Textures - all you to use raster images such as JPEG and TIFF files, computer generated patterns known as procedurals, and gradients which all surfaces properties to change according to conditions defined by the user. This allows the artist to add details to your surfaces

Surface Basics

Surface is a collection of unique properties that allow you to describe what an object looks like. Surfaces are applied to polygons in Modeler

<F5> Keyboard Shortcut opens the Surface Editor in both Modeler and Layout
<q> Keyboard Shortcut brings up the Change Surface window in Modeler

Primary Attributes

Color - channel is used to change the base color of a surface.

Luminosity - channel determines the degree to which a surface is self-illuminating. Example: rocks don’t normally emit light so the rock would have luminosity value of zero (0). However molten lava does emit light. When Radiosity is turned on/used your surfaces will become a light source and illuminate the environment.

Diffuse - channel determines how much light an object reflects. Higher values means the surface will reflect more light and in turn will be brighter. Lower values means the surface will reflect less light and typically be darker.

Specularity - channel controls the intensity of the highlights that appear on the surface of your object. Specularity is a surface “cheat”. In the real world, highlights are actually reflections of bright light.

Glossiness - channel determines how big the specular hot spot will be. High values generate a small, tight hotspot, while low numbers give a wide, soft highlight. If Specularity is set to 0% this channel will be inactive.

Reflection - channel controls how much of the environment is mirrored on the surface of your object. In the Environment Tab of the Surface Editor you set whether the surface truly reflects its environment (computationally intensive for rendering) or uses a reflection map (an image) to give a quick but convincing illusion of reflecting the world around it.

Transparency - channel determines the degree the degree to which you can see through a surface. Higher values make your object “invisible”; however the surface will still show specular highlights and reflections. Using a Color Filter setting on the Advance Tab in the Surface Editor you can created tinted transparent objects such as plastic or stained glass.
**Refraction Index** - channels determine how much light is “bent” as it passes through transparent surfaces. This bending of light is a natural phenomenon and different materials have different refraction indexes.

**Translucency** - channel measures how much light passing through an object will be “seen” on the other side (think of leaves glowing when backlit by the sun).

**Bump** - channels determine the overall intensity of the textures applied to this channel. This channel increase or decreases the overall bump effect. Use a texture map to apply a “bumpy” surface.

**Smoothing** - option tells Lightwave to render adjacent polygons as a single smooth surface rather than distinct, individual polygons. Smoothing works in conjunction with the **Smooth Threshold** setting to shade adjoining polygons.

**Double Sided** - settings makes the surface of a polygon visible from either side, regardless of which way its surface normal is facing.

**Environment Attributes**
- **Backdrop Only** - will cause this surface to ignore objects around it and only reflect environments set.
- **Ray Tracing + Backdrop** - is the default setting. This will cause reflective objects to reflect objects around them as well as environments setup in the Effects | Backdrop tab. This produces the most realistic reflections, but comes at the price of longer rendering times.
- **Spherical Map** - similar to Backdrop Only. It will ignore objects around the reflective surface and only reflect the image you choose from the Reflection Map pop-up menu. This method does not require ray-tracing and therefore renders quickly. However does not produce very realistic results.
- **Reflection Blurring** - helps create the imperfections of objects that reflecting an image or elements in the scene. Its easier and faster to use this option instead of creating a small bump map texture to create the effect.

**Technical Notes (Not Part of the Quiz - but useful for logo animation project)**
2 Types of reflection on every surface. Reflection of light, which is called Diffuse, and the reflection of the environment, which is called Reflection. As a basic rule the sum of Diffuse and Reflection should equal 100%. When using all three channels as basic rule is to have Diffuse, Specularity, and Reflection values equal up to 100%.

Since Real highlights are reflections of bright light sources in the environment, the best way to create realistic highlights in the Lightwave is to model simple shapes (discs and rectangles) as your light sources and give them a unique surface with a high Luminosity value. Then use Reflection instead of Specularity on your normal surfaces, which will cause these modeled light sources to appear as bright reflections on your object.