Multi-Texture Shader

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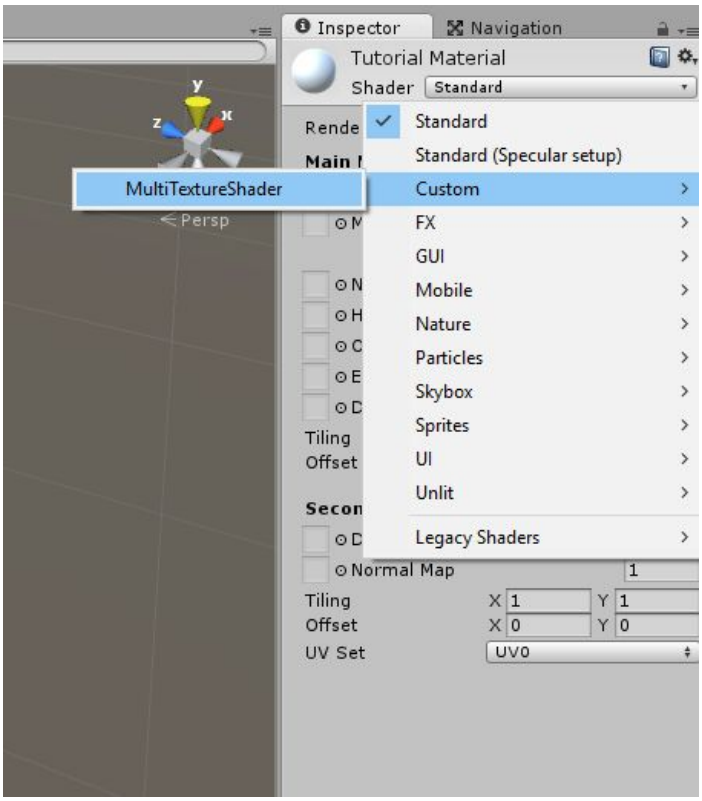
Overview:

This shader gives you the ability to apply multiple diffuse and normal maps, as well as multiple layers of specular metallic and smoothness sliders, and apply these via bitmasks to a model. This enables the reuse of textures throughout the production of a game or application, and makes the art style very consistent with a lower memory footprint. The entirety of this functionality is done through a single surface shader. This entails a higher computing cost at runtime, but allows you to more easily use multiple materials across entire projects, instead of baking diffuse, normal, and specular maps beforehand.

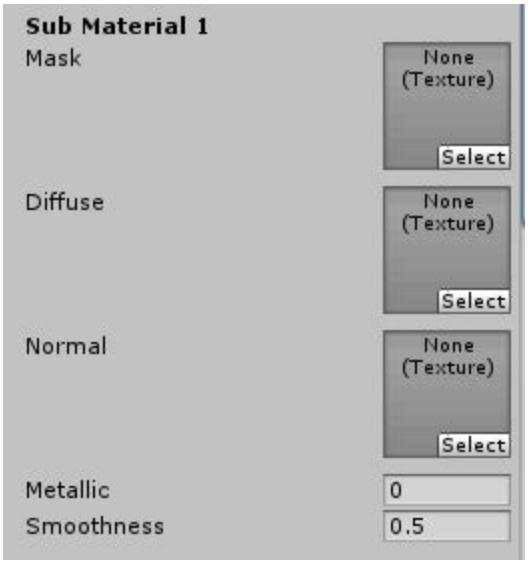
Tutorial:

1. Start by creating a new material. Then, in the inspector, set the shader from “Standard” to “Custom>MultiTextureShader”

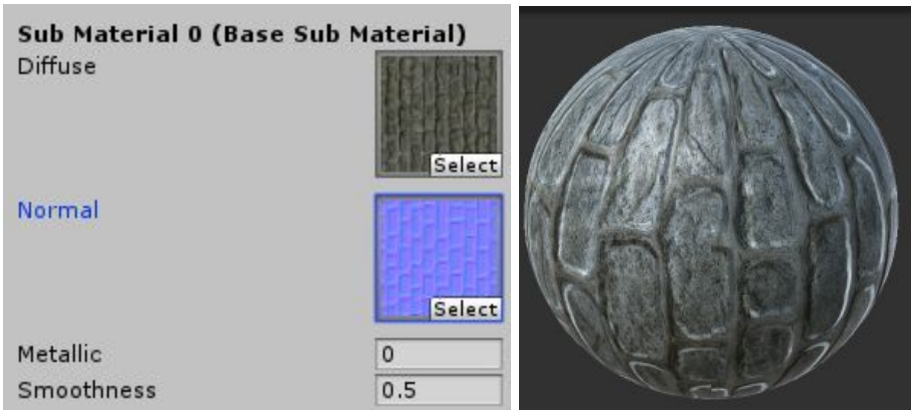


2. You will then see the default shader. Along the left are the inputs for sub-materials. Each of these has 3 respective slots for the following:
    - Mask - determines where (in UV coordinates) the following diffuse and normal maps, as well as the specularity setting, are applied. Note, the first sub-material does not have a mask component.
    - Diffuse - determines the color of the sub-material. Identical to “albedo” component of the standard shader.
    - Normal - determines the appearance of the roughness or smoothness of the surface.

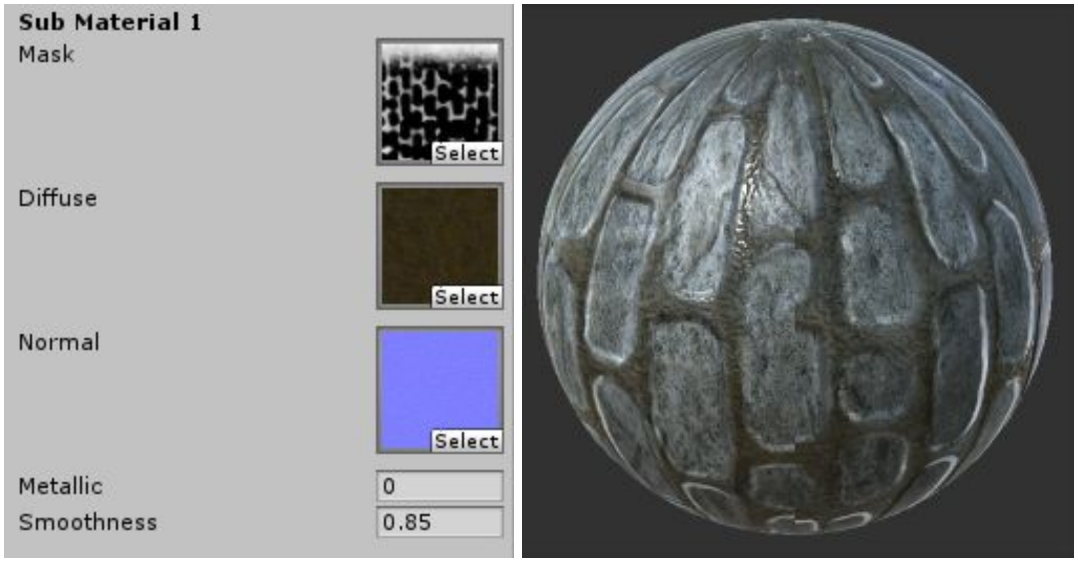
    Additionally, there are two float input boxes for the values for metallic and smoothness.



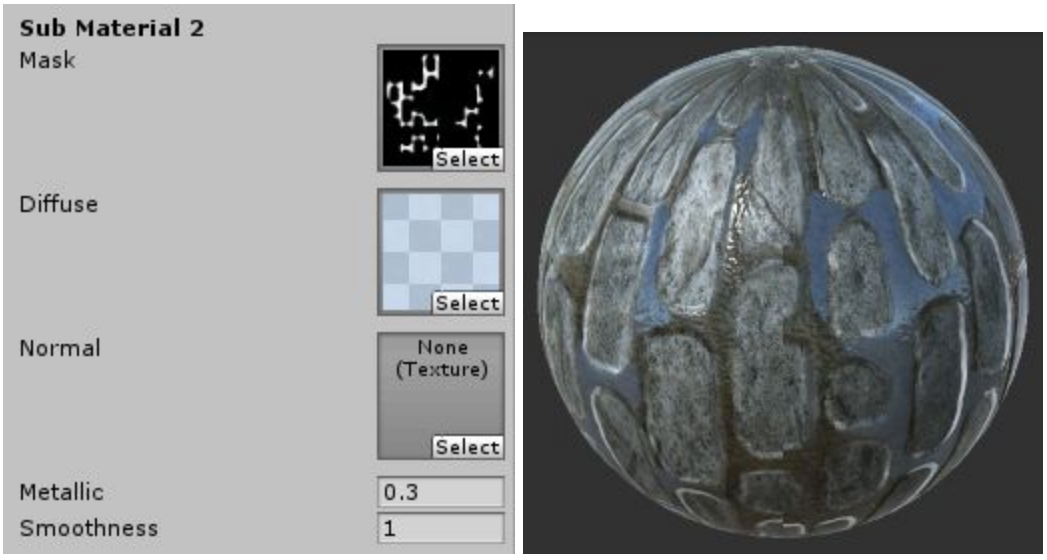
3. First, we will apply our base sub-material in the **Sub Material 0 (Base Sub Material)** section. This will be the underlying texture for our entire model, so be sure to plan around that. Here is the appearance of the material and shader after applying an initial diffuse and normal (found in the cobblestone texture group, in the materials folder). Leave the metallic and smoothness settings at their defaults for now.



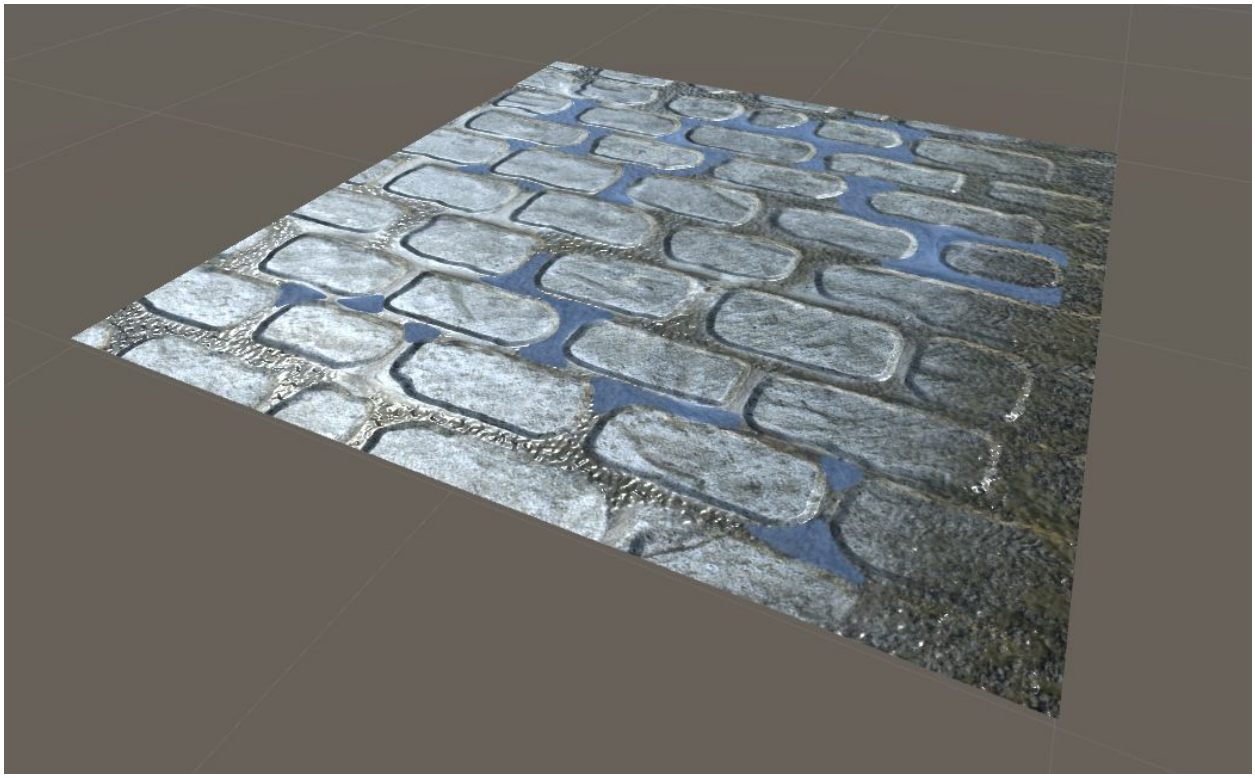
4. Next, we will overlay mud onto the cobblestone. We will do this by applying the mask, before adding the diffuse and the normal maps to the corresponding slots (found in the “Mud” texture group). We will also tweak the mud’s smoothness - we want it to have a dull shine. Set this value to 0.85, emulating the look of wet mud. This gives us the shader and the material viewer as such:



5. Finally, we will apply the water to the model. Begin by applying the diffuse and mask.Note that there is no corresponding normal for the water - and that’s fine. For a diffuse-only setup, simply leave the corresponding normal slot blank. You should have the final material should look like this:



6. This concludes the material tutorial! Note that only 3 out of the 4 possible sub material slots were used. The fourth would be used identically from the following three. The resulting material, applied to a flat plane, appears as such.



Code Notes:

- For better performance, consider removing unused sub materials from shader entirely.
- All textures are applied using the same UV-coordinates. This can be manually changed by removing the “NoScaleOffset” tag from the `_diff0` property in the shader - however, all textures will then use the UV properties of this single texture.
- Shader code is well-organized. I suggest reading through it if you want to begin learning shader programming - it’s relatively simple and cleanly arranged.