Adding basic lighting – step by step

a.k.a. “What Michael did to show a scene with simple point lights”

We need to:

* Add “normals” to the models
  + This can be done programmatically, or by adding them to the models
  + Be sure to “normalize” the normals (i.e. make the normals a length of 1.0)
    - Again, this can be done in the program or in the models themselves
* Change the “vertex layout” in: the loader (VOA manager) and the shader
  + We need “normals” now (after the mid-term, we will also add “texture coordinates”
  + We’ll change *all* the vertex values to vec4 (no matter what they are)
  + Things like xyz will need to have a “w” (4th value) added. Make it 1.0f
  + Other things, like RGBA (colours) already have a 4th value.
    - Traditionally, the 4th value is “alpha” or a “transparency”. Set this to 1.0f.
  + The “normal” is another xyz value
* We need to add an “inverse transpose” of the model/world matrix
* We need to pass additional things to the fragment shader:
  + Vertex position (multiplied by *only* the model/world matrix)
  + Normal (multiplied by *only* the inverse transpose of the model/world matrix)
* We need to add the lighting components to the fragment shader:
  + The lighting function
  + The lighting structure
  + Set up the uniform variables to handle these