes and below documentation;

Destroyable_Manager

Description

A GameObject with the "Destroyable_Manager" component is **required** for breakable items to function correctly. If the user has not created a "Destroyable_Manager" in the scene, it will be automatically added with default settings upon the first collision with a breakable item. The "Destroyable_Manager" with default settings is located in the Resources folder and should not be modified.

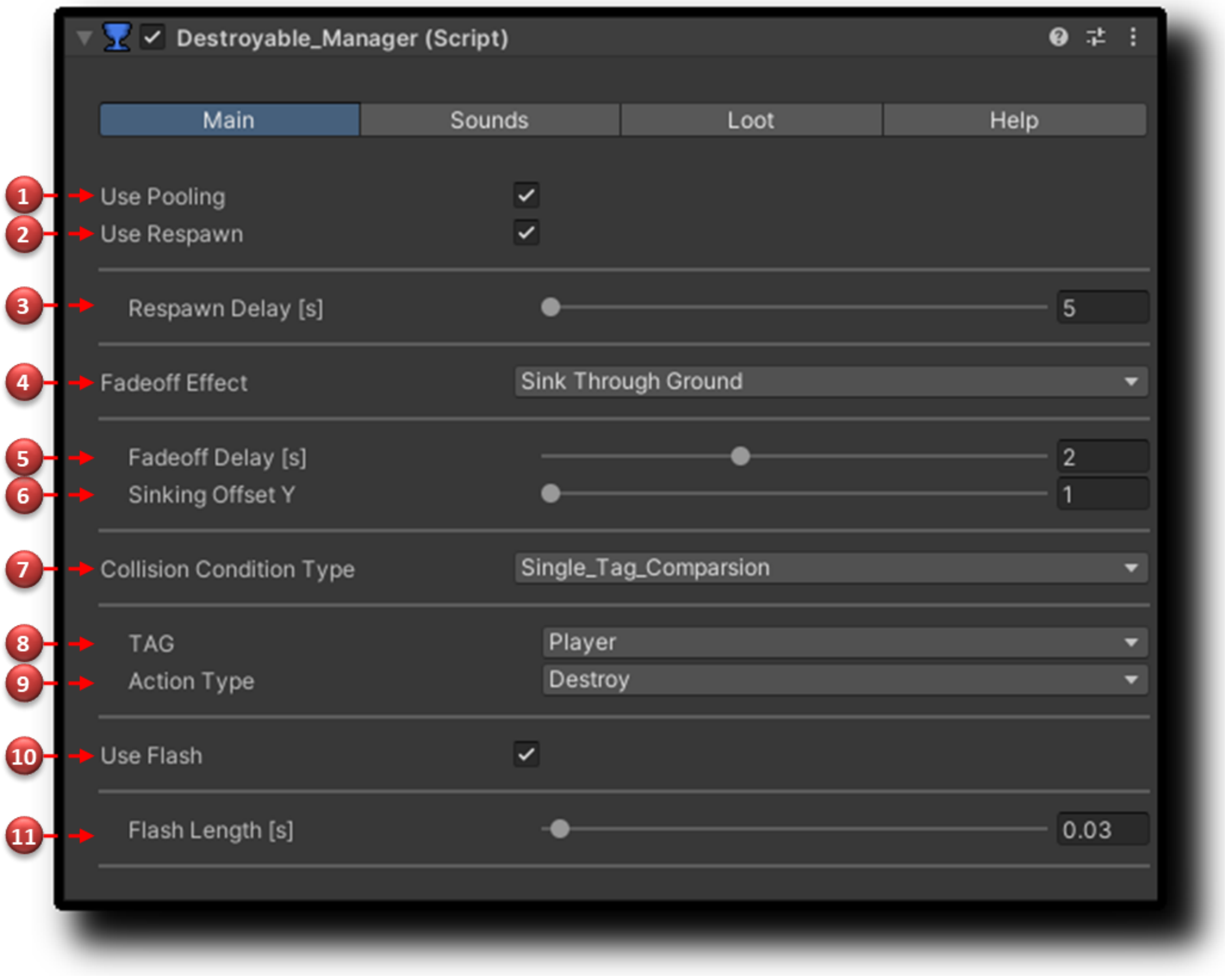


Use Pooling: ☐
Use Respawn: ☐
Fadeoff Effect: None
Collision Condition Type: Simple
Action Type: Destroy
Use Flash: ✓
Flash Length [s]: 0.03

The "Destroyable_Manager" custom inspector window has been divided into four tabs: Main, Sounds, Loot, and Help.

1	Main Tab	Handles settings and features for breakable items.
2	Sounds Tab	Manages sounds associated with breakable items.
3	Loot Tab	Organizes the global loot table used with breakable items.
4	Help Tab	Provides quick access to learning resources and developer support.

Main Tab Description

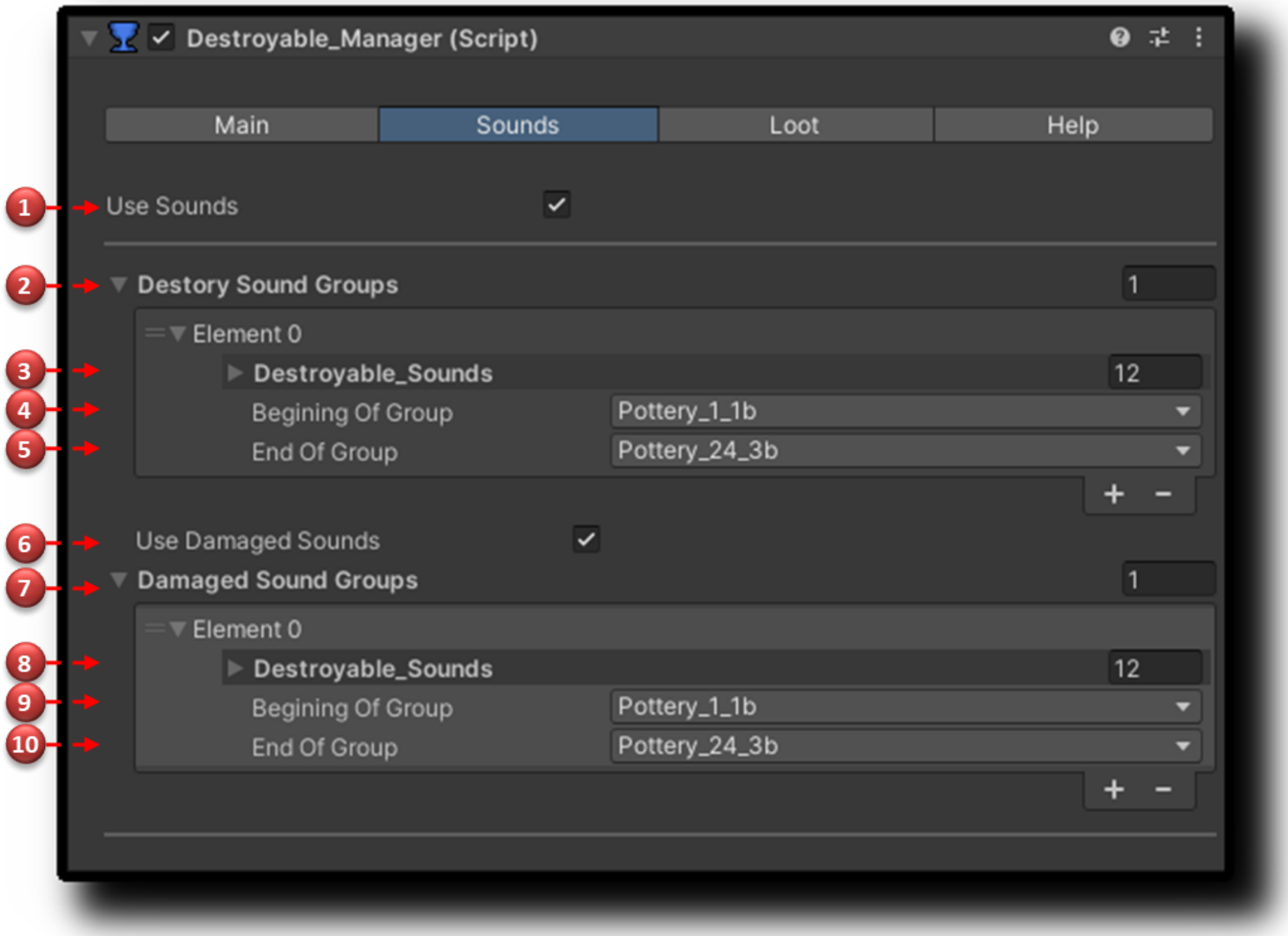


Use Pooling ✓
Use Respawn ✓
Respawn Delay [s] 5
Fadeoff Effect Sink Through Ground
Fadeoff Delay [s] 2
Sinking Offset Y 1
Collision Condition Type Single_Tag_Comparsion
TAG Player
Action Type Destroy
Use Flash ✓
Flash Length [s] 0.03

1	Use Pooling	When enabled, destroyed items will be recovered and reused. In order to work Fadeoff Effect need to be set to 'Disappear', or 'SinkThroughGround'
2	Use Respawn	When enabled, destroyed items will disappear for some declared by user amount of time. After which will appear again ready to be destroyed.
3	Respawn Delay [s]	Allows setting the amount of time in seconds after which each item will be respawned.
4	FadeOff Effect	Allows setting up the 'FadeOffEffect' value to either 'None', 'Disappear', or 'SinkThroughGround'. The FadeOffEffect will be executed after the destroyed item falls to pieces.
5	FadeOff Delay [s]	Allows setting the amount of time in seconds after which each FadeOffEffect will be executed.
6	Sinking Offset Y	Allows setting the distance of sinking which will occure during 'FadeOffEffect' execution.
7	Collision Condition Type	Allows setting up the 'CollisionConditionType' value to either 'None', 'Simple', 'SingleTagComparison', or

		'MultipleTagComparison'. The 'CollisionConditionType' will be executed each time either when OnCollisionEnter occurs or when the method TryDestroy_AccordingToAction() is called on Destroyable_WholeItem.
8	TAG	A single TAG required during OnCollisionEnter. If it matches, the chosen ActionType will be executed.
9	Action Type	Allows setting the 'ActionType' value to either 'Destroy', 'DamageConstant', 'DamageRandom', or 'ChanceRandom'. 'ActionType' will be executed after a successful 'CollisionConditionType' check.
10	Use Flash	When enabled, destroyed items will flash for short amount of time.
11	Flash Length [s]	Allows setting the duration, in seconds, of the flash effect.

Sounds Tab Description


Destroyable_Manager (Script)

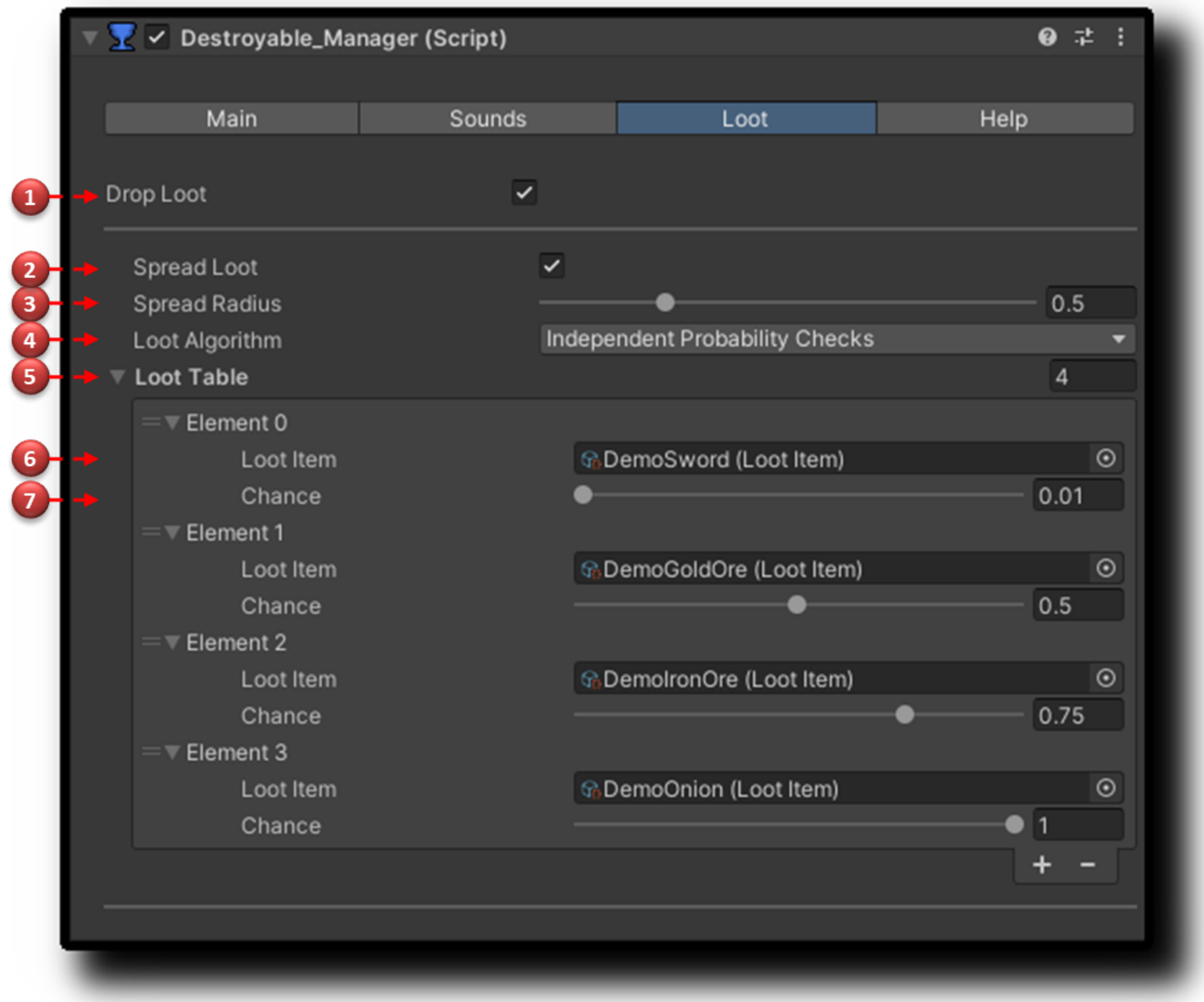
Main | Sounds | Loot | Help

1 Use Sounds ✓
2 Destory Sound Groups 1
Element 0
3 Destroyable_Sounds 12
4 Begining Of Group Pottery_1_1b
5 End Of Group Pottery_24_3b
6 Use Damaged Sounds ✓
7 Damaged Sound Groups 1
Element 0
8 Destroyable_Sounds 12
9 Begining Of Group Pottery_1_1b
10 End Of Group Pottery_24_3b

1	Use Sounds	When enabled, destroyed items will play sound according to declared Sound_Groups.
2	Destroy Sound Groups	Allows adding Destroy Sound Groups for each type of Breakable Items. All items in Sound Group will share

		same sounds.
3	DestoyableSounds Array	Allows assign sound file assign to Sound Group. If array had more than 1 file, during each destruction random clip will be used.
4	Beginning Of Group	Allows choosing first item of Sound Group.
5	**End Of Group**	Allows choosing last item of Sound Group.
6	Use Damaged Sounds	When enabled, damaged items will play sound according to declared Sound_Groups.
7	Damaged Sound Groups	Allows adding Damaged Sound Groups for each type of Breakable Items. All items in Sound Group will share same sounds.
8	DestoyableSounds Array	Allows assign sound file assign to Sound Group. If array had more than 1 file, during each damage random clip will be used.
9	Beginning Of Group	Allows choosing first item of Sound Group.
10	**End Of Group**	Allows choosing last item of Sound Group.

Loot Tab Description


Destroyable_Manager (Script)

Main | Sounds | Loot | Help

1 Drop Loot ✓

2 Spread Loot ✓

3 Spread Radius 0.5

4 Loot Algorithm: Independent Probability Checks

5 Loot Table 4

Element 0
6 Loot Item: DemoSword (Loot Item)
7 Chance: 0.01

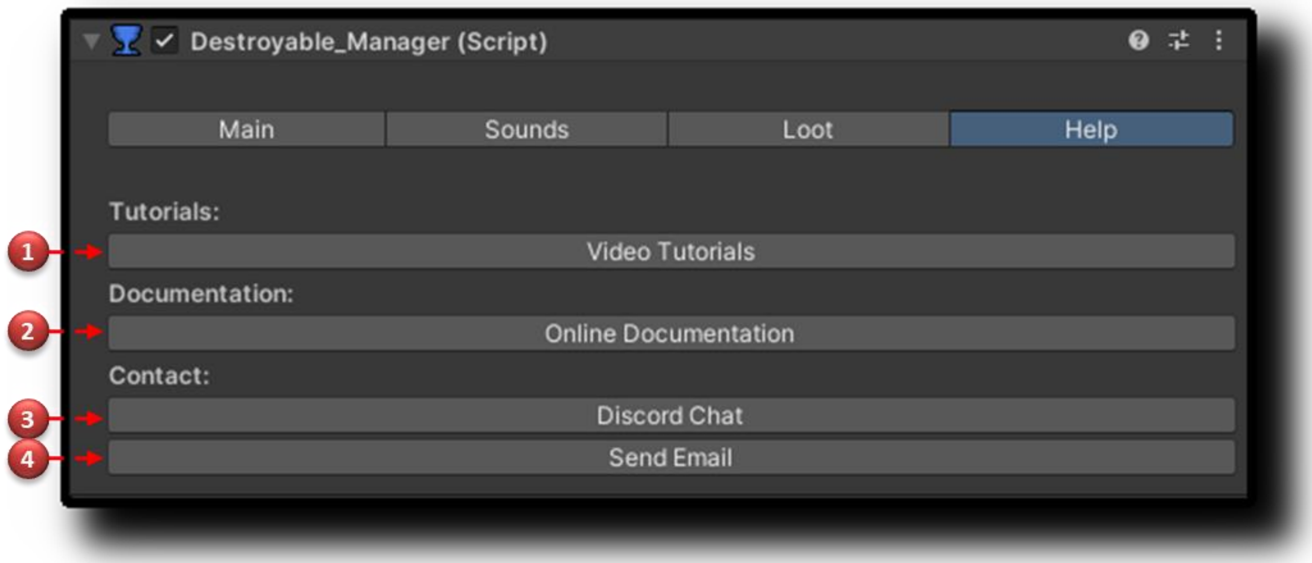
Element 1
Loot Item: DemoGoldOre (Loot Item)
Chance: 0.5

Element 2
Loot Item: DemoIronOre (Loot Item)
Chance: 0.75

Element 3
Loot Item: DemoOnion (Loot Item)
Chance: 1

1	Drop Loot	When enabled, damaged items will spawn loot GameObject according to User defined 'Loot Table'.
2	Spread Loot	When enabled, loot prefabs will be spawned around the destroyed item within the declared radius.
3	Spread Radius	Define the radius for spreading the loot.
4	Loot Algorithm	Choose the Loot Algorithm. Independent Probability Checks or Roulette Wheel Selection.
5	**Loot Table**	Define the Loot Table by choosing prepared 'LootItems' ScriptableObjects and setting the 'Chance' for dropping them.
6	Loot Item	Assign Loot Item ScriptableObjects as item which will be droped.
7	Chance	Define Chance of dropping item.

Help Tab Description



1	Video Tutorials	When clicked, hyperlink to YouTube playlist will be activated.
2	Online Documentation	When clicked, hyperlink to Github manual file will be activated.
3	Discord Chat	When clicked, hyperlink to CatBorg discord channel will be activated.
4	Send Email	When clicked, create email window will pop up.

(Enum) Collision Condition Type

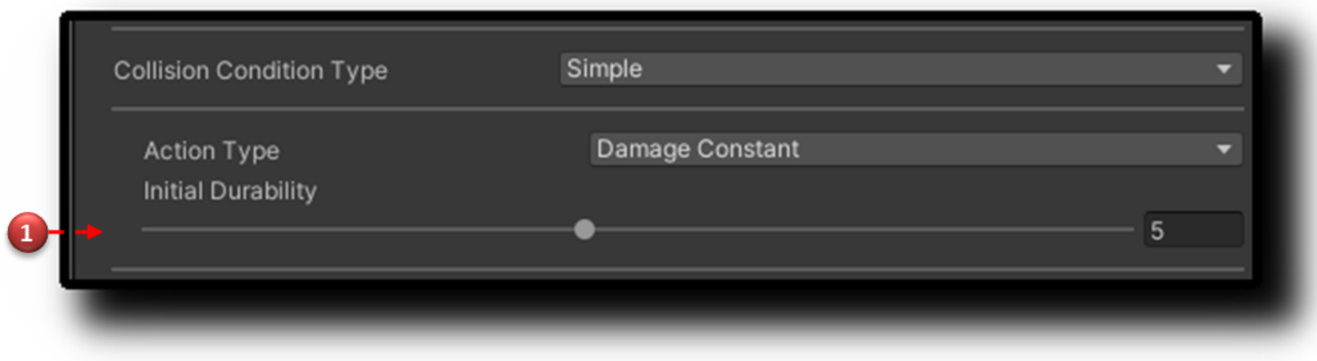
The Collision Condition Type enum defines the behavior of an item when a collision occurs, specifically during the OnCollisionEnter event. It provides several options to control how collisions are handled based on tag comparisons:

- **None:** No action will be taken when a collision occurs. This option effectively disables collision handling for the item.
- **Simple:** No tag check will be conducted. Any collision will trigger the chosen ActionType.
- **Single_Tag_Comparison:** A single tag is required during OnCollisionEnter. If the tag of the colliding object matches the specified tag, the chosen ActionType will be executed.
- **Multiple_Tag_Comparison:** Multiple tags are required during OnCollisionEnter. If the tag of the colliding object matches any of the specified tags, the chosen ActionType will be executed.

(Enum) Action Type

The ActionType enum defines various actions that can be executed based on specific conditions in a game environment. Each ActionType offers distinct functionality to enhance gameplay dynamics.

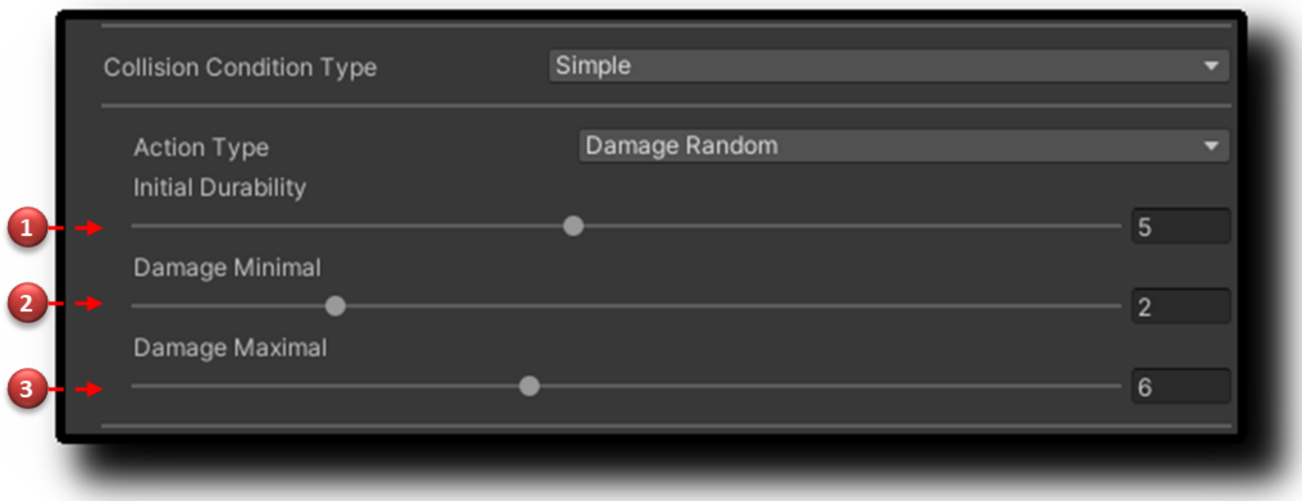
- **Destroy:** This action immediately removes an object from the scene upon meeting specified conditions. It's useful for scenarios where objects need to disappear or be eliminated upon collision.
- **DamageConstant:** This action inflicts a consistent amount of damage to affected objects or entities. It provides predictable outcomes for game mechanics involving health reduction or durability reduction.



Collision Condition Type: Simple
Action Type: Damage Constant
Initial Durability: 5

1	Initial Durability	Allows setting the initial value of 'Item Durability'. This value functions similarly to health points for game characters; when it reaches 0, the item will break into parts.

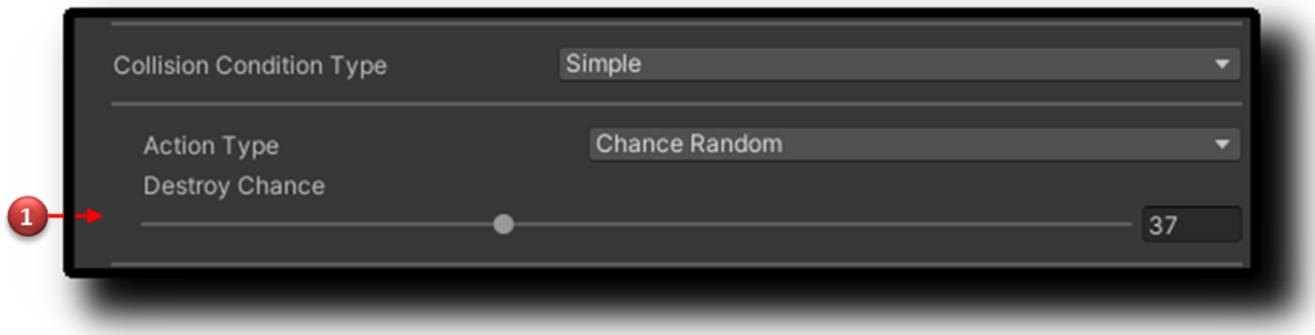
- **DamageRandom:** This action introduces variability by inflicting random amounts of damage within a specified range. It adds unpredictability to gameplay, making each encounter or collision unique in its consequences.



Collision Condition Type: Simple
Action Type: Damage Random
Initial Durability: 5
Damage Minimal: 2
Damage Maximal: 6

1	Initial Durability	Allows setting the initial value of 'Item Durability'. This value functions similarly to health points for game characters; when it reaches 0, the item will break into parts.
2	Damage Minimal	Specifies the minimum amount of damage subtracted from 'Item Durability' with each hit or trigger
3	Damage Maximal	Specifies the maximum amount of damage subtracted from 'Item Durability' with each hit or trigger

- **ChanceRandom:** This action introduces a probabilistic element where outcomes are determined based on chance. It allows for scenarios where the success or failure of an action is influenced by probability, adding a layer of risk and reward to gameplay decisions.


Collision Condition Type: Simple
Action Type: Chance Random
Destroy Chance: 37

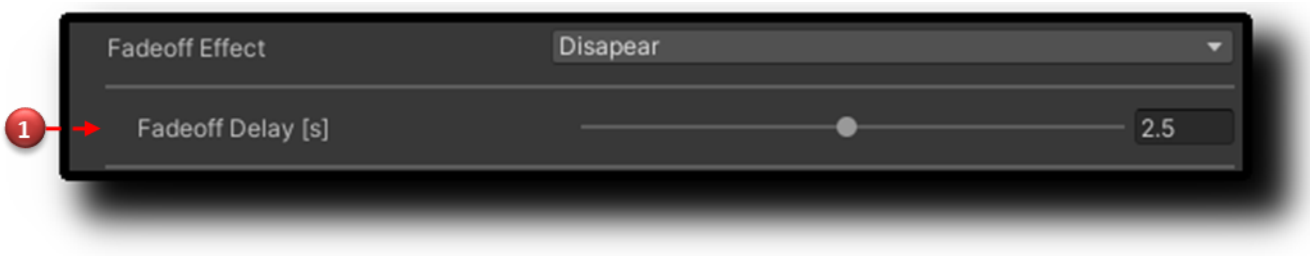
1	Destroy Chance	Allows setting the 'Destroy Chance' value, which ranges from 1 to 100. A value of 100 ensures the item will definitely fall apart when triggered.

These ActionType options are designed to be flexible and adaptable, allowing game developers to create diverse and engaging interactions based on collision conditions specified using the Collision Condition Type enum.

(Enum) FadeOff Effect

The FadeOffEffect enum provides options for visual effects that occur after an item falls to pieces in a game environment. Each FadeOffEffect option enhances the visual feedback and realism of the destruction process.

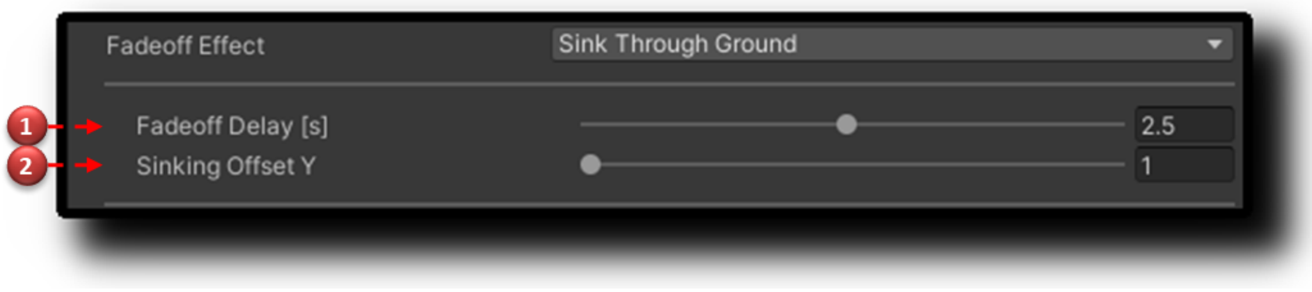
- **None:** No additional visual effect will occur after the item is destroyed. This option is suitable for scenarios where the destroyed object remains on the ground in pieces, contributing to environmental detail.
- **Disappear:** The destroyed item is instantly removed from the world after a user-defined amount of time. This option offers a quick and clean removal of the destroyed object, streamlining gameplay and visual continuity.


Fadeoff Effect: Disapear

1 Fadeoff Delay [s]: 2.5

1	Fadeoff Delay [s]	Allows setting the amount of time in seconds after which each FadeOffEffect will be executed.

- **SinkThroughGround:** The destroyed item sinks through the ground or platform after falling to pieces. This effect adds a dynamic element to the destruction sequence, providing a visual conclusion to the interaction and enhancing realism.


Fadeoff Effect: Sink Through Ground

1 Fadeoff Delay [s]: 2.5

2 Sinking Offset Y: 1

1	Fadeoff Delay [s]	Allows setting the amount of time in seconds after which each FadeOffEffect will be executed.
2	Sinking Offset Y	Allows setting the distance of sinking which will occure during 'FadeOffEffect' execution.

These FadeOffEffect options enable game developers to tailor the post-destruction visual experience, ensuring that the game environment reacts realistically and engagingly to interactions and events within the game world. Each option serves a distinct purpose in enhancing gameplay immersion and visual storytelling.

(Scriptable Objects) Loot Item

Description

Contains a reference to an Item GameObject Prefab, which defines the visual and functional representation of the loot item in the game. This Scriptable Object can be used to add an unlimited amount of user data, such as the item's name, amount, description, rarity, and any special properties or behaviors it may have when spawned.

Creation

To add a new Loot Item Scriptable Object in Unity, follow these steps:

1. Navigate to the **Project Window**: In the Unity Editor, go to the Project Window where your assets are displayed.
2. Create a New Loot Item: Right-click in the Project window, then select **Create** from the context menu. Navigate to **ScriptableObjects** and then select **LootItem**. This will create a new Loot Item Scriptable Object.
3. **Name Your Loot Item**: You will be prompted to name your new Loot Item Scriptable Object. Enter a descriptive name, such as "Excalibur".
4. Configure the Loot Item: Select the newly created Loot Item in the Project window to view its properties in the Inspector. Currently here, you can only assign GameObject prefab reference if willing to configure various attributes, such as the item's name, amount, description, rarity, check out and edit LootItem.cs.

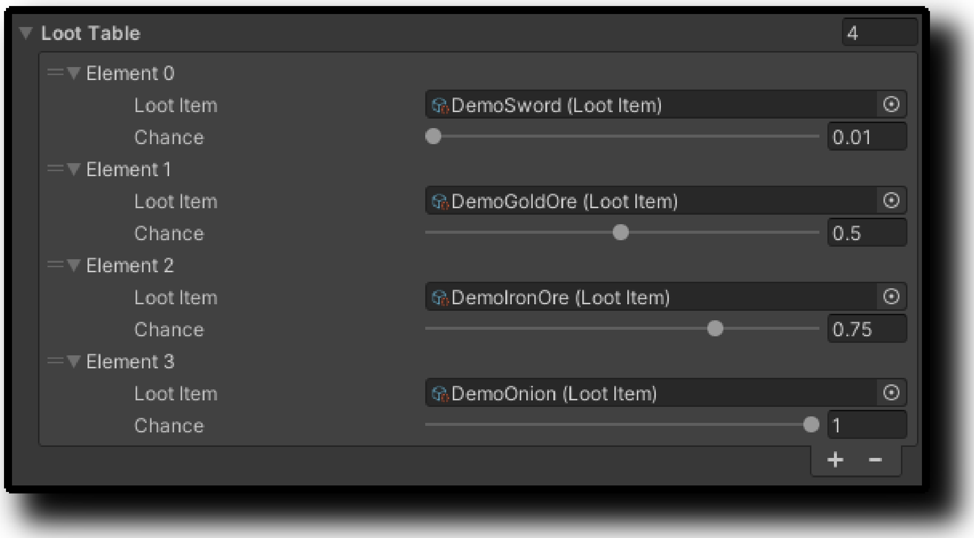
(Loot Algorithm) Independent Probability Checks

Description

This algorithm evaluates each element in the Loot Table individually. For each element, the algorithm performs a random check using the following condition:

Random.Range(0,100) < Chance

If the condition is met, the loot item is added to the spawned loot list.



Loot Table 4
Element 0
Loot Item DemoSword (Loot Item)
Chance 0.01
Element 1
Loot Item DemoGoldOre (Loot Item)
Chance 0.5
Element 2
Loot Item DemoIronOre (Loot Item)
Chance 0.75
Element 3
Loot Item DemoOnion (Loot Item)
Chance 1

Example

Let's conduct **theoretical** loot table cast according to Independent Probability Checks.

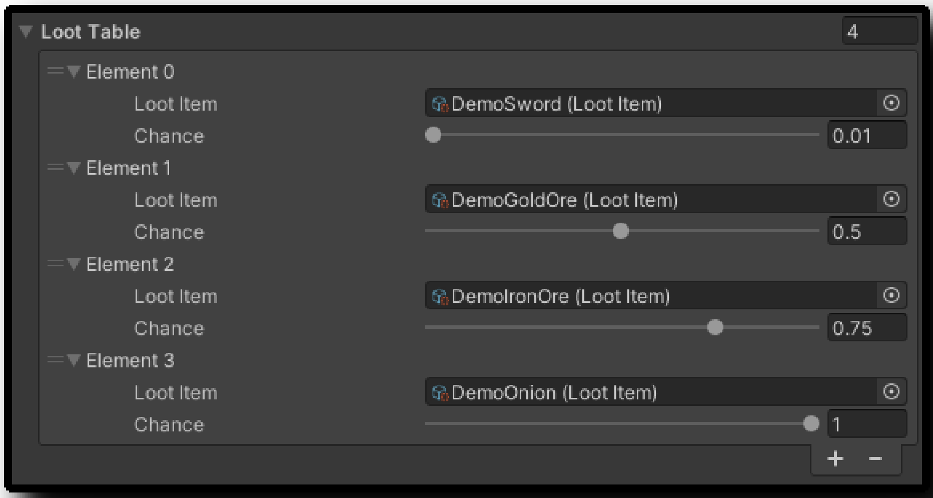
1. **Loot Item "Demosword":** Random.Range(0, 1) resulted in 0.5. Since 0.5 is higher than the Chance (0.01), the item **will not be added** to the spawned loot list.
2. **Loot Item "DemoGoldOre":** Random.Range(0, 1) resulted in 0.27. Since 0.27 is smaller than the Chance (0.5), the item **will be added** to the spawned loot list.
3. **Loot Item "DemoIronOre":** Random.Range(0, 1) resulted in 0.89. Since 0.89 is higher than the Chance (0.75), the item **will not be added** to the spawned loot list.
4. **Loot Item "DemoOnion":** Random.Range(0, 1) resulted in 0.07. Since 0.07 is smaller than the Chance (1), the item **will be added** to the spawned loot list.

As a result of above **theoretical** cast, 2 items will be spawned.

(Loot Algorithm) Roulette Wheel Selection,

Description

This algorithm assigns each element in the Loot Table a segment on a roulette wheel based on its Chance value. A single random number is generated to determine which segment is selected. The item corresponding to the selected segment is added to the spawned loot list. The process ensures that items with higher chances occupy larger segments, increasing their likelihood of being selected.



Loot Table 4

Element 0		
Loot Item	DemoSword (Loot Item)	
Chance		0.01
Element 1		
Loot Item	DemoGoldOre (Loot Item)	
Chance		0.5
Element 2		
Loot Item	DemoIronOre (Loot Item)	
Chance		0.75
Element 3		
Loot Item	DemoOnion (Loot Item)	
Chance		1

Example

Let’s conduct **theoretical** loot table cast according to Independent Probability Checks.

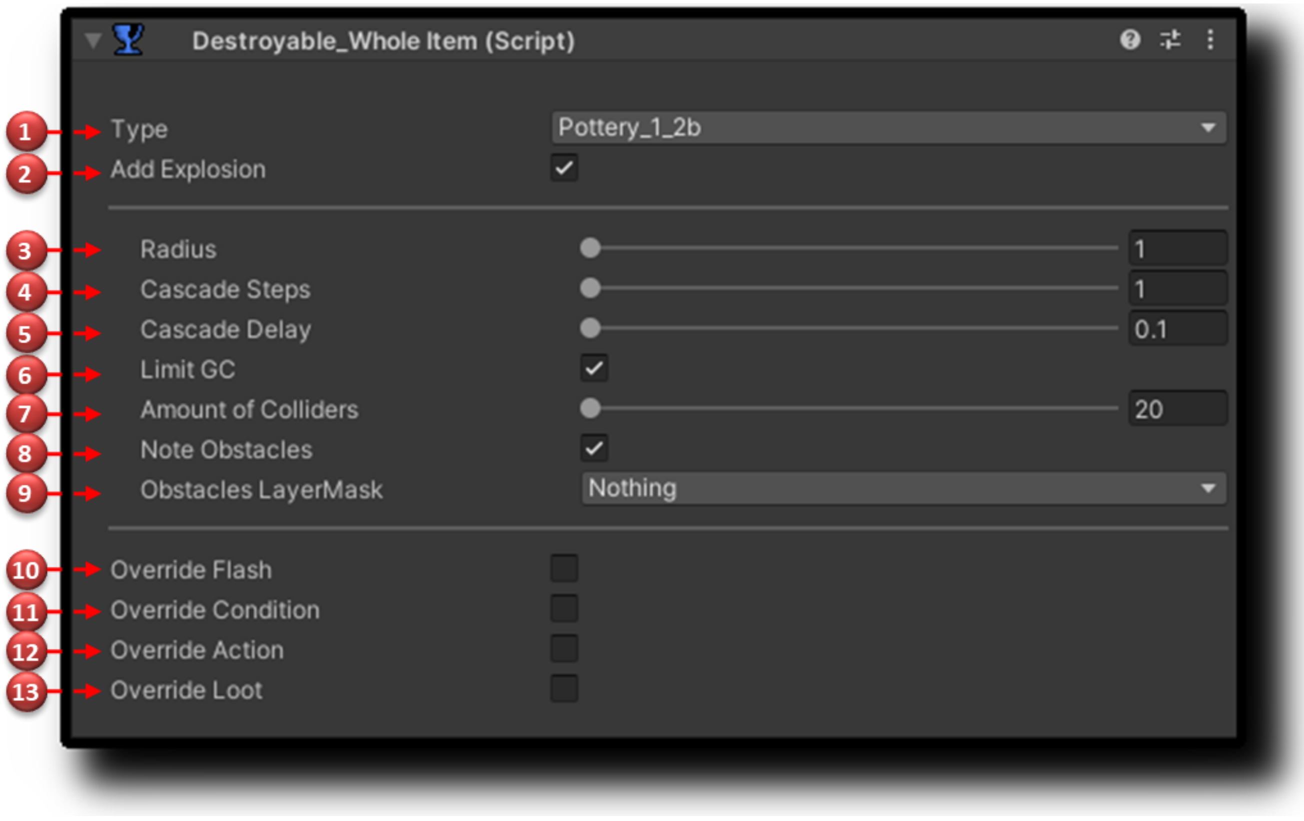
1. The algorithm calculates the total weight (sum of all Chance values): 0.01 + 0.5 + 0.75 + 1 = 2.26.
2. A random number between 0 and 2.26 is generated, e.g., 1.3.
3. The algorithm iterates through the Loot Table, summing the Chance values until the sum exceeds the random number:
   - **Loot Item** "**Demosword**" segment: 0 to 0.01
   - **Loot Item** "**DemoGoldOre**" segment: 0.01 to 0.51
   - **Loot Item** "**DemoIronOre**" segment: 0.51 to 1.26
   - **Loot Item** "**DemoOnion**" segment: 1.26 to 2.26
4. Since the random number (1.3) falls within the "**DemoOnion**" segment (1.26 to 2.26), "**DemoOnion**" is selected and added to the spawned loot list.

As a result of above **theoretical** cast, **always only one** item will be spawned.

Destroyable_WholeItem

Description

Each of breakable items had Destroybale_WholeItem Component attached. When items are added to your scene, all of above settings can be used **except for (1) Type, which** `should not be changed!`



Destroyable_Whole Item (Script)

1 Type: Pottery_1_2b
2 Add Explosion: ✓
3 Radius: 1
4 Cascade Steps: 1
5 Cascade Delay: 0.1
6 Limit GC: ✓
7 Amount of Colliders: 20
8 Note Obstacles: ✓
9 Obstacles LayerMask: Nothing
10 Override Flash
11 Override Condition
12 Override Action
13 Override Loot

1	Type	This enum value directly references the prefab stored in the Destroyable Manager and should not be changed!
2	Add Explosion	When enabled, the item, after being destroyed, will cast a 'destruction wave' around it. The wave will have the declared Radius, Cascade Steps count, and time delay between Cascades.
3	Radius	Allows setup of the explosion radius.
4	Cascade Steps	Allows setup of the number of steps in the explosion. If the explosion 'Radius' equals 10, and 'Cascade Steps' equals 2, in the first step all items in the range of 0-5 will be destroyed, followed by items in the range of 5-10 from the explosion center during the second step.
5	Cascade Delay [s]	Allows setup of the time delay between each cascade.
6	Limit GC	When enabled, there will be a single memory allocation with a limited number of hit items. This setting should be used with 'Object Pooling'.
7	Amount of Colliders	Allows choosing the number of colliders hit during the item explosion. When not using a designated

		layerMask for Breakable items, this value should be higher.
8	Note Obstacles	When enabled, the exploded item's 'wave' will not penetrate/pass through items of 'Obstacle LayerMask'.
9	Obstacles LayerMask	Allows choosing the LayerMask of objects that will block the exploded item's 'wave'.
10	Override Flash	When enabled, this will change the DestroyableManager setting of 'Use Flash'.
11	Override Condition	When enabled, destroyed items will flash for a short amount of time.
12	Override Action	When enabled, this will change the DestroyableManager setting of 'Collision Condition Type'.
13	Override Loot	When enabled, this will change the DestroyableManager setting of 'Use Loot'.

Troubleshooting

Pink Items Issue

The 3D Breakables Lowpoly Pack **was created by default for URP projects**. This issue could occur when **using the asset with the Built-In Render Pipeline** and the asset still tries to use URP shaders. To resolve this, we need to change the shader in the asset materials and assign the Albedo texture for Material MK2.

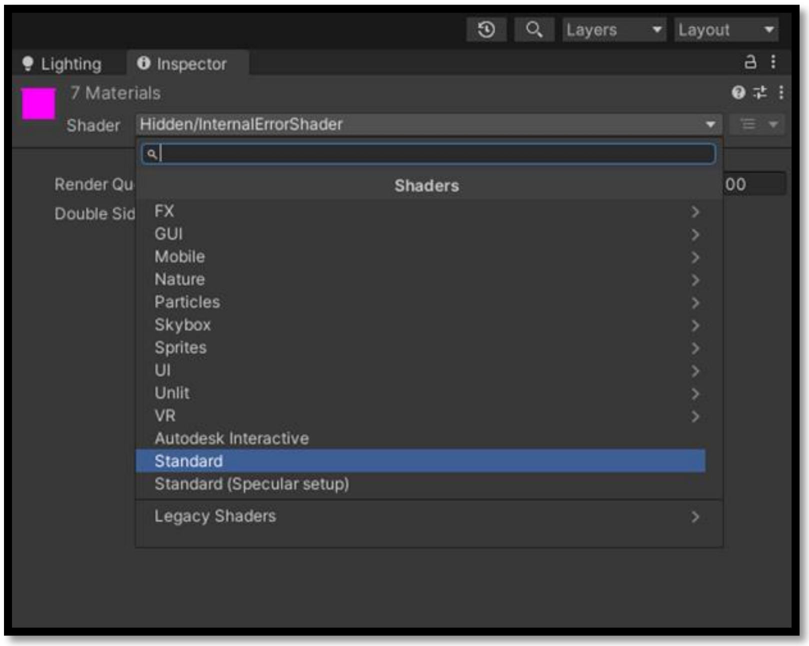
Solving Pink Items Issue

Step 1:

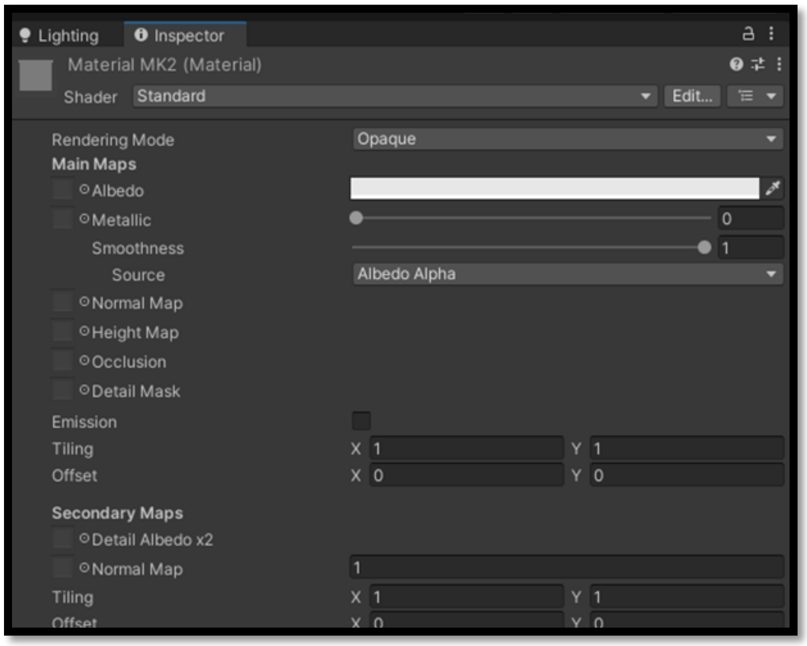
- Go to 3D Pottery Lowpoly Pack → Materials

Step 2:

- Select **All** materials;
- In Materials Properties chose Shader → Standard;



- Select material "**Material MK2**";



Lighting | Inspector

Material MK2 (Material)

Shader: Standard | Edit...

Rendering Mode: Opaque

Main Maps
- Albedo
- Metallic: 0
- Smoothness: 1
- Source: Albedo Alpha
- Normal Map
- Height Map
- Occlusion
- Detail Mask

Emission

Tiling: X 1, Y 1

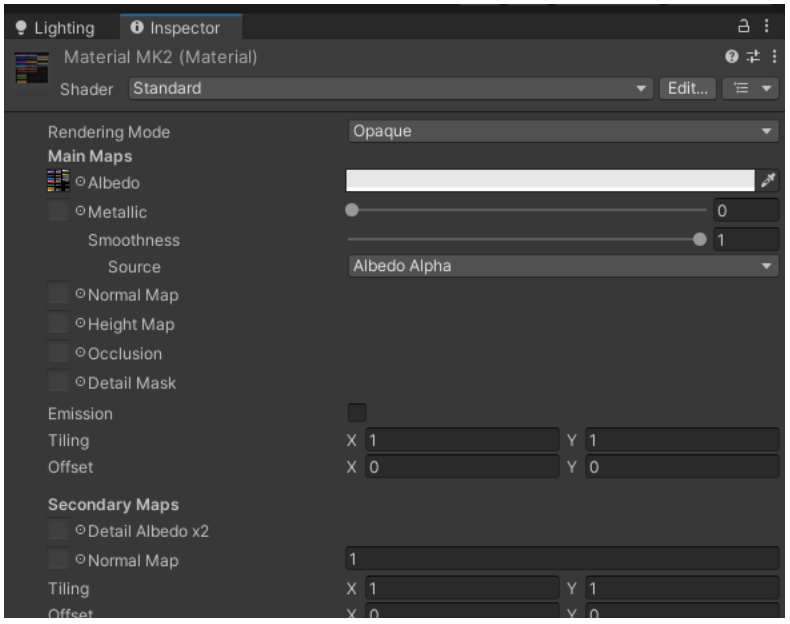
Offset: X 0, Y 0

Secondary Maps
- Detail Albedo x2
- Normal Map: 1

Tiling: X 1, Y 1

Offset: X 0, Y 0

- Go to 3D Pottery Lowpoly Pack → Textures;
- Drag drop CatBorg_Pallete_MK_1_1.png to Albedo properties inside **Material MK2** inspector properties;



Lighting | Inspector

Material MK2 (Material)

Shader: Standard | Edit...

Rendering Mode: Opaque

Main Maps
- Albedo
- Metallic: 0
- Smoothness: 1
- Source: Albedo Alpha
- Normal Map
- Height Map
- Occlusion
- Detail Mask

Emission

Tiling: X 1, Y 1

Offset: X 0, Y 0

Secondary Maps
- Detail Albedo x2
- Normal Map: 1

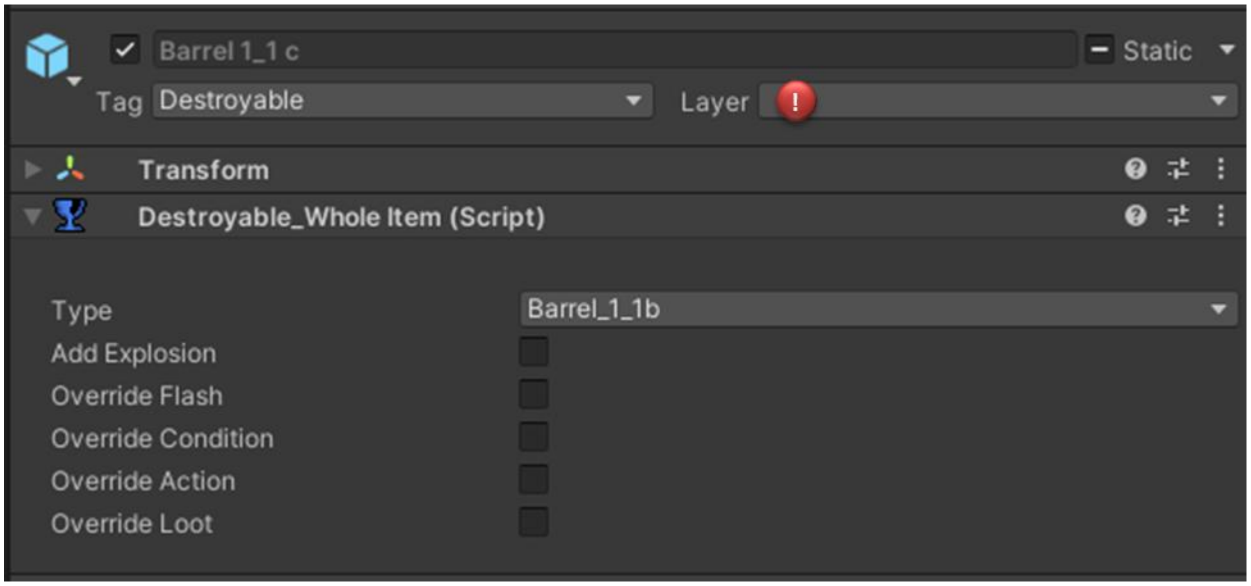
Tiling: X 1, Y 1

Offset: X 0, Y 0

Congratulations you manage to solve the issue!

Physics Issue

The 3D Breakables Lowpoly Pack had a separate layer dedicated to all of the prefabs. Unfortunately, when importing assets into Unity, all of the layer names are overwritten by your project settings (this is **not** a bug but a **smart feature to prevent assets from breaking your projects**). When you inspect prefabs in "02 Items Breakable" and "03 Items In Pieces" you can see nothing under the Layer drop-down selection.



Type: Barrel_1_1b
Add Explosion
Override Flash
Override Condition
Override Action
Override Loot

Q: Is this an issue if nothing is displayed as Layer in prefabs?

A: Although nothing is displayed, all prefabs are still assigned to Layer 31; we're only missing a name. To change the name of the layer, click the Layer drop-down selection (indicated with a red dot above) and choose "Add Layer." Change the layer name of "User Layer 31" to "Breakables" (as shown in the picture here).

Q: Why Layer 31?

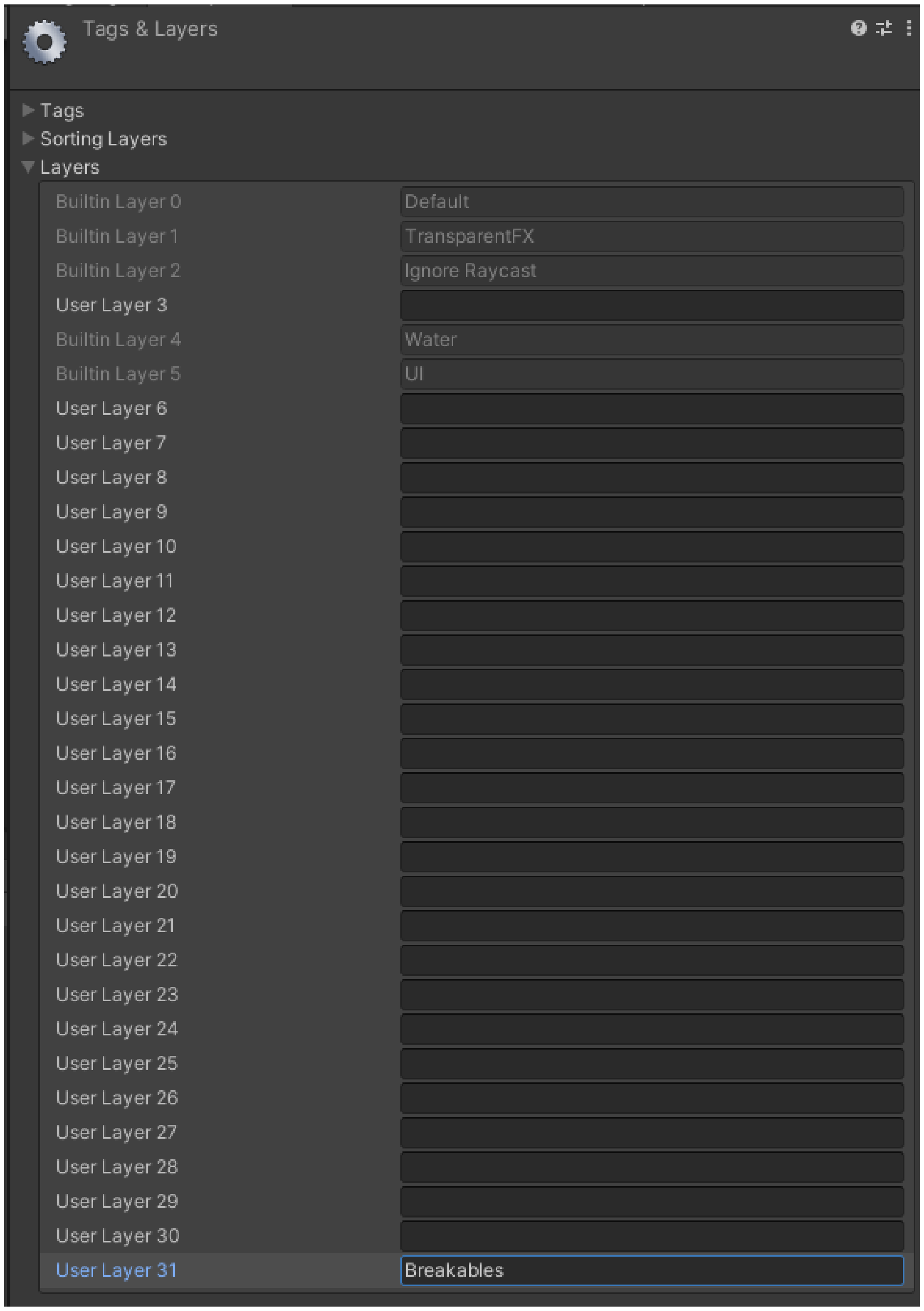
A: This is to make integration with your project easier. Most users build projects using layers from the lowest to the highest numbers, so the probability that Layer 31 will already be used is the lowest.

Q: Why a separate Layer for Breakable prefabs?

A: This setup is used to limit the amount of physics interactions, resulting in a reduction of script calls. This type of setup allows for better performance. Remember to declare/check interactions between physics layers in your "Project Settings → Physics."

Q: In my project, instead of nothing, there is an XXXXXXXX Layer. Is this an issue?

A: Most of the issues with the asset that required assistance from my side occurred because of this. Users had some layers already declared with interactions between the rest of the physics layers. As a result, some interactions acted weirdly (e.g., falling through the ground or ignoring hits from melee weapons). If Layer 31 is already occupied in your project, you can always declare a new layer and assign all prefabs from "02 Items Breakable" and "03 Items In Pieces" to it.



Builtin Layer 0	Default
Builtin Layer 1	TransparentFX
Builtin Layer 2	Ignore Raycast
User Layer 3	
Builtin Layer 4	Water
Builtin Layer 5	UI
User Layer 6	
User Layer 7	
User Layer 8	
User Layer 9	
User Layer 10	
User Layer 11	
User Layer 12	
User Layer 13	
User Layer 14	
User Layer 15	
User Layer 16	
User Layer 17	
User Layer 18	
User Layer 19	
User Layer 20	
User Layer 21	
User Layer 22	
User Layer 23	
User Layer 24	
User Layer 25	
User Layer 26	
User Layer 27	
User Layer 28	
User Layer 29	
User Layer 30	
User Layer 31	Breakables