



Terraria has some interesting visual effects for dyed armor. Reflective dye adds a particularly interesting visual effect, adding highlights to your armor depending on your distance from various light sources and updating said highlights in real time as you move around the world. Though Terraria is a 2D pixel art game, this dye adds what appears to be 3D lighting to any piece of gear you use it on, which suggests that the game has some sort of 3D representation of space under the hood. I've always found it very satisfying to throw light sources everywhere and run through them to see how the armor reacts -- sometimes the highlights will flicker uncontrollably! Even though the effect is not perfectly executed, I find it intriguing and fun to experiment with.

I imagine that the effect is achieved through a fragment shader. There is probably some sort of rudimentary 3D simulation going on behind the scenes, where a phong shader is being used to determine how a 3D representation of the object is lit. Then, in the fragment shader, each pixel in the armor texture is updated to the average color (or perhaps the brightest color?) of a neighborhood of pixels in the 3D model. This could explain the spazzy behavior of the lighting when a large number of light sources are nearby -- it's difficult to represent the smooth lighting of a 3D model in a pixelated 2D image. Alternatively, they could simply be brightening the pixels of the 2D texture based on the armor's 2D distance from various light sources, but this wouldn't explain how the lighting wraps around the armor seemingly 3-dimensionally.

There are some other interesting dye effects, like a dye that displays a texture that scrolls as you move around, and a dye that shifts rows of pixels in a wave-like pattern. Terraria is a wonderful example of how shaders can be used to great effect in a 2D game.