Lab Title: Creating an Aura Effect

Objective

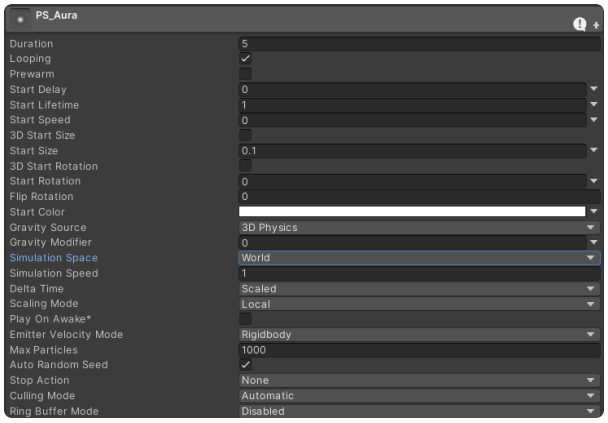
Create a pulsating aura effect around a game object, first using the Particle System and then recreating and enhancing it with VFX Graph.

Part 1: Particle System

1. Create a new scene and add a simple 3D object (e.g., a sphere) to represent your character.
2. Add a Particle System to your character:
    - Right-click on your character object in the Hierarchy
    - Select Effects > Particle System

> **Tip**
>
> The Particle System is CPU-based, making it easier to set up but potentially less performant for complex effects.

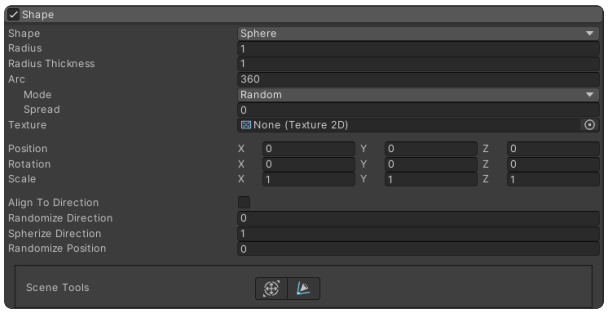
1. Configure the Particle System, In the `Main` (Top) Module of your Particle System:
    - Set Start Lifetime to 1
    - Set Start Speed to 0
    - Set Start Size to 0.1
    - Set Simulation Space to World



Note

World space simulation allows particles to stay in place even if the emitter (character) moves.

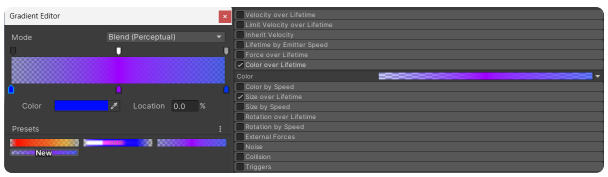
1. In the `Shape` module:
    - Set Shape to Sphere
    - Set Radius to match your character's size
    - Set Spherize Direction to 1+



Note

Emitting from the sphere direction creates a surface effect rather than filling the volume.

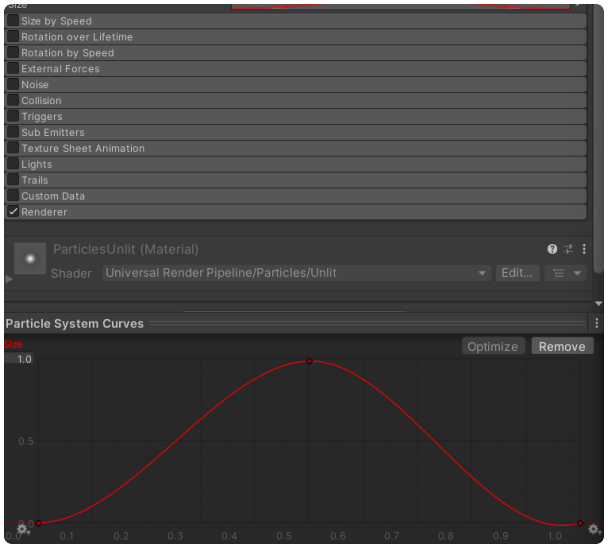
1. In the `Color over Lifetime` module:
    - Tick it On
    - Create a gradient that goes from transparent to opaque and back to transparent by clicking the color bar.
        - Save your gradient by pressing New when done creating it



Hint

The top notch of the color picker sets Alpha, the bottom notch sets the Color

1. In the `Size over Lifetime` module:
    - Tick it On
    - Create a curve that starts small, grows, then shrinks again by clicking the box to the right of Size
        - You can save your curve preset by clicking the Gear Icon on Particle system Curves then clicking New



> **Tip**
>
> Combining size and color changes over lifetime adds depth and interest to the effect.

7. Experiment with other modules like Noise, Rotation, Emission, or Renderer for added complexity and visual interest.

Part 2: VFX Graph

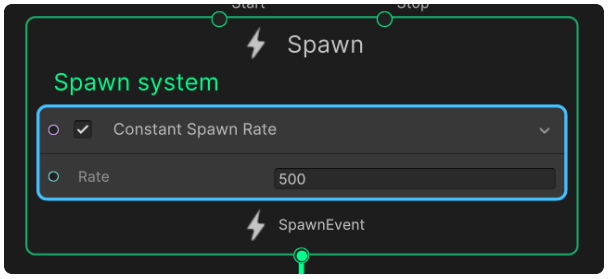
> **Attention**
>
> VFX Graph requires the Scriptable Render Pipeline (SRP). Ensure your project is set up for URP and ensure you have installed Visual Effect Graph from the `Package`

`Manager`.

1. Create a new VFX Graph:
    - Right-click in the Project window
    - Select Create > Visual Effects > Visual Effect Graph
2. Set up the basic structure (If not already present when created):
    - Add a `Spawn` context
    - Add an `Initialize Particle` context
    - Add an `Update Particle` context
    - Add an `Output Particle` context

> **Note**
>
> This structure represents the rendering and lifecycle of particles in the VFX Graph.

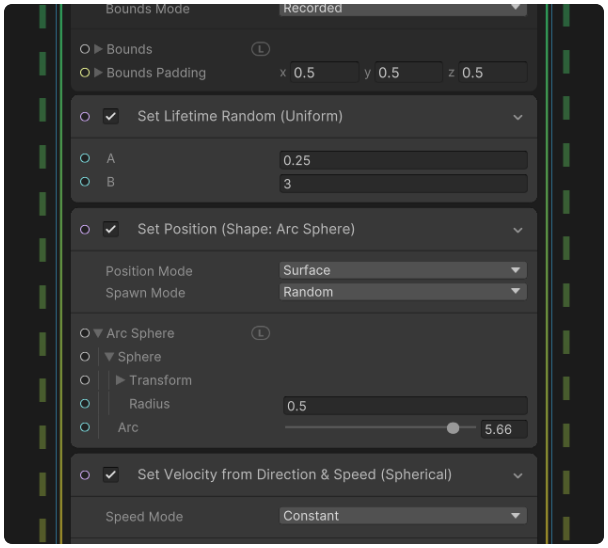
1. In the `Spawn` context:
    - Set the spawn rate to Constant with a value of 500



> **Tip**
>
> Tip: Adjust this value to balance between effect density and performance.

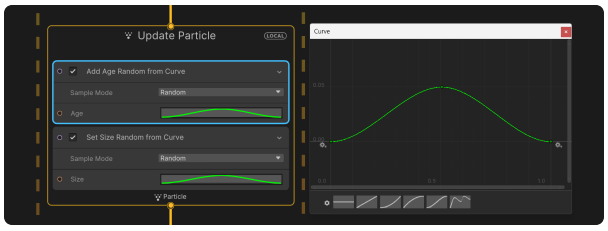
1. In the `Initialize Particle` context:
    - Add a Set Position (Shape: Arc Sphere) node
        - Adjust the Arc and Sphere>Transform>Radius to better match the "character" in your scene

- Delete the original Set Velocity block
- Add a Set Velocity from Direction & Speed (Spherical)
    - Adjust Speed and Direction Blend to get a look similar to the Particle System



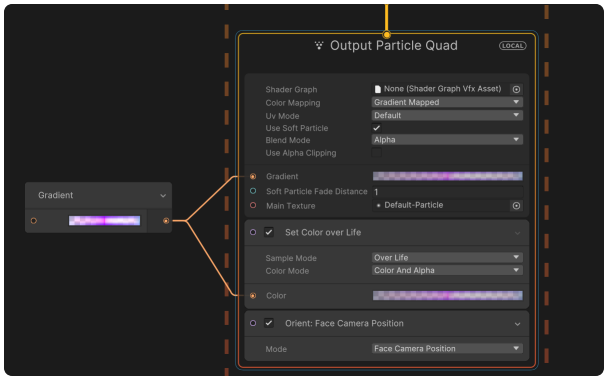
> **Note**
>
> Educational Context: This mimics the "Spherize" option in the Particle System, but with more control.

1. In the `Update Particle` context:
    - Add an Add Age Random from Curve node
    - Add a Set Size Random From Curve node
    - Adjust both curves to achieve a similar/desired effect compared to the Particle System



2. Experiment with Different nodes/blocks in the `Update Context`. Nodes like Turbulence, Vector Field, Force, Etc.
3. In the `Output Particle ---` context:
    - Make sure the type is Quad

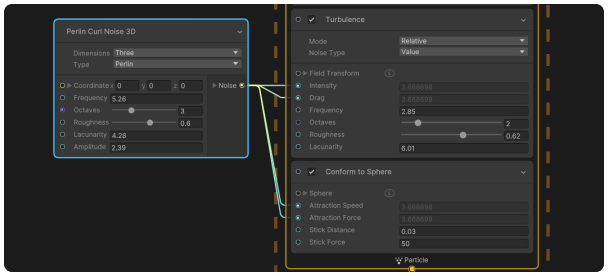
- Set the Color Mapping to Gradient
  - Create a gradient node and assign your old saved gradient, or create a new one



> **Tip**
>
> `Experiment with adjusting the Intensity value of the Color Picker`

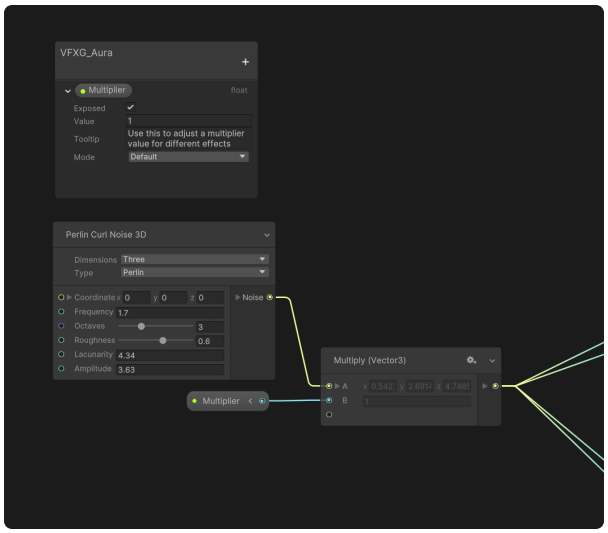
> **Note**
>
> VFX Graph allows for more complex data-driven behaviors compared to the Particle System.

1. Add motion to the aura:
   - In the `Update Particle` context, add a Turbulence node
   - Create a 3D Noise node (like Perlin Curl Noise 3D)
     - Use the noise output to control different inputs of the Turbulence node (like Intensity, Drag, etc.)
   - Experiment with Different nodes/blocks in the `Update and Initialize Contexts`. Nodes like Turbulence, Vector Field, Force, Etc.



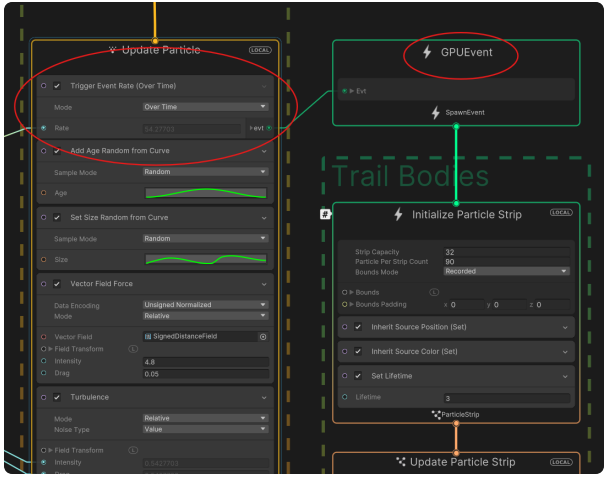
> **Note**
>
> Educational Context: Procedural motion adds life to the effect without manual animation.

Challenges

1. React to game events:
    - Add a property(s) to control some input of the aura (pick something like Lifetime or)
    - Use this property to modify spawn rate, size, or color intensity by linking it with C# (***Follow the Guide on using C# with VFX Graph***)
    - 

> **Tip**
>
> This could be used to show a character's changing power level or health and easily be animated using something like DOTween

1. Add secondary particles (Secondary Emitter):
    - Create small, fast-moving particles that occasionally emit from the main aura
    - *This is done using GPU Events as part of the* `Update Particle` *context*



> **Tip**
>
> Layering multiple effects adds depth and interest to your VFX.

When you are finished

This lab provides a structured introduction to both systems, with a heavier focus on VFX Graph.

Compare your Particle System and VFX Graph implementations. Reflect on the differences in setup, control, performance, etc.

Consider how you might use each system in different game development scenarios.