Developer Notes: Units of Measure

"Basically I see there being a laundry list of reasons for using consistent units of measurement. I think the real question is why you wouldn't use them. Here is a quick list of some of the reasons."

1. **Accurate Modeling:** When building something off of blue prints or measurements you've taken, it is much simpler to build using those actual measurements you have in front of you. You are assured everything will line up and fit properly, as well as be in perfect proportion.
2. **Lighting:** If you are using lighting solutions that involve ray trace (lights/shadows), photometric lights, or any other kind of global illumination, all models must be built to real life scale or the lighting solution will not work.
3. **Multiple Modelers:** If there are multiple modelers, or you are building multiple models to put into a scene, all models should be built to the same scale so that when art is merged together there does not have to be any extra scaling (which usually involves guesswork or tedious measuring on the rescaled models).
4. **Reusing a model:** If all of the models you create are built using the same scale they can be easily dropped into other scenes you construct, or combined with other models you build.
5. **Forensics Modeling:** Sometimes animation is used for forensics purposes (court cases or other scientific reasons). Here it is absolutely necessary that everything is the right scale because having things the wrong scale can result in false data for a scientific animation. If the models are not built to the right scale in an animation for litigation purposes it can be dismissed as evidence (this tends to make lawyer clients very mad at you.).
6. **3D printing** - Having a model that doesn't have a proper scale can cause many issues when using any sort of 3D printer (stereo lithography and mill are two examples of these kinds of printers.).
7. **Digital Prototyping** - Sometimes I build units in 3D before they are built in the real world. Since I use real measurements I'm assured that everything is in perfect proportion and scale. So I can find flaws in the blueprints before we start construction. An example of this is when I built a Subway quick service restaurant, in 3D, and discovered that when all of the bread ovens, bread warmers, sinks and such were put in the kitchen area, there wasn't enough room to open a closet door all the way.
8. **Dynamics** - in 3D you can build in dynamics such as gravity, wind, water, and cause items to bounce when they hit, etc. These will not work very well if you do not build things to scale. It may work with items on another scale, but if you build it right the first time you save a lot of headaches trying to make it work."