**Part 1: Setting up Particle Effects for the Background**

Particle Systems will be used to enhance our game environment by having stars moving along the sky. Follow the instructions below to setup the particle system. Answer all the questions along the way.

1. Right Click Hierarchy → Effects → Particle System. The default particles will show.

2. Particle System is made up of 2 things; the Particles and an Emitter (which emits the particles)

3. If you click the Particle System, and check the Inspector, you can see that there are a lot of settings:
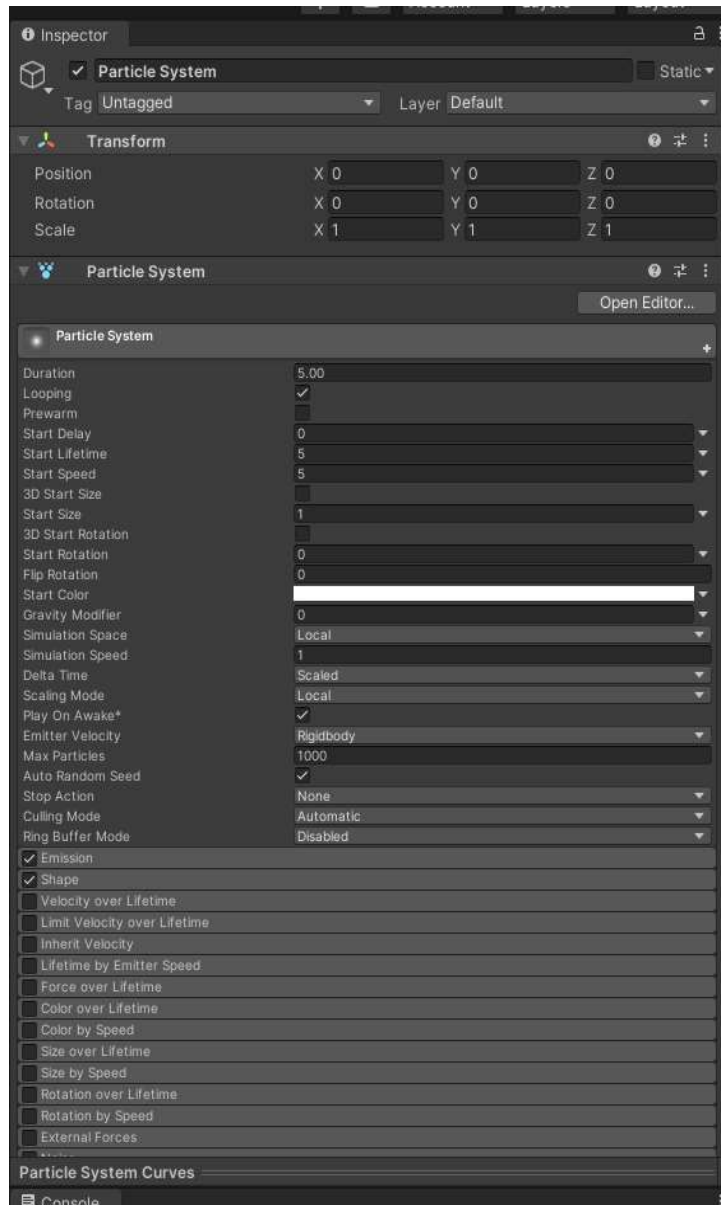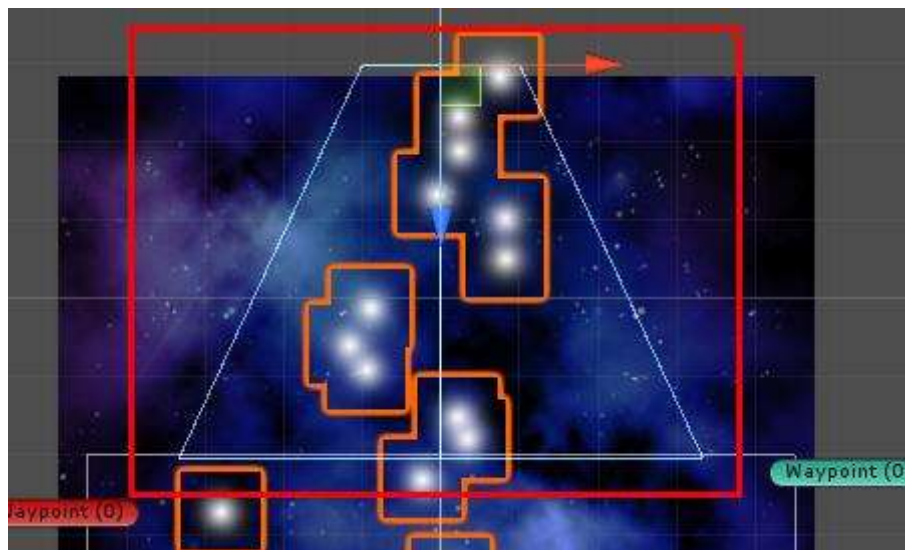

4. Rename the Particle System as **Starfield**.

5. Move the Particle System on top of the Screen and change the x-rotation to 90.

What does this do?

Answer:
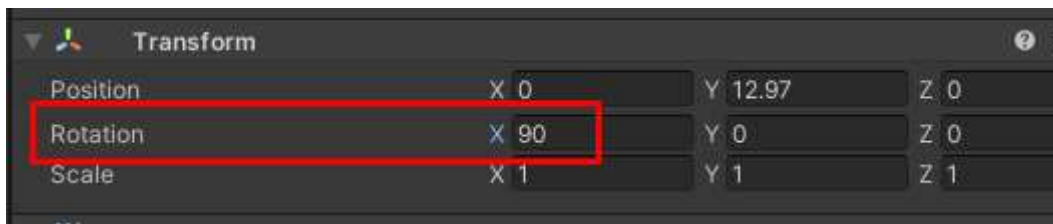
6. In the Inspector Particle System, open Shape. By default it will be set to Cone, meaning that the particles will start in a small area and then expand as they move along the screen:
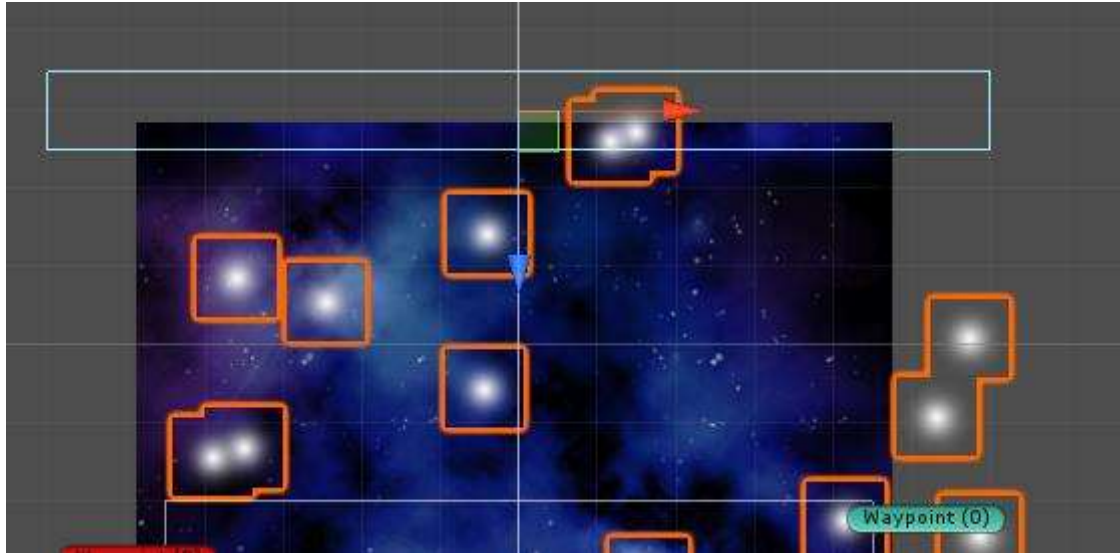

Experiment with the different shapes and paste a picture of any 3 emissions you liked
Picture 1:
Picture 2:
Picture 3:

7. Set the Shape to Box and scale it so it's wider than the camera as shown below:

What setting did you change to achieve this?
Answer:

8. Particles now are flying down like snowflakes

9. In the Starfield Inspector, click **Start Size** and on the right choose the drop down menu and choose **Random between 2 Constants**:

10. Set the 2 numbers **0.1 and 0.4.** This will set the size of the particles randomly between 0.1 and 0.4

11. Do the same for **Start Speed**, so that they start between 0.2 and 1 Speed

12. At the moment the stars are dying too quickly and are only visible at the top of the screen. Set a new value for the **Start Lifetime** property in order to have the particles stay visible till they reach the end of the screen.

What value did you set?
Answer:

13. Click on the Start Color, give the particles a color you like and arrange the Alpha (Opacity). Set it below 150 so that our particle will be transparent

14. Click the checkbox next to the **Prewarm** property.

Explain what is the function of the Prewarm property.

Answer:

15. Rename the Starfield as Starfield Far, as these will be stars at the background.

16. Duplicate the Particle System and rename it Starfield Close

17. Set the following Starfield properties:

    a. Start Size: 0.1 and 0.2

    b. Start Speed: 3 and 7

    c. Emission → Rate over time: 7

**Part 2: Setting up Particle Effect for an explosion**

1. In this section we will apply sprites to Particle Effects

2. In Assets create a folder VFX (Visual Effects)

3. Find explosion-stars.png from Space Shooter Assets and drag and drop it in the VFX folder.

4. To apply a Sprite to a Particle Effect we need to add it to a Material. Right click → Create → Material in the folder VFX and name it *Explosion Stars*.

5. Select the Material, click on Albedo dot and from the top search for Explosion Stars and apply it to our material:

6. In the Material Inspector, select Shader and search for Alpha Blended (Alternatively you can click Legacy Shaders → Particles → Alpha Blended):
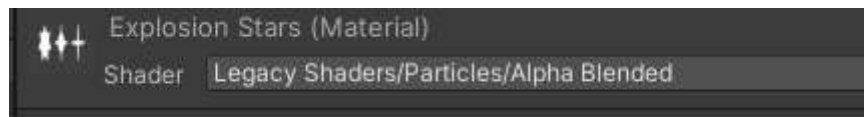

7. Go in Hierarchy and create a new Particle Effect, Right Click → Effects → Particle System. Name it **Explosion Particles**

8. Select the new particle System, go to the Inspector and find the Renderer section. In the Material property search for your material *Explosion Stars* and you will see that the particle effect will change to the material with the 3 stars.
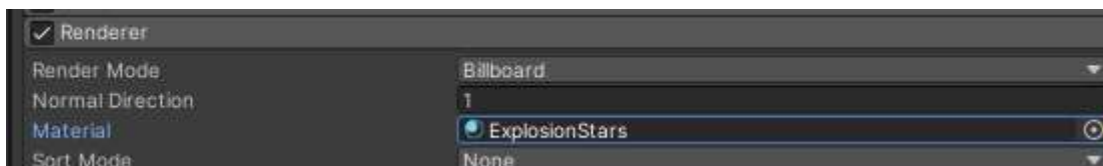

9. Find the section **Texture Sheet Animation** and find **Tiles**. Our material is made up of 3 rows (X) and 1 column (Y). Set the X to 3 and Y to 1. This ensures that only 1 of the stars is spawned.

10. Find **Start Frame**, dropdown arrow → **Random between 2 Constants**. Input the numbers between 1 and 3, so that the explosion star will be randomly selected from the 3 we have:
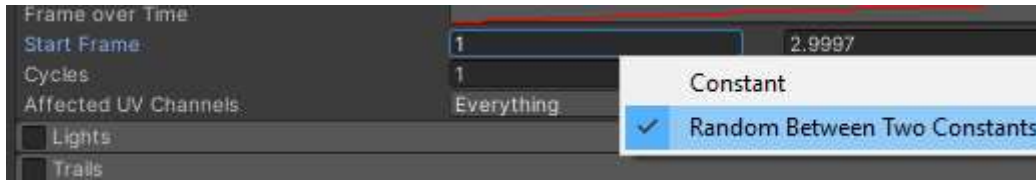
11. Change the **Cycles** to 20 so that stars will start "blinking"

12. Go to the top section of the Inspector and find **Duration,** set it to 0.2 since the explosion will only last 0.2 of a second. Uncheck *Looping* and test it. You should get one Particle and it takes 0.2s to change

13. Set **Start Lifetime** between 0.1 and 0.2 (Random between 2 Constants)

14. Set **Start Speed** between 5 and 10

15. Set **Start Size** between 0.2 and 1

16. Select **Start Color** → Gradient. Click the color to access the Color Gradient:
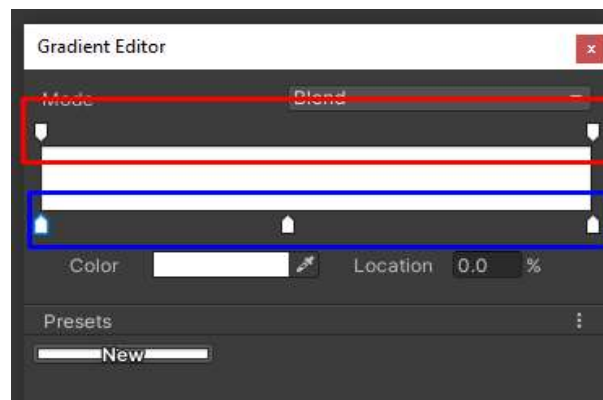
17. The tabs at the top (red) are for transparency and the tabs at the bottom (blue) are for colour changer

18. Set 5 (or as many as you like) colour changers at the bottom with different colours. To add new tables simply click anywhere in between the two existing tabs at the bottom. To change the colour, double click on the tab.
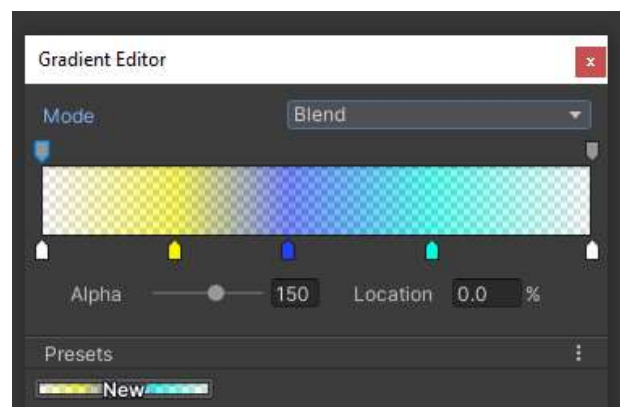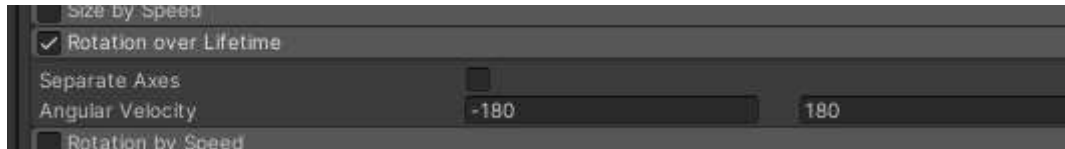

19. Set both tabs at the top to Alpha 150 to be semi-transparent.

20. When ready click on New (at the bottom) so that the preset will be saved:

21. Change the **Shape** of the Particle Emitter to **Sphere** and **Radius** 0.4 as the explosion will happen in a circular way:

22. Find the Emission section and set **Rate over Time** to **400**

23. Set **Rotation over Lifetime** (-180 to 180)

24. Once complete, duplicate the Explosion prefab and name it **Explosion Player.** Keep the same setting but change the Gradient colours. This ensure that the death of the enemy and the player will look slightly different.

25. Make both Explosions into Prefabs.