Planning

Before painting, choose your color groups.

Do most painting zoomed out.

Desaturate a color by adding tint, shade, tone, sienna/umber, or its complement.

Mud is useful when used correctly, such as in shadow areas.

Where a plane turns, the value changes, and where the value changes, the color changes.

Create a value-check layer with a Saturation blend mode.

Start with midtone flats so that you have headroom for shadows and highlights.

Everything in a piece, including colors, has to serve a purpose and work together, like different actors in a story.

Ambient Occlusion

The AO will carry neither direct nor indirect light because light cannot reach that area.

Where objects sit flat on the surface, there is no AO.

If the entire object is in shadow, there will be little AO.

Bounce Lighting

The bounce lighting of the object is influenced by the ground and the direct light, but darker and less saturated than the parts of the object hit by direct lighting.

Bounce lighting is apparent close to the surface where there is a lack of cast shadow. It'll appear over cast shadow on a higher point where bounce lighting can reach (if there is global illumination). Without GI, there is no bounce lighting above the cast shadow.

Most bounce lighting has soft edges.

Highlights

If the light source is colored, the highlight and full light zones of the object have higher saturation.

The bigger the light source, the bigger the highlight.

On cylindrical objects, the highlight runs vertically, but only if the light source points perpendicular to the object. The more the light source is angled, the shorter the vertical highlight on the object.

Misc.

Put cooler colors in the background and warmer colors in the foreground.

Colored lights are not solid color; they grade outward and lose saturation.

Aqua-green is a foreboding color.

In forest scenes, colors vary between green-blue in the shadows and green--yellow in the light. Any natural environment needs to be partially monochromatic.

Background objects reflect the color of the sky.

The more humidity, the more the clouds carry the color of the sky.

Black and white alone can make gray look blue, so mix burnt sienna with the middle gray to overcome this.

Bodies of water reflect the color of the sky.

The glossier the material, the harder the highlight, the more pronounced the bounce lighting, the better the cast shadow reflects on the object casting it, and the more all surrounding objects are reflected. If the object has a round cross section, such as spheres, toruses, or cylinders, the reflections are warped on the object. The reflections on flat surfaces are flat like a mirror.

Creating Harmony

1. Choose three master colors of the same hue, but one is lighter and another one is darker and less-saturated. When you want to lighten a color on the canvas, such as areas hit by sunlight, pick from the lighter master color. Areas in shadow should be mixed with the darker master color, and the local colors are mixed with the original master color.
2. You can also create harmony with a flat color layer set to Overlay.
3. Use a color filter.
4. Manually add the master color to every other color on your palette.
5. Use neighboring colors on the color wheel.
6. Use an underpainting, such as burnt umber, to help unite the piece.
7. Keep the values and saturations of different colors similar.
8. Use the Rule of Three.
9. Use the local color of one plane on another plane, and do the same for objects and characters, but do not over-emphasize this.

Whatever method you use, this master color is in every color on the canvas *except* on the subject.

Do not use too many colors in the piece. Add color notes of simplified, abstract shapes to the flats for variation. Use warm color notes in the shadows and cool ones in the light. You could also use similar, analogous hues in each zone instead.

Direct Light

The local color of the object changes where it is hit by the direct light and surrounding colors.

The closer the local color to the light color, or if they're far apart but the local color has low saturation, the more the light color influences the local color, including bounce lighting.

Direct Light (cont)

Increase the value of the local color where light hits it and shift the hue in the direction of the light color.

Light influences the edge of an object in increments.

On a bright, sunny day, colors are brighter and more saturated.

A brighter object has less saturation if it's hit by white light, but if it is hit by colored light (*any* color), it has *more* saturation.

There should be more detail in areas hit by light.

When warm light hits a warm object, the highlight is strong, almost to the point of glowing. Use color dodge.

In a simple test scene, if the light source is white, the highlight and full light zones of the object have lower saturation.

When you add color, you are adding light.

Torus Objects

Highlights occur at the turning planes that face the light source and are shaped longitudinally along the turning plane.

Bounce lighting starts where the cast shadow starts and runs diagonally until it is between the top and bottom turning planes. From there, it runs longitudinally between the top and bottom turning planes all the way around the torus, both on the interior and exterior.

Form shadows run longitudinally above and below the bounce lighting.

AO is apparent between the ground plane and the bounce lighting.

Metal Objects

The highlight core has a color mix ratio that is mostly the local color (even if the light is white). The highlight rim's mix ratio is mostly local color.

Metal Objects (cont)

The light color has less of an effect on the entire object.

Shadows

If the entire object is *entirely* in shadow, only ambient lighting will affect it, and it will also affect it where the direct lighting *would* have if the object wasn't in shadow.

The form and cast shadows carry the light from the sky and surrounding objects.

If the object is /partially/ behind a bigger object, then some of it will still receive direct lighting, so the highlight is still apparent.

The higher the light source, the more horizontal the form shadow on a sphere. This doesn't affect cubes and cylinders.

Outdoor cast shadows should be cool, but you should also mix in a complement of the cool color for depth.

In a globally lit scene, if the surrounding objects are colored, but the ground is white, then saturation in the shadows is either constant or lower. If the surrounding objects have no color, shadows have less saturation.

If the receiving object is warm, then the shadows are warm; if the receiving object is cool, then the shadows are cool.

The shadow color is the complement of the local color.

The darker the local color, the darker the shadow.

In shadow, only the planes that are facing toward the sky receive the ambient color of the sky. In both shadow and light, vertical planes that are not facing the sky receive bounce lighting from the ground.

In a globally lit scene, the shadows have increased saturation if surrounding objects, including the ground, are colored (even if the light source is white).

Shadows (cont)

If you mix complementary colors, you get mud (unless they are primary colors).

Saturation

When adding tone to a color, move diagonally from the local color toward the middle of the value scale.

Use the most saturated colors on the subject.

On an overcast day, colors have low saturation and contrast.

When you desaturate color, you are removing light.

Objects at different depths cannot have the same saturation.

When light sources are of two complementary sources, the colors should not overlap. Put a desaturated area between them. Complementary colors neutralize each other.

Use atmospheric distortion on the backsides of objects to emphasize depth.

To keep grays from looking dull, vary them with warm and cool color notes to keep them interesting, though still gray.

SSS is created with a bright, saturated color and a Soft Light blend mode. SSS is on the nose, ears, cheeks, and hands. Normal redness can be found at the joints.

Post-Production

Use a large, soft brush to darken everything outside the focal point.

Create chromatic abberation by nudging the color channels one pixel.

Dielectric Objects

The highlight core has a color mix ratio that is mostly the light color (even if the light is white). The highlight rim's mix ratio is mostly light source color.

The light color has more of an effect on the entire object.