1. “If something is outside the viewing frustrum, it doesn’t get __________________________________.”

2. “Projection transformations just set up the _______; viewing transformations will set up how the ______________ goes.”

3. “For cameras, we generally set up one routine called ______________.”

4. Run Projection.exe now. To look at the bottom of the shoes (soles) closely, what values should you use below?

   ```
   glPerspective(_______, 1.0, 1.0, 10.0)
   gluLookAt(_______, ______, ______)
   ```

5. “Take one model of a chair, and position them all through the room... by setting up a transformation called ______________.”

6. “The collection of each transformation that takes an object... and puts it into the world, is called a ______________.”

7. “______________ is the coordinates of the object you are modeling, we map that into ____________________. Eyespace is the one where you are looking ______________.”

8. There are three modeling transformations:

   ___________________________________
   ___________________________________
   ___________________________________
9. "You want to think about encasing an object that wants to move around [translate, rotate, scale] inside a ________________________________.”

10. "Under the scene __________ transformations and ______________ transformations are the same thing.”

11. Run Transformation.exe now. Orbiting the camera around the front of the car (headlights, say) about the z-axis (angle $\phi$), with the camera about one cars length radius from the z-axis, can be done with what values below:

   \[
   \text{glTranslate}(_______, ______, ______) \\
   \text{glRotate}(\phi, ______, _______, ______) \\
   \]

12. "This is a standard reshape function... the important points:
   1. Set up your __________________
   2. Manipulate your___________________________
   3. Set up any ____________________________.”

13. "So, in that one nasty thing that we need to clean up, which is what you do when the window is resized... update the ______________________________.”

14. "So, this is the way we do composited matrices and how we set up hierarchical objects, its all ____________, do some______________________________, then your object.”

### Lighting

15. "The whole concept of lighting is that instead of setting up __________________ for your vertex, you are going to set up __________________ for lighting for that vertex.”

16. "At the vertex... you are going to specify a __________ or direction vector.”
17. Lighting contributors
   ________________ properties
   ________________ properties
   ________________ properties.

18. [For Material properties] “The one that is the most
   important is ________________, this is the base
   color of the object.”

19. “Specular and ________________ actually go
together.”

20. “Specular is one of the ones that make your object look
    ______... expensive.”

21. “Specular is the actual ________________ and shininess is
    how big that ____________ is.”

22. “Emissive color is the one that actually
    __________________________.”

23. “You can set up ____________________________ for
    the front and back.”

24. “_______________ is the only one that has properties
    defined: white light, shining down the – z axis.

25. OpenGL supports two types of lights:
    __________________________
    __________________________

    red diffuse object with blue specular reflection, as
    described in the movie. To turn the object completely red,
    what would the specular light values be below?

    GLfloat light_Ks[]={____, ____, ____, 1.0}

    To see only the blue specular reflection, and no red, what
    values of diffuse light would you use below?

    GLfloat light_Kd[]={____, ____, ____, 1.0}

27. “If you want the light to actually move like the sun... then
    you would give it its own __________________________.”
    [We will quit here at 49:26 and pick up the rest in class.]
Textures

1. “A __________________ in OpenGL is defined as a 2D array of bits.”

2. “_____________ are rectangles of pixels which have red, green and blue values.”

3. Three steps to apply a texture:
   1. __________________________________
   2. __________________________________
   3. __________________________________

4. “There are 1D, 2D, 3D and 4D textures for OpenGL... 1D textures are something you want to add to a ___________; 3D textures is a whole ______________ of textures.”

5. “Open GL created ___________________________ which allowed you to have an object plus all the textures and parameters associated with that object.”

6. “How does texture interact with other things?... The color you assign by shading, lighting and materials; and the answer is this parameter over here called the ________________________________.”

7. Run Texture.exe now. For what parameters below will the fishermen appear gray with yellow clouds?

   GLfloat env_color[]={____, ____, ____, 1.0}
   glTexEnvi(GL_TEXTURE_ENV,
             GL_TEXTURE_ENV_MODE, ________,};

8. We have talked about the Modelview matrix and the Projection matrix, but there is a third called the ______________________ matrix which applies to texture coordinates.”

9. “Filter modes have to do with ____________________, ____________________ and ____________________.”

10. “The basic issue here is if you have a texture map, one texel... how many ______________ does that correspond to in the image?”

11. “mipmapping gives you a __________ resolution image.”