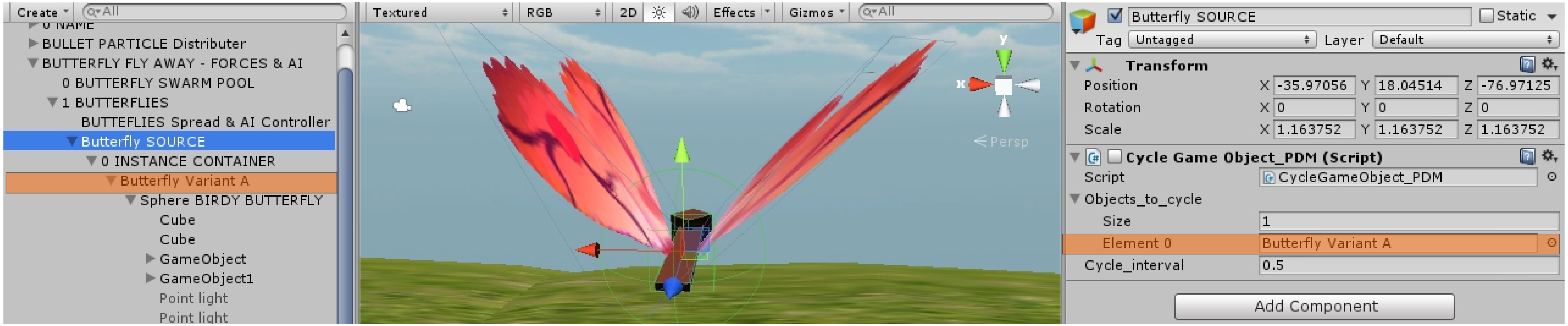
Particle Dynamic Magic v2.0

STEP By STEP GUIDE

1. Create the AI agent that will be spread on the map and cast spells on targets. In this sample a butterfly is used. It is possible to vary the spread items by using the “Cycle Game objects” script shown below and assign more butterfly variants to cycle through while spreading them. All variants must be disabled at the game start. Set cycle interval to a low enough number so the variants may change fast enough before the spreading of agents is over.

The agent may be any item and contain lights and other scripts and will be spread using gameobject particles with the Propagation/Painting system.



0 NAME
▶ BULLET PARTICLE Distributer
▼ BUTTERFLY FLY AWAY - FORCES & AI
0 BUTTERFLY SWARM POOL
▼ 1 BUTTERFLIES
BUTTEFLIES Spread & AI Controller
▼ Butterfly SOURCE
▼ 0 INSTANCE CONTAINER
▼ Butterfly Variant A
▼ Sphere BIRDY BUTTERFLY
Cube
Cube
▶ GameObject
▶ GameObject1
Point light
Point light

☑ Butterfly SOURCE ☐ Static

Tag Untagged Layer Default

▼ Transform

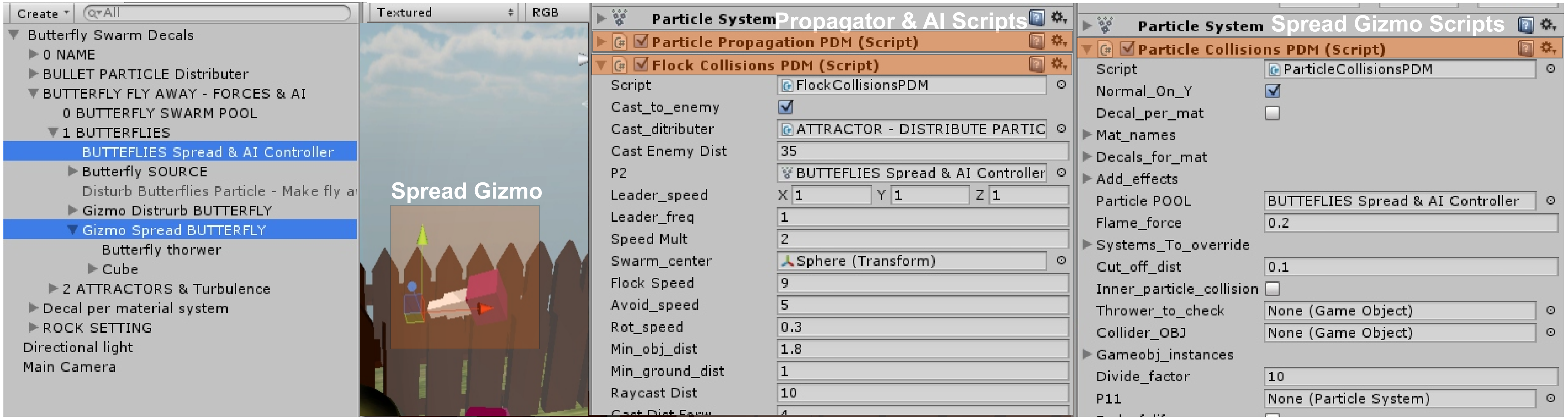
Position	X -35.97056	Y 18.04514	Z -76.97125
Rotation	X 0	Y 0	Z 0
Scale	X 1.163752	Y 1.163752	Z 1.163752

▼ ☐ Cycle Game Object_PDM (Script)

Script	CycleGameObject_PDM
▼ Objects_to_cycle	
Size	1
Element 0	Butterfly Variant A
Cycle_interval	0.5

Add Component

2. Create the Propagation system that will spread the gameobject particles. This requires a particle system and the Collisions script attached to that for the spreading and a particle pool with the Propagator script for controlling and registering the spread decals. Also the AI module will be attached to the latter in order to sense the environment for avoidance and enemies for spell casting from a single pool.



Spread Gizmo

Propagator & AI Scripts

Spread Gizmo Scripts

▼ Butterfly Swarm Decals
▶ 0 NAME
▶ BULLET PARTICLE Distributer
▼ BUTTERFLY FLY AWAY - FORCES & AI
0 BUTTERFLY SWARM POOL
▼ 1 BUTTERFLIES
BUTTEFLIES Spread & AI Controller
▶ Butterfly SOURCE
Disturb Butterflies Particle - Make fly a
▶ Gizmo Distrurb BUTTERFLY
▼ Gizmo Spread BUTTERFLY
Butterfly thorwer
▶ Cube
▶ 2 ATTRACTORS & Turbulence
▶ Decal per material system
▶ ROCK SETTING
Directional light
Main Camera

▶ Particle System

▶ ☑ Particle Propagation PDM (Script)

▼ ☑ Flock Collisions PDM (Script)

Script	FlockCollisionsPDM
Cast_to_enemy	☑
Cast_ditributer	ATTRACTOR - DISTRIBUTE PARTIC
Cast Enemy Dist	35
P2	BUTTEFLIES Spread & AI Controller
Leader_speed	X 1 Y 1 Z 1
Leader_freq	1
Speed Mult	2
Swarm_center	Sphere (Transform)
Flock Speed	9
Avoid_speed	5
Rot_speed	0.3
Min_obj_dist	1.8
Min_ground_dist	1
Raycast Dist	10
Cast Dist Farw	4

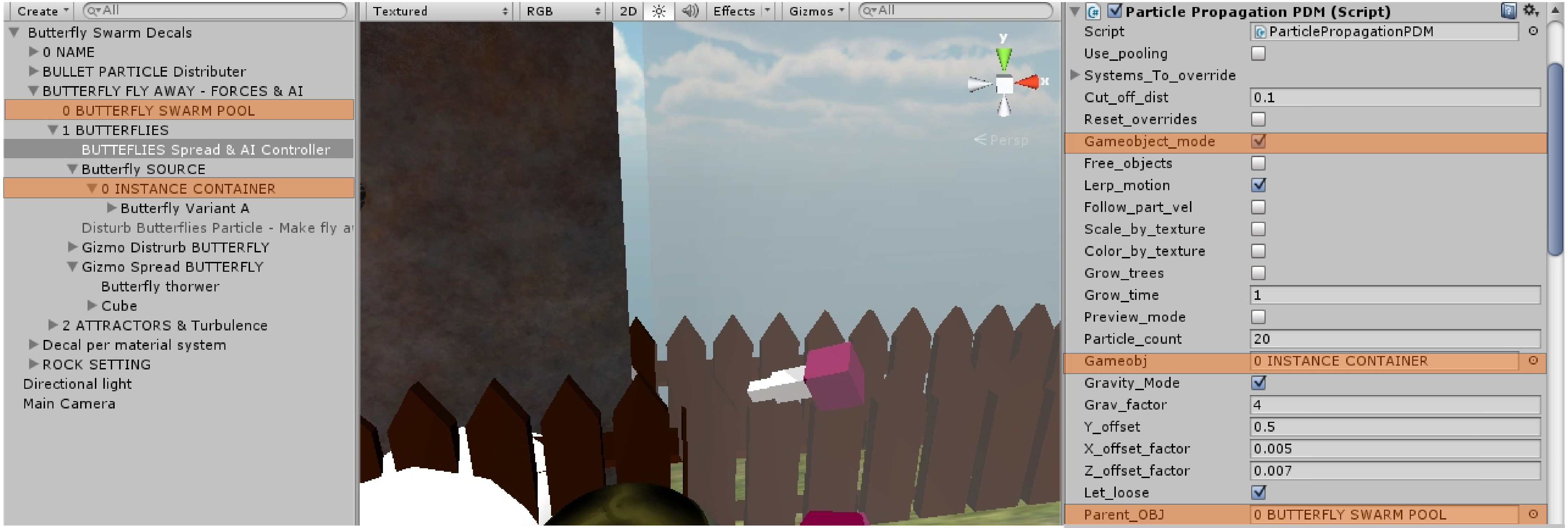
▶ Particle System

▼ ☑ Particle Collisions PDM (Script)

Script	ParticleCollisionsPDM
Normal_On_Y	☑
Decal_per_mat	☐
▶ Mat_names	
▶ Decals_for_mat	
▶ Add_effects	
Particle POOL	BUTTEFLIES Spread & AI Controller
Flame_force	0.2
▶ Systems_To_override	
Cut_off_dist	0.1
Inner_particle_collision	☐
Thrower_to_check	None (Game Object)
Collider_OBJ	None (Game Object)
▶ Gameobj_instances	
Divide_factor	10
P11	None (Particle System)

3. Setup the Propagator script, by using the Gameobject mode and inserting the Pool Object to use as a holder for the instantiated agents and the agent item. The reason why we don't put the Buttefly directly as agent and use a Container, is because we need the container to hold all variants if the variation cycling is used, with one of the varieties enabled for each container, using the cycle script of step one. Make sure that the holder pool is scaled at (1,1,1) & not moving.

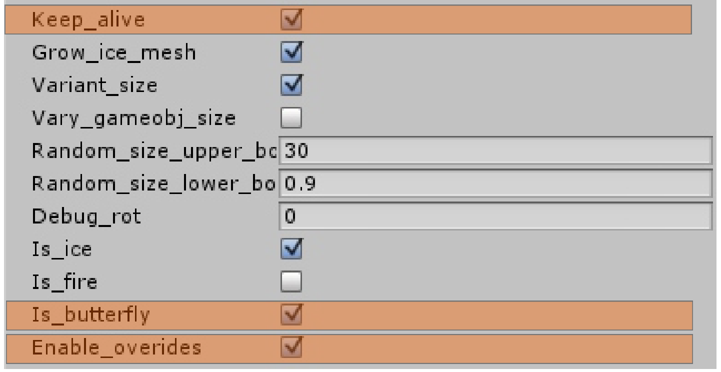
Now the system is ready to spread the gameobject particles defined in Gameobj parameter using any caster particle linked to this Propagator system.



```
Butterfly Swarm Decals
  0 NAME
  BULLET PARTICLE Distributer
  BUTTERFLY FLY AWAY - FORCES & AI
    0 BUTTERFLY SWARM POOL
    1 BUTTERFLIES
      BUTTEFLIES Spread & AI Controller
      Butterfly SOURCE
        0 INSTANCE CONTAINER
          Butterfly Variant A
      Disturb Butterflies Particle - Make fly a
      Gizmo Distrurb BUTTERFLY
      Gizmo Spread BUTTERFLY
        Butterfly thorwer
        Cube
    2 ATTRACTORS & Turbulence
  Decal per material system
  ROCK SETTING
Directional light
Main Camera
```

Particle Propagation PDM (Script)

Script	ParticlePropagationPDM
Use_pooling	☐
Systems_To_override	
Cut_off_dist	0.1
Reset_overrides	☐
Gameobject_mode	☑
Free_objects	☐
Lerp_motion	☑
Follow_part_vel	☐
Scale_by_texture	☐
Color_by_texture	☐
Grow_trees	☐
Grow_time	1
Preview_mode	☐
Particle_count	20
Gameobj	0 INSTANCE CONTAINER
Gravity_Mode	☑
Grav_factor	4
Y_offset	0.5
X_offset_factor	0.005
Z_offset_factor	0.007
Let_loose	☑
Parent_OBJ	0 BUTTERFLY SWARM POOL
Keep_alive	☑
Grow_ice_mesh	☑
Variant_size	☑
Vary_gameobj_size	☐
Random_size_upper_bc	30
Random_size_lower_bo	0.9
Debug_rot	0
Is_ice	☑
Is_fire	☐
Is_butterfly	☑
Enable_overides	☑

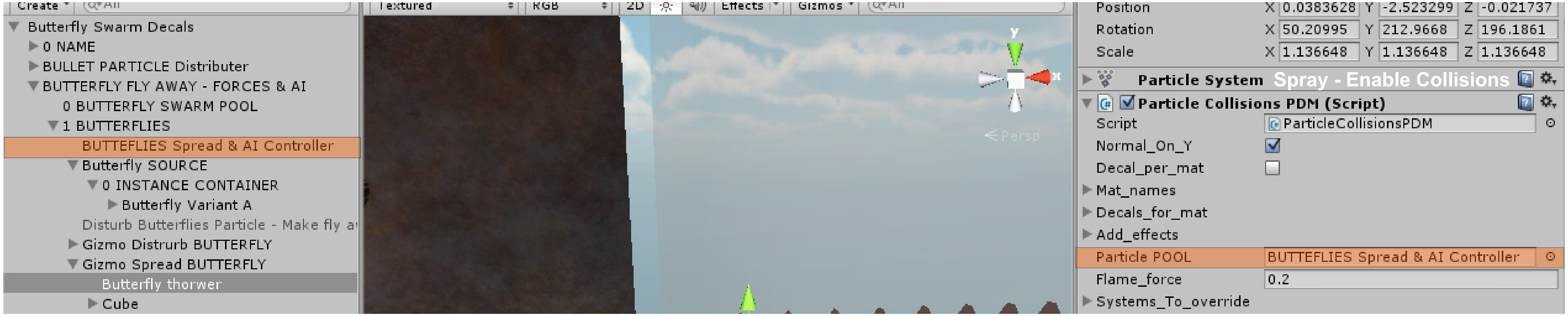


The Propagator in this sample will use the Gravity option to initially have the spread butterflies locked to the ground and a disturb particle system (same setup as this Propagator, but will Disturb properties) will be used to Override the gravity property and have them take to the air in the collisions spots locally.

Other parameters used is the Keep Alive mode that will stop emission after a specified number and hold gameobjects and particles alive, plus the Butterfly option and Local Overrides option to allow the Disturb system make the butterflies change their gravity locally.

Also note that the Particle System attached to the Propagator may have its Renderer disabled if it is not required to be shown together with the gameobject particles. In this sample it is disabled.

4. Setup the particle that will spread the gameobject particles by linking it to the Butterfly Decal Propagator pool system described in step 3. Using the advanced collisions the system will register a Butterfly Decal (gameobject particle) to each collision position. **The Shuriken must have collisions enabled** and it is possible to use the layer masks to control where the decals will be spread. There is also a per material system to control both decal placement and variety in a single collisions script and will be detailed in the bullet decal spread section.



Butterfly Swarm Decals
- 0 NAME
- BULLET PARTICLE Distributer
- BUTTERFLY FLY AWAY - FORCES & AI
  - 0 BUTTERFLY SWARM POOL
  - 1 BUTTEFLIES
    - BUTTEFLIES Spread & AI Controller
    - Butterfly SOURCE
      - 0 INSTANCE CONTAINER
        - Butterfly Variant A
    - Disturb Butterflies Particle - Make fly a
    - Gizmo Distrurb BUTTERFLY
    - Gizmo Spread BUTTERFLY
      - Butterfly thorwer
      - Cube

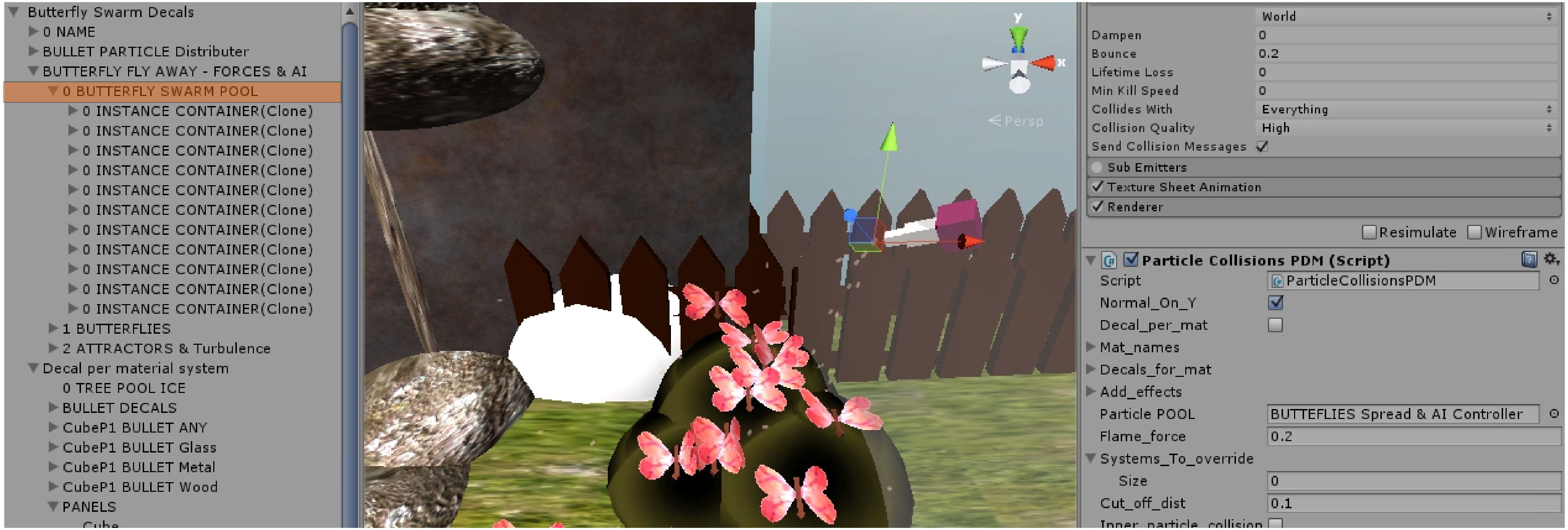
Position	X	0.0383628	Y	-2.523299	Z	-0.021737
Rotation	X	50.20995	Y	212.9668	Z	196.1861
Scale	X	1.136648	Y	1.136648	Z	1.136648

Particle System **Spray - Enable Collisions**

☑ Particle Collisions PDM (Script)

Script	ParticleCollisionsPDM
Normal_On_Y	☑
Decal_per_mat	□
Mat_names	
Decals_for_mat	
Add_effects	
Particle POOL	BUTTEFLIES Spread & AI Controller
Flame_force	0.2
Systems_To_override	

5. Test the setup by entering play mode. The spray will create butterflies on the ground upon collision and they will remain there due to the high gravity setting in the Propagator that makes them return to their initial spread position. We can see that the pool is now filled with the instantiated Butterflies.



Butterfly Swarm Decals
- 0 NAME
- BULLET PARTICLE Distributer
- BUTTERFLY FLY AWAY - FORCES & AI
  - 0 BUTTERFLY SWARM POOL
    - 0 INSTANCE CONTAINER(Clone)
    - 0 INSTANCE CONTAINER(Clone)
    - 0 INSTANCE CONTAINER(Clone)
    - 0 INSTANCE CONTAINER(Clone)
    - 0 INSTANCE CONTAINER(Clone)
    - 0 INSTANCE CONTAINER(Clone)
    - 0 INSTANCE CONTAINER(Clone)
    - 0 INSTANCE CONTAINER(Clone)
    - 0 INSTANCE CONTAINER(Clone)
    - 0 INSTANCE CONTAINER(Clone)
    - 0 INSTANCE CONTAINER(Clone)
  - 1 BUTTERFLIES
  - 2 ATTRACTORS & Turbulence
- Decal per material system
  - 0 TREE POOL ICE
  - BULLET DECALS
  - CubeP1 BULLET ANY
  - CubeP1 BULLET Glass
  - CubeP1 BULLET Metal
  - CubeP1 BULLET Wood
  - PANELS
    - Cube

	World
Dampen	0
Bounce	0.2
Lifetime Loss	0
Min Kill Speed	0
Collides With	Everything
Collision Quality	High
Send Collision Messages	✓

○ Sub Emitters

✓ Texture Sheet Animation

✓ Renderer

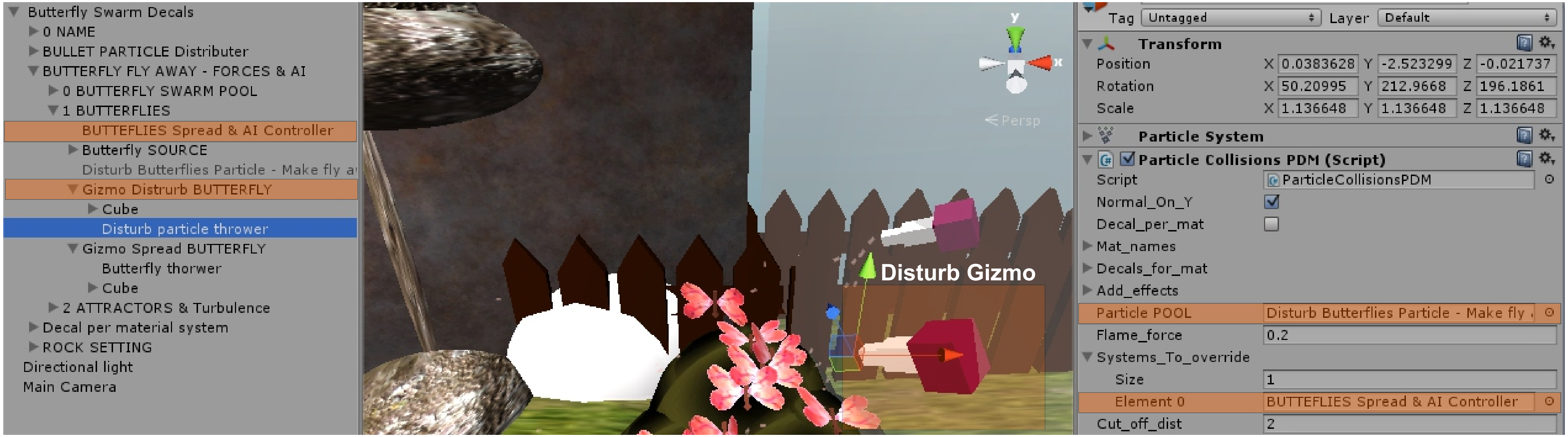
□ Resimulate □ Wireframe

☑ Particle Collisions PDM (Script)

Script	ParticleCollisionsPDM
Normal_On_Y	☑
Decal_per_mat	□
Mat_names	
Decals_for_mat	
Add_effects	
Particle POOL	BUTTEFLIES Spread & AI Controller
Flame_force	0.2
Systems_To_override	
Size	0
Cut_off_dist	0.1
Inner_particle_collision	□

6. Setup the particle that will disturb the Butterflies locally and make them take to the air by reducing their gravity per buttefly hit by this disturb system. The same technique is also used to melt ice with fire locally and for any other possible local override of the main Propagator system properties and functionality.

Place the butterfly Propagator system in the “Systems to Override” parameter so the system knows which Propagator to override and add the Disturb pool Propagator to the “Particle POOL” parameter. Note that this pool is needed to be active only when the items that will override the main Propagator need to be visible (e.g. fire that will melt the main system ice). In the butterflies case it may be disabled (but still must be linked to grab its Distrub properties).



```
▼ Butterfly Swarm Decals
  ▶ 0 NAME
  ▶ BULLET PARTICLE Distributer
  ▼ BUTTERFLY FLY AWAY - FORCES & AI
    ▶ 0 BUTTERFLY SWARM POOL
    ▼ 1 BUTTERFLIES
        BUTTEFLIES Spread & AI Controller
      ▶ Butterfly SOURCE
        Disturb Butterflies Particle - Make fly a
      ▼ Gizmo Distrurb BUTTERFLY
        ▶ Cube
          Disturb particle thrower
      ▼ Gizmo Spread BUTTERFLY
          Butterfly thorwer
        ▶ Cube
    ▶ 2 ATTRACTORS & Turbulence
  ▶ Decal per material system
  ▶ ROCK SETTING
  Directional light
  Main Camera
```

Tag Untagged Layer Default

Transform

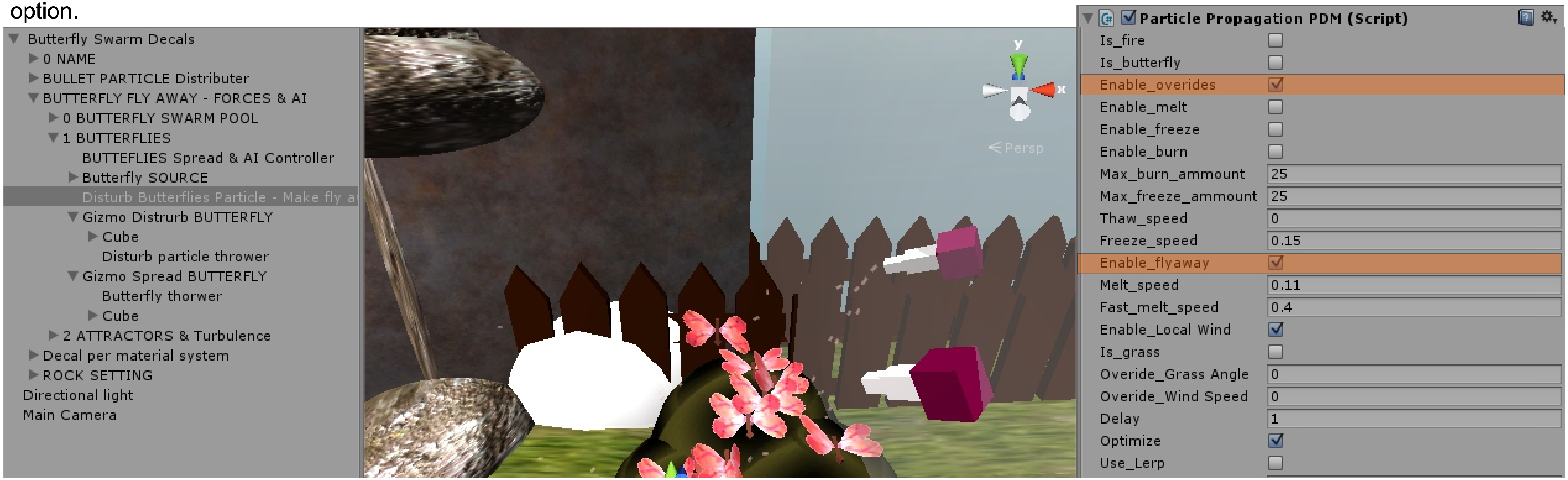
Position	X	0.0383628	Y	-2.523299	Z	-0.021737
Rotation	X	50.20995	Y	212.9668	Z	196.1861
Scale	X	1.136648	Y	1.136648	Z	1.136648

Particle System

☑ Particle Collisions PDM (Script)

Script	ParticleCollisionsPDM
Normal_On_Y	☑
Decal_per_mat	☐
▶ Mat_names	
▶ Decals_for_mat	
▶ Add_effects	
Particle POOL	Disturb Butterflies Particle - Make fly .
Flame_force	0.2
▼ Systems_To_override	
Size	1
Element 0	BUTTEFLIES Spread & AI Controller
Cut_off_dist	2

7. Setup the Disturb Propagator so that it has the distrub property enabled, that is the “Enable Fly Away” option. Also activate the “Enable overrides” option.

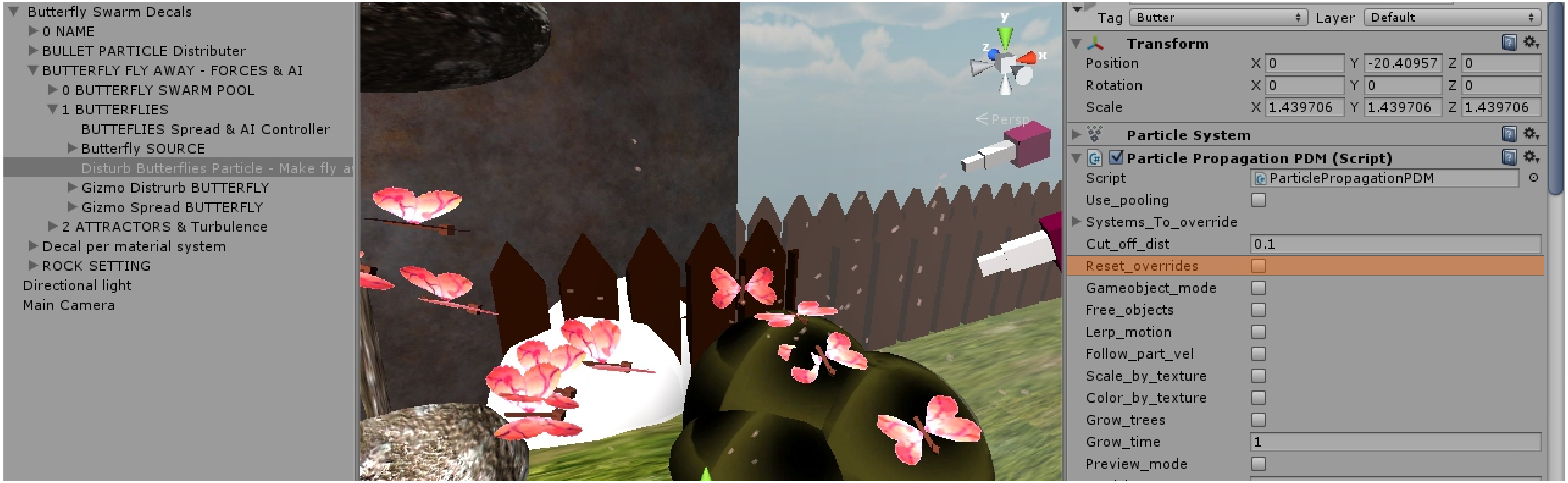


```
▼ Butterfly Swarm Decals
  ▶ 0 NAME
  ▶ BULLET PARTICLE Distributer
  ▼ BUTTERFLY FLY AWAY - FORCES & AI
    ▶ 0 BUTTERFLY SWARM POOL
    ▼ 1 BUTTERFLIES
        BUTTEFLIES Spread & AI Controller
      ▶ Butterfly SOURCE
        Disturb Butterflies Particle - Make fly a
      ▼ Gizmo Distrurb BUTTERFLY
        ▶ Cube
          Disturb particle thrower
      ▼ Gizmo Spread BUTTERFLY
          Butterfly thorwer
        ▶ Cube
    ▶ 2 ATTRACTORS & Turbulence
  ▶ Decal per material system
  ▶ ROCK SETTING
  Directional light
  Main Camera
```

☑ Particle Propagation PDM (Script)

Is_fire	☐
Is_butterfly	☐
Enable_overides	☑
Enable_melt	☐
Enable_freeze	☐
Enable_burn	☐
Max_burn_ammount	25
Max_freeze_ammount	25
Thaw_speed	0
Freeze_speed	0.15
Enable_flyaway	☑
Melt_speed	0.11
Fast_melt_speed	0.4
Enable_Local Wind	☑
Is_grass	☐
Overide_Grass Angle	0
Overide_Wind Speed	0
Delay	1
Optimize	☑
Use_Lerp	☐

8. Test the disturb mode by spreading the Disturb particle over the butterfly positions and see them fly to the air. Check what happens when the reset overrides option is checked, the butterflies will return to their original gravity and positions, as long as the Disturb system does not make them take to the air again. Note that the system will create a gradual return, so can be use directly for a gravitate back to original positions during gameplay.



```
▼ Butterfly Swarm Decals
  ▶ 0 NAME
  ▶ BULLET PARTICLE Distributer
  ▼ BUTTERFLY FLY AWAY - FORCES & AI
    ▶ 0 BUTTERFLY SWARM POOL
    ▼ 1 BUTTERFLIES
        BUTTEFLIES Spread & AI Controller
      ▶ Butterfly SOURCE
        Disturb Butterflies Particle - Make fly a
      ▶ Gizmo Distrurb BUTTERFLY
      ▶ Gizmo Spread BUTTERFLY
    ▶ 2 ATTRACTORS & Turbulence
  ▶ Decal per material system
  ▶ ROCK SETTING
  Directional light
  Main Camera
```

Tag Butter | Layer Default

Transform

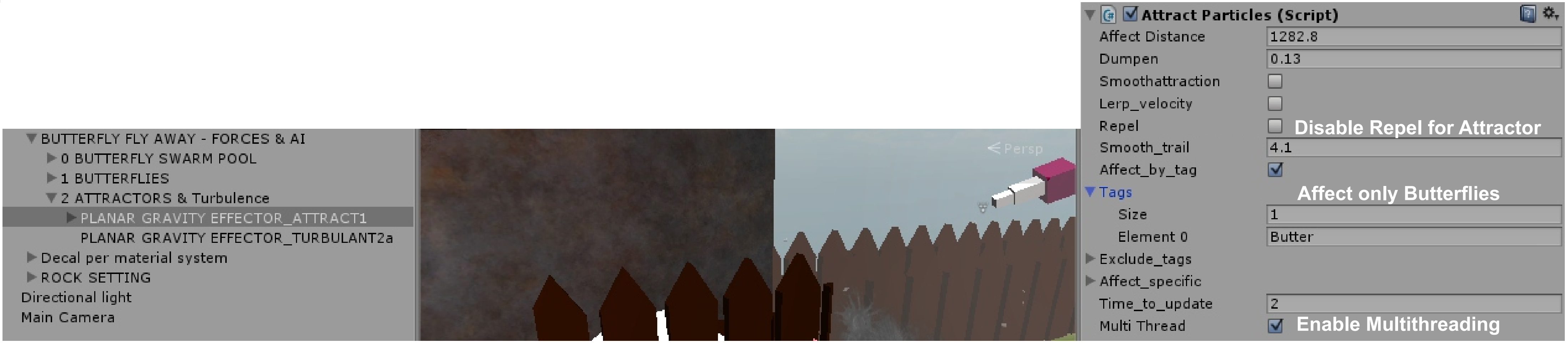
Position	X 0	Y -20.40957	Z 0
Rotation	X 0	Y 0	Z 0
Scale	X 1.439706	Y 1.439706	Z 1.439706

Particle System

Particle Propagation PDM (Script)

Script	ParticlePropagationPDM
Use_pooling	□
Systems_To_override	
Cut_off_dist	0.1
Reset_overrides	□
Gameobject_mode	□
Free_objects	□
Lerp_motion	□
Follow_part_vel	□
Scale_by_texture	□
Color_by_texture	□
Grow_trees	□
Grow_time	1
Preview_mode	□

9. Setup local Attractive forces and Turbulence to make butterflies move towards an Attractor and fly like a swarm with Turbulence. The Attractor main parameters are shown below.



```
▼ BUTTERFLY FLY AWAY - FORCES & AI
  ▶ 0 BUTTERFLY SWARM POOL
  ▶ 1 BUTTERFLIES
  ▼ 2 ATTRACTORS & Turbulence
    ▶ PLANAR GRAVITY EFFECTOR_ATTRACT1
      PLANAR GRAVITY EFFECTOR_TURBULANT2a
▶ Decal per material system
▶ ROCK SETTING
Directional light
Main Camera
```

Attract Particles (Script)

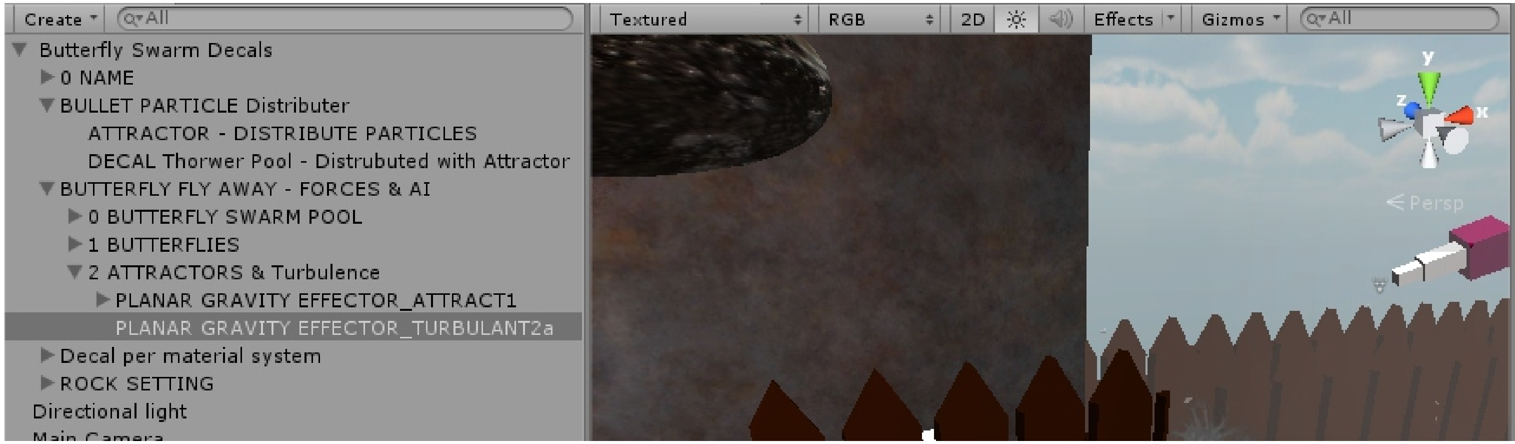
Affect Distance	1282.8
Dumpen	0.13
Smoothattraction	□
Lerp_velocity	□
Repel	□
Smooth_trail	4.1
Affect_by_tag	☑
Tags	
Size	1
Element 0	Butter
Exclude_tags	
Affect_specific	
Time_to_update	2
Multi Thread	☑

Disable Repel for Attractor

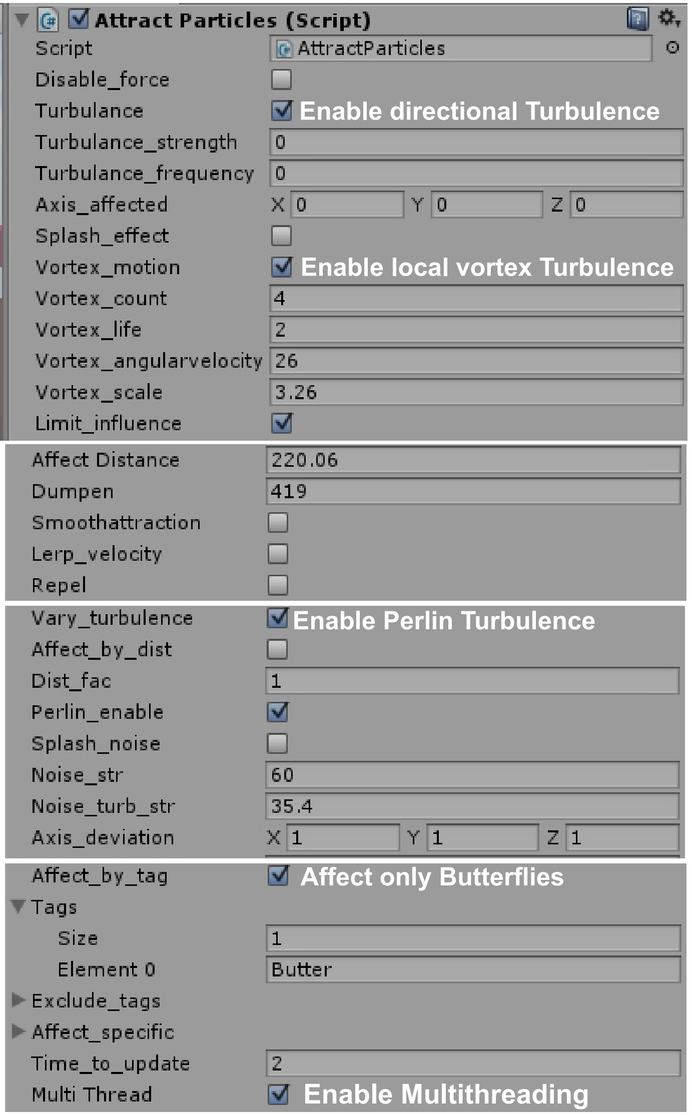
Affect only Butterflies

Enable Multithreading

10. Setup local Turbulence. The Turbulence script main parameters are shown below.



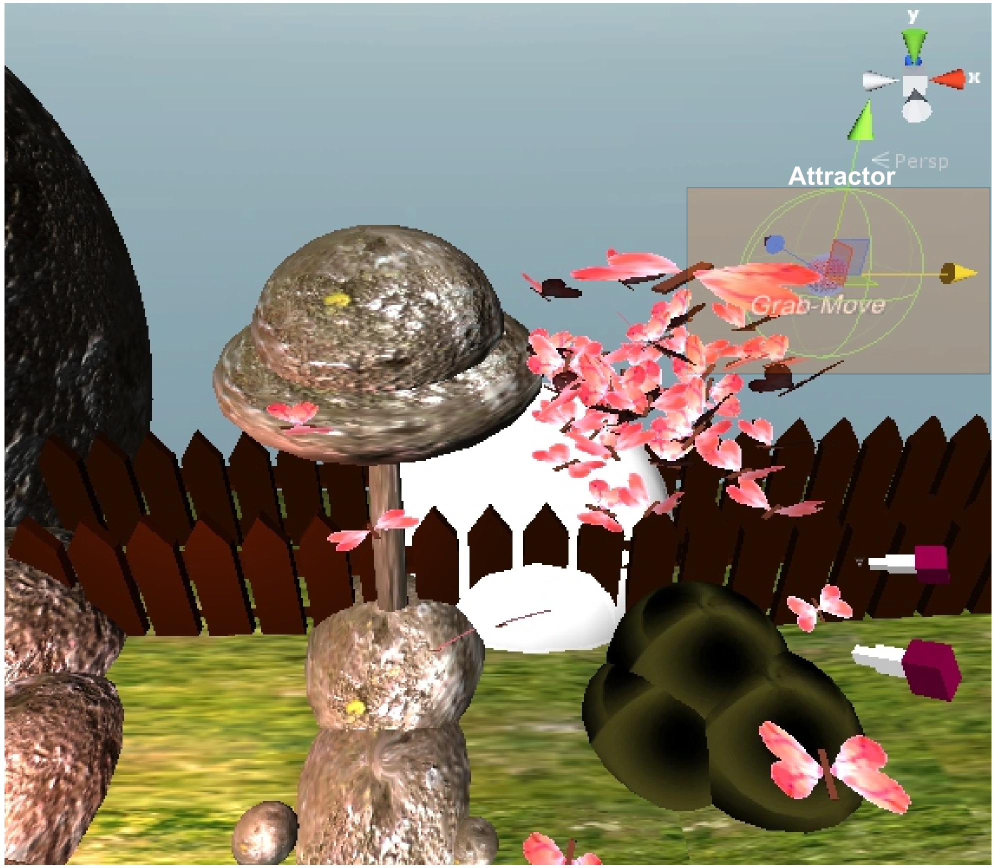
- Butterfly Swarm Decals
  - 0 NAME
  - BULLET PARTICLE Distributer
    - ATTRACTOR - DISTRIBUTE PARTICLES
    - DECAL Thorwer Pool - Distrubuted with Attractor
  - BUTTERFLY FLY AWAY - FORCES & AI
    - 0 BUTTERFLY SWARM POOL
    - 1 BUTTERFLIES
    - 2 ATTRACTORS & Turbulence
      - PLANAR GRAVITY EFFECTOR_ATTRACT1
      - PLANAR GRAVITY EFFECTOR_TURBULANT2a
  - Decal per material system
  - ROCK SETTING
- Directional light
- Main Camera



Attract Particles (Script)

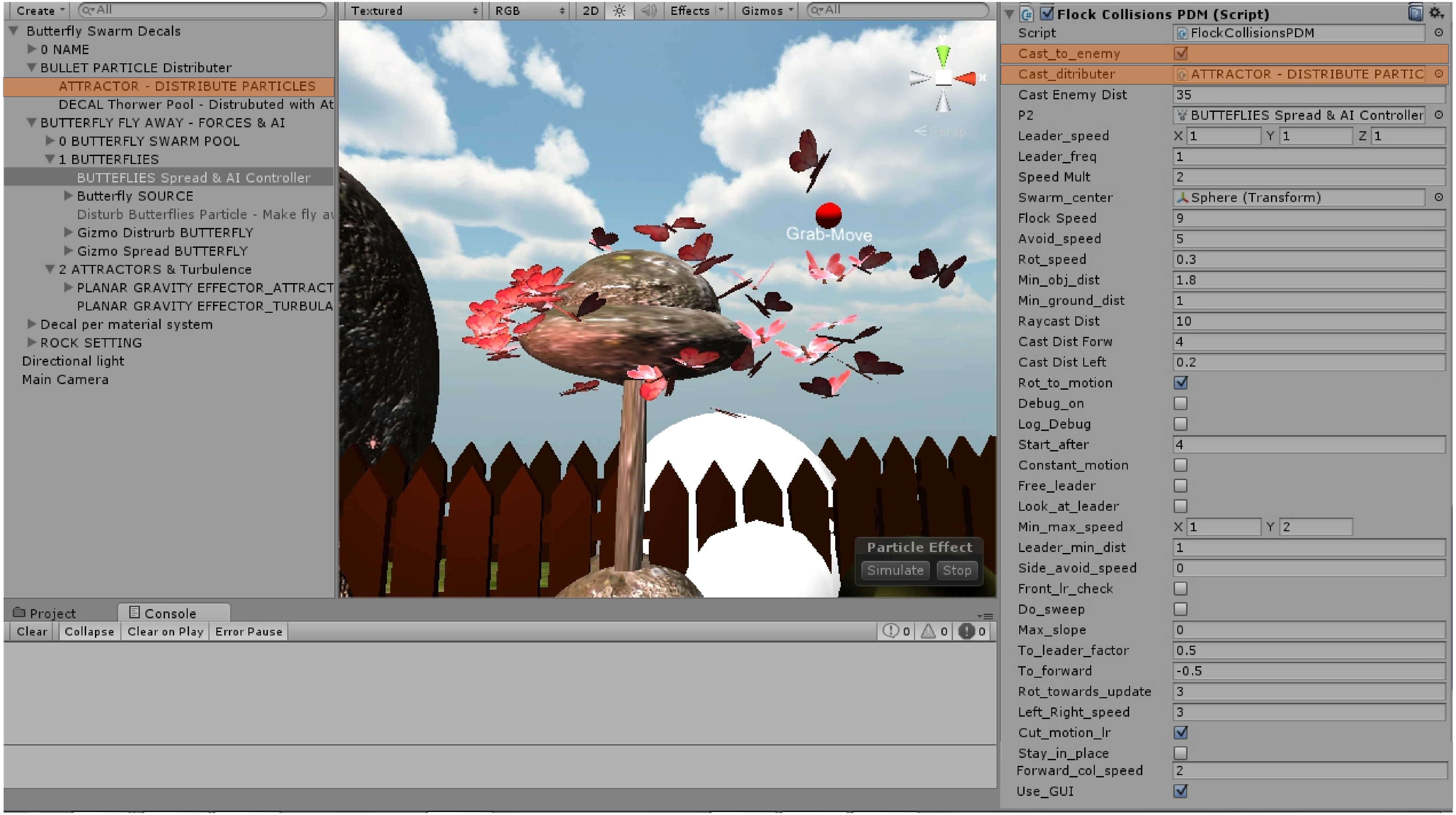
Script	AttractParticles	
Disable_force	□	
Turbulance	☑	Enable directional Turbulence
Turbulance_strength	0	
Turbulance_frequency	0	
Axis_affected	X 0 Y 0 Z 0	
Splash_effect	□	
Vortex_motion	☑	Enable local vortex Turbulence
Vortex_count	4	
Vortex_life	2	
Vortex_angularvelocity	26	
Vortex_scale	3.26	
Limit_influence	☑	
Affect Distance	220.06	
Dumpen	419	
Smoothattraction	□	
Lerp_velocity	□	
Repel	□	
Vary_turbulence	☑	Enable Perlin Turbulence
Affect_by_dist	□	
Dist_fac	1	
Perlin_enable	☑	
Splash_noise	□	
Noise_str	60	
Noise_turb_str	35.4	
Axis_deviation	X 1 Y 1 Z 1	
Affect_by_tag	☑	Affect only Butterflies
Tags		
Size	1	
Element 0	Butter	
Exclude_tags		
Affect_specific		
Time_to_update	2	
Multi Thread	☑	Enable Multithreading

Butterflies will now swarm around the Attractor sphere, while moving along the Turbulence direction and vortexes for swarm like motion. The forces will normally make the Butterflies go through any obstacle, even with a collider, so in the next step we will enable the advanced AI module for agents to sense the environment and avoid surfaces properly, even under the influence of forces.



11. Setup advanced AI module for the Buttefly agents. Use the “FlockCollisionsPDM” script on the Buttefly propagator system described in previous steps. Using the parameters shown below the system will now allow the agents to avoid obstacles and follow the terrain or any object contour.

This system will also be used to find enemy targets & cast fire on them by a single distribution pool. It uses the Attracrtor script to distribute a single particle system to multiple transforms and the AI system will insert the agents transforms in that distributer when they find an enemy to cast on. Then will remove the transform to stop the casting when the enemy is out of sight. Enable “Cast to enemy” and insert the Distributer in the “Cast distributer” parameter to enable the casting system.

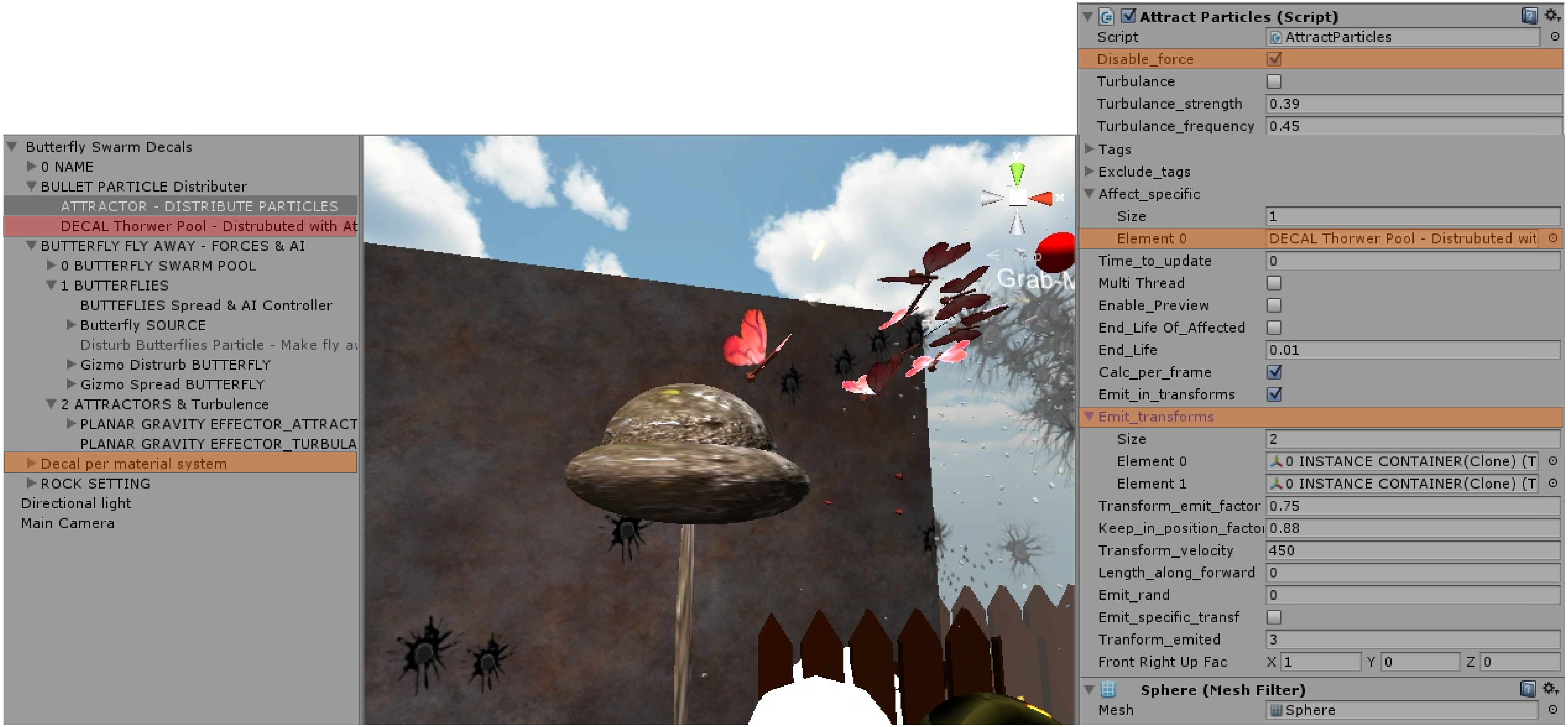


- Butterfly Swarm Decals
  - 0 NAME
  - BULLET PARTICLE Distributer
    - ATTRACTOR - DISTRIBUTE PARTICLES
    - DECAL Thorwer Pool - Distrubuted with At
  - BUTTERFLY FLY AWAY - FORCES & AI
    - 0 BUTTERFLY SWARM POOL
    - 1 BUTTERFLIES
      - BUTTEFLIES Spread & AI Controller
      - Butterfly SOURCE
      - Disturb Butterflies Particle - Make fly av
      - Gizmo Distrurb BUTTERFLY
      - Gizmo Spread BUTTERFLY
    - 2 ATTRACTORS & Turbulence
      - PLANAR GRAVITY EFFECTOR_ATTRACT
      - PLANAR GRAVITY EFFECTOR_TURBULA
  - Decal per material system
  - ROCK SETTING
- Directional light
- Main Camera

Flock Collisions PDM (Script)

Script	FlockCollisionsPDM
Cast_to_enemy	☑
Cast_ditributer	ATTRACTOR - DISTRIBUTE PARTIC
Cast Enemy Dist	35
P2	BUTTEFLIES Spread & AI Controller
Leader_speed	X 1 Y 1 Z 1
Leader_freq	1
Speed Mult	2
Swarm_center	Sphere (Transform)
Flock Speed	9
Avoid_speed	5
Rot_speed	0.3
Min_obj_dist	1.8
Min_ground_dist	1
Raycast Dist	10
Cast Dist Forw	4
Cast Dist Left	0.2
Rot_to_motion	☑
Debug_on	☐
Log_Debug	☐
Start_after	4
Constant_motion	☐
Free_leader	☐
Look_at_leader	☐
Min_max_speed	X 1 Y 2
Leader_min_dist	1
Side_avoid_speed	0
Front_lr_check	☐
Do_sweep	☐
Max_slope	0
To_leader_factor	0.5
To_forward	-0.5
Rot_towards_update	3
Left_Right_speed	3
Cut_motion_lr	☑
Stay_in_place	☐
Forward_col_speed	2
Use_GUI	☑

12. Setup of fire casting distributer to be used by the AI agents and module. The attractor script is used to distribute the particle defined in "Affect specific" parameter. The "Emit transforms" list will be filled by the linked Ai module from the previous step. Forces are disabled so the Attractor is used only for the particle distribution to the agent transforms.



```
▼ Butterfly Swarm Decals
  ▶ 0 NAME
  ▼ BULLET PARTICLE Distributer
      ATTRACTOR - DISTRIBUTE PARTICLES
      DECAL Thorwer Pool - Distrubuted with At
  ▼ BUTTERFLY FLY AWAY - FORCES & AI
    ▶ 0 BUTTERFLY SWARM POOL
    ▼ 1 BUTTERFLIES
        BUTTEFLIES Spread & AI Controller
      ▶ Butterfly SOURCE
        Disturb Butterflies Particle - Make fly a
      ▶ Gizmo Distrurb BUTTERFLY
      ▶ Gizmo Spread BUTTERFLY
    ▼ 2 ATTRACTORS & Turbulence
      ▶ PLANAR GRAVITY EFFECTOR_ATTRACT
        PLANAR GRAVITY EFFECTOR_TURBULA
  ▶ Decal per material system
  ▶ ROCK SETTING
  Directional light
  Main Camera
```

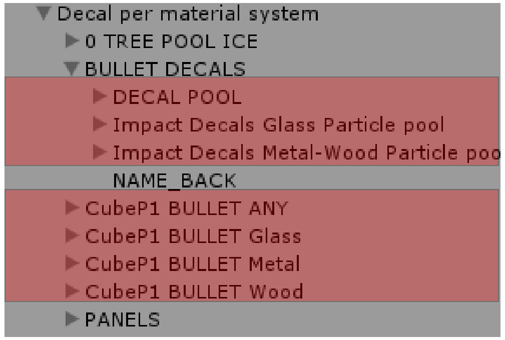
▼ ☑ **Attract Particles (Script)**

Script	AttractParticles
Disable_force	☑
Turbulance	☐
Turbulance_strength	0.39
Turbulance_frequency	0.45
▶ Tags	
▶ Exclude_tags	
▼ Affect_specific	
Size	1
Element 0	DECAL Thorwer Pool - Distrubuted wit
Time_to_update	0
Multi Thread	☐
Enable_Preview	☐
End_Life Of_Affected	☐
End_Life	0.01
Calc_per_frame	☑
Emit_in_transforms	☑
▼ Emit_transforms	
Size	2
Element 0	0 INSTANCE CONTAINER(Clone) (T
Element 1	0 INSTANCE CONTAINER(Clone) (T
Transform_emit_factor	0.75
Keep_in_position_factoi	0.88
Transform_velocity	450
Length_along_forward	0
Emit_rand	0
Emit_specific_transf	☐
Tranform_emited	3
Front Right Up Fac	X 1 Y 0 Z 0

▼ **Sphere (Mesh Filter)**

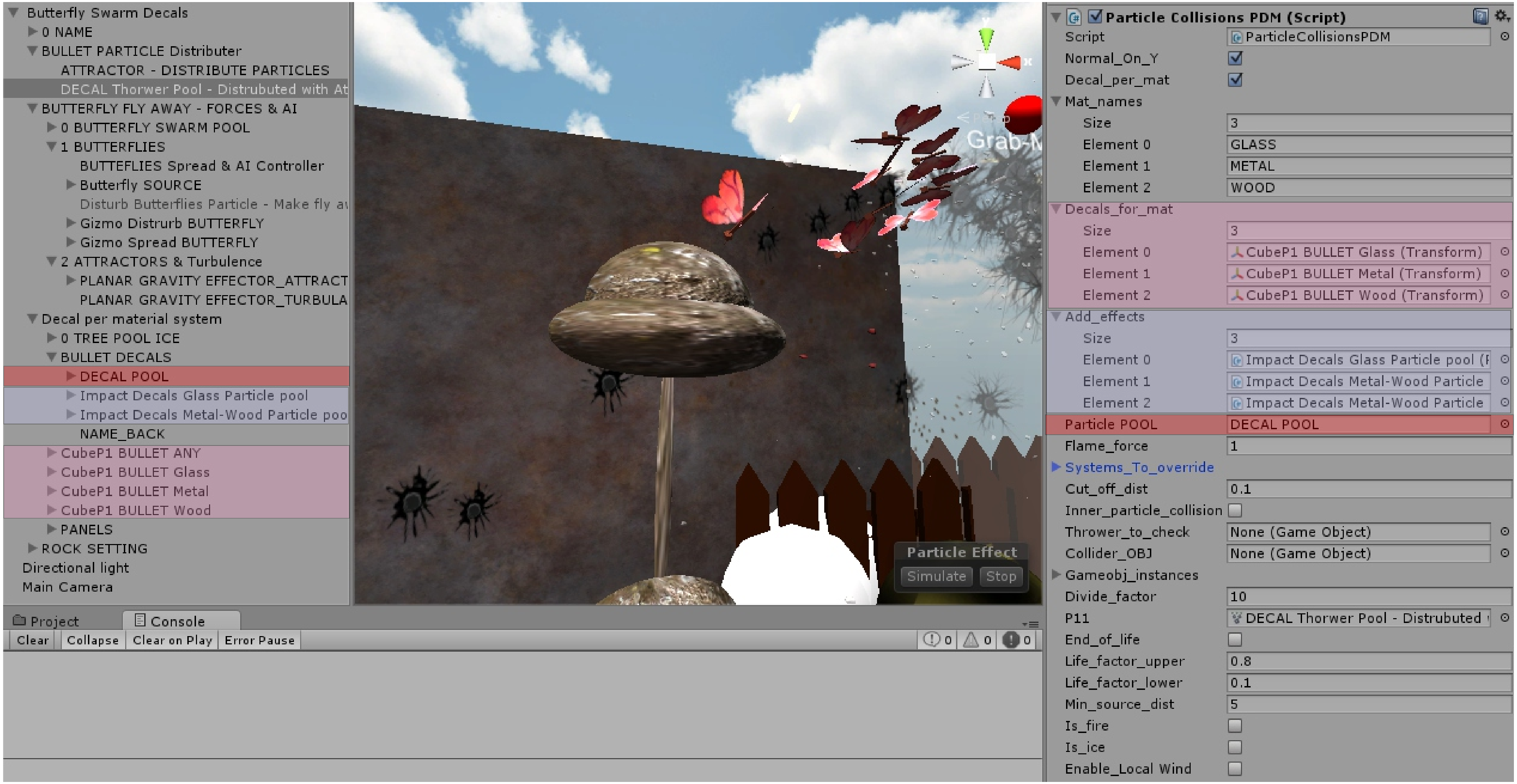
Mesh	Sphere

The "DECAL thower pool" is the fire particle that also uses a Propagation-Collision setup to place Bullet Decals from a pool upon collision/impact to the enemies. This system is using a Decal per material arrangement to cast different bullet decals depending on what material is hit.



```
▼ Decal per material system
  ▶ 0 TREE POOL ICE
  ▼ BULLET DECALS
    ▶ DECAL POOL
    ▶ Impact Decals Glass Particle pool
    ▶ Impact Decals Metal-Wood Particle poo
      NAME_BACK
  ▶ CubeP1 BULLET ANY
  ▶ CubeP1 BULLET Glass
  ▶ CubeP1 BULLET Metal
  ▶ CubeP1 BULLET Wood
  ▶ PANELS
```

13. Setup of Per Material Decals for the casting impact points. The Collisions script is attached to the single fire particle pool that agents use for casting and ia linked to the bullet decal system Propagator pool, which controls the decals (e.g. move them when items in the scene move)



```
▼ Butterfly Swarm Decals
   ▶ 0 NAME
   ▼ BULLET PARTICLE Distributer
        ATTRACTOR - DISTRIBUTE PARTICLES
        DECAL Thorwer Pool - Distrubuted with At
   ▼ BUTTERFLY FLY AWAY - FORCES & AI
      ▶ 0 BUTTERFLY SWARM POOL
      ▼ 1 BUTTERFLIES
           BUTTEFLIES Spread & AI Controller
         ▶ Butterfly SOURCE
           Disturb Butterflies Particle - Make fly a
         ▶ Gizmo Distrurb BUTTERFLY
         ▶ Gizmo Spread BUTTERFLY
      ▼ 2 ATTRACTORS & Turbulence
         ▶ PLANAR GRAVITY EFFECTOR_ATTRACT
           PLANAR GRAVITY EFFECTOR_TURBULA
   ▼ Decal per material system
      ▶ 0 TREE POOL ICE
      ▼ BULLET DECALS
         ▶ DECAL POOL
         ▶ Impact Decals Glass Particle pool
         ▶ Impact Decals Metal-Wood Particle poo
           NAME_BACK
      ▶ CubeP1 BULLET ANY
      ▶ CubeP1 BULLET Glass
      ▶ CubeP1 BULLET Metal
      ▶ CubeP1 BULLET Wood
      ▶ PANELS
   ▶ ROCK SETTING
  Directional light
  Main Camera
```

▼ ☑ Particle Collisions PDM (Script)

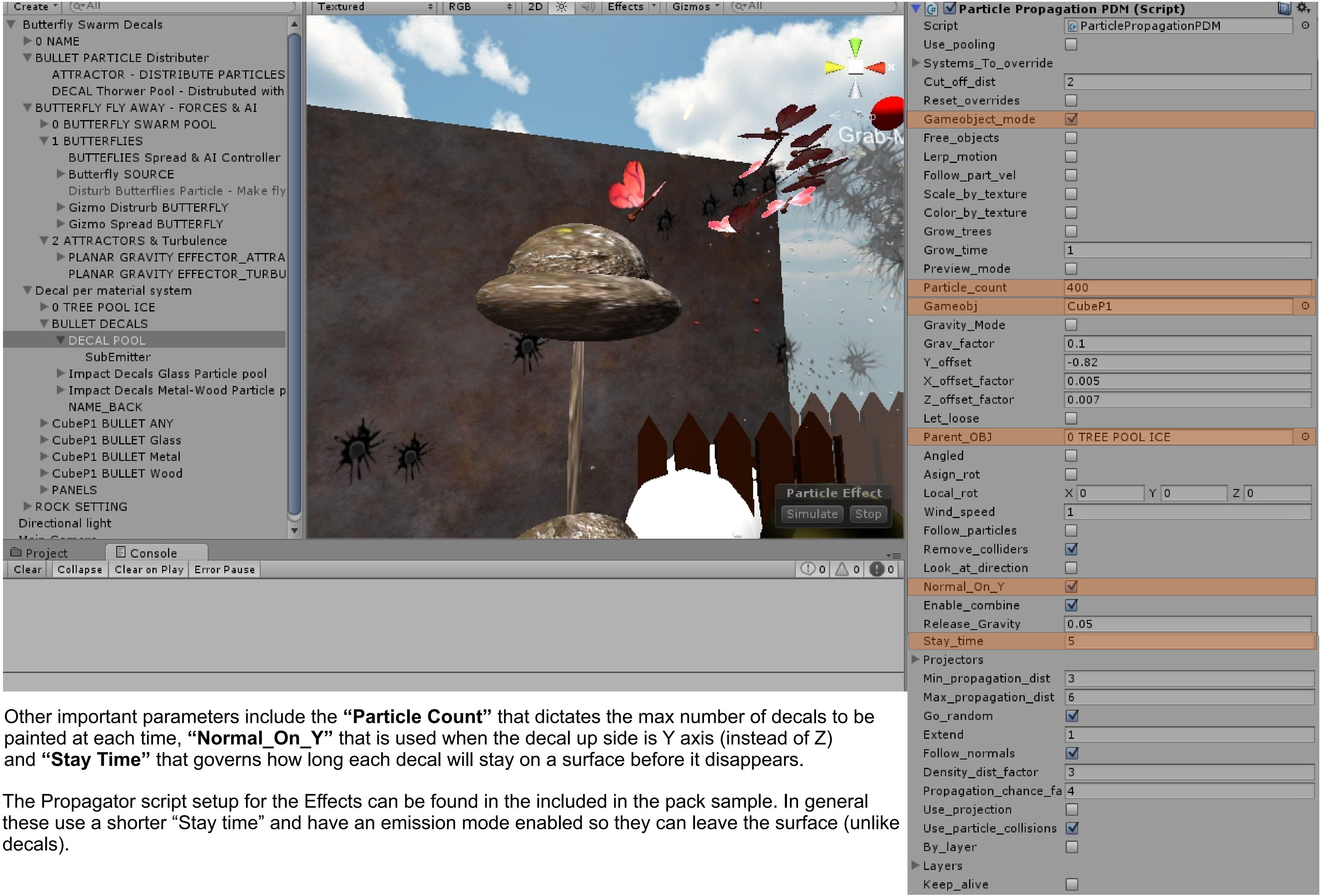
Script	ParticleCollisionsPDM
Normal_On_Y	☑
Decal_per_mat	☑
▼ Mat_names	
Size	3
Element 0	GLASS
Element 1	METAL
Element 2	WOOD
▼ Decals_for_mat	
Size	3
Element 0	CubeP1 BULLET Glass (Transform)
Element 1	CubeP1 BULLET Metal (Transform)
Element 2	CubeP1 BULLET Wood (Transform)
▼ Add_effects	
Size	3
Element 0	Impact Decals Glass Particle pool (F
Element 1	Impact Decals Metal-Wood Particle
Element 2	Impact Decals Metal-Wood Particle
Particle POOL	DECAL POOL
Flame_force	1
▶ Systems_To_override	
Cut_off_dist	0.1
Inner_particle_collision	□
Thrower_to_check	None (Game Object)
Collider_OBJ	None (Game Object)
▶ Gameobj_instances	
Divide_factor	10
P11	DECAL Thorwer Pool - Distrubuted
End_of_life	□
Life_factor_upper	0.8
Life_factor_lower	0.1
Min_source_dist	5
Is_fire	□
Is_ice	□
Enable_Local Wind	□

A. (DECAL POOL) Main Decal pool - This will control the Decal Bullets on the impact points. “Decals for Mat” parameter will dictate which decal to use for each material defined in the “Mat names” parameter (strings must be included in material name). “Decals per mat” parameter must also be activated. DECAL POOL uses the Propagator system to control the decals.

B. (Add Effects) Effect Decals pool - This option enables effects per material hit, that also use the Propagator system to activate particles on the impact points alongside the Bullet Decals, but these have a shorter time span and an emission property so they stay only on impact, unlike the Bullet decals that stay longer.

C. (Decals for Material) Decal items - The bullet hole images per material, assigned to Decal quads and used as decals on impact.

14. Setup of Per Material Decals main Propagator script. The script must be in Gameobject mode and also have the decal pool and item defined. The item will be dictated by the Collisions script in the “Decal per Material” case, otherwise the item defined here will be used.



- Butterfly Swarm Decals
  - 0 NAME
  - BULLET PARTICLE Distributer
    - ATTRACTOR - DISTRIBUTE PARTICLES
    - DECAL Thorwer Pool - Distrubuted with
  - BUTTERFLY FLY AWAY - FORCES & AI
    - 0 BUTTERFLY SWARM POOL
    - 1 BUTTERFLIES
      - BUTTEFLIES Spread & AI Controller
      - Butterfly SOURCE
      - Disturb Butterflies Particle - Make fly
      - Gizmo Distrurb BUTTERFLY
      - Gizmo Spread BUTTERFLY
    - 2 ATTRACTORS & Turbulence
      - PLANAR GRAVITY EFFECTOR_ATTRA
      - PLANAR GRAVITY EFFECTOR_TURBU
  - Decal per material system
    - 0 TREE POOL ICE
    - BULLET DECALS
      - DECAL POOL
        - SubEmitter
      - Impact Decals Glass Particle pool
      - Impact Decals Metal-Wood Particle p
      - NAME_BACK
    - CubeP1 BULLET ANY
    - CubeP1 BULLET Glass
    - CubeP1 BULLET Metal
    - CubeP1 BULLET Wood
    - PANELS
  - ROCK SETTING
- Directional light

Particle Propagation PDM (Script)

Script	ParticlePropagationPDM
Use_pooling	□
Systems_To_override	
Cut_off_dist	2
Reset_overrides	□
Gameobject_mode	☑
Free_objects	□
Lerp_motion	□
Follow_part_vel	□
Scale_by_texture	□
Color_by_texture	□
Grow_trees	□
Grow_time	1
Preview_mode	□
Particle_count	400
Gameobj	CubeP1
Gravity_Mode	□
Grav_factor	0.1
Y_offset	-0.82
X_offset_factor	0.005
Z_offset_factor	0.007
Let_loose	□
Parent_OBJ	0 TREE POOL ICE
Angled	□
Asign_rot	□
Local_rot	X 0 Y 0 Z 0
Wind_speed	1
Follow_particles	□
Remove_colliders	☑
Look_at_direction	□
Normal_On_Y	☑
Enable_combine	☑
Release_Gravity	0.05
Stay_time	5
Projectors	
Min_propagation_dist	3
Max_propagation_dist	6
Go_random	☑
Extend	1
Follow_normals	☑
Density_dist_factor	3
Propagation_chance_fa	4
Use_projection	□
Use_particle_collisions	☑
By_layer	□
Layers	
Keep_alive	□

Other important parameters include the **“Particle Count”** that dictates the max number of decals to be painted at each time, **“Normal_On_Y”** that is used when the decal up side is Y axis (instead of Z) and **“Stay Time”** that governs how long each decal will stay on a surface before it disappears.

The Propagator script setup for the Effects can be found in the included in the pack sample. In general these use a shorter “Stay time” and have an emission mode enabled so they can leave the surface (unlike decals).