

Visual perception and composition

What do we perceive as beautiful?

What do we perceive as "beautiful"? I think that our more basic value judgements of what is good and bad to look at has been programmed into us by evolution: looking at some things gives us pleasure, and looking at some other things can make us physically nauseated, and there are pragmatic survival-promoting reasons for this, like us being very social and sexual animals, and needing to build strong parent-child bonding, and also strong bonding between parents, (for the safety of the young, since human childhood lasts so long). That's why people never really grow tired of looking at people. So then, what are these basic values, these most primal likes and dislikes most of us have?

Why we perceive things as attractive

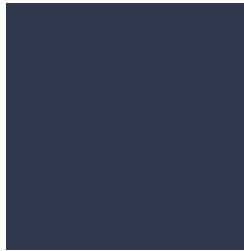
Human skin is very thin and translucent, and seems to have an internal saturated glow in strong light - so we are attracted to translucent and glowing things, like the sea, sea foam, fog, the sky, glowing clouds, leaves or grass (especially in backlight), frosted glass, paper, cloth, rubber, plastic, milk, ice, neon, pearls, jade, alabaster, etc. Healthy skin is smooth, so we like smooth things, like polished wood for example, and we don't like the opposite (check out any monster, or raw concrete wall, or book on skin diseases). Our bodies have a certain type of complex organic curvature that is almost aerodynamic - so we prefer this kind of design to other, more angular ones. Our eyes glisten and light refracts in the lens like in a jewel - so we like jewels, and glass, and the play of light in brandy and wine, caustics in a sunlit swimming pool, shiny things like chrome, gold, silver, polished marble... (Youthful healthy hair is shiny - so we like satin and velvet etc.)

Also, we seem to like contours and outlines around edges of objects (as in Japanese prints, cloisonne, engravings, cartoons, comic strips, all kinds of drawings, maps, neon lights, edge-glow, any sort of outline-enhancement). We see objects by edge detection, where an edge can be created by a difference in color or brightness or both. So we like lines of all sorts even more, especially when they separate two areas with different color or brightness - they become "super edges".

How does this apply to cg? I'm not saying you should put glows and translucence and outlines on everything - but I think it helps to know these things when you're designing your scene. For instance, instead of an outline, maybe an adjustment of the lighting so that the edges become more defined? Maybe a more rounded shape on some parts of your design? Maybe some more work to make that slice of cheese or jade sculpture more translucent? (Read more about this in the chapter on shading).

Composition - hints and tips

I think graphics can be classified according to how many Levels of Variation (LV), and Discontinuities (D's), they contain: LV zero with D zero would be an image consisting of all pixels the same color.

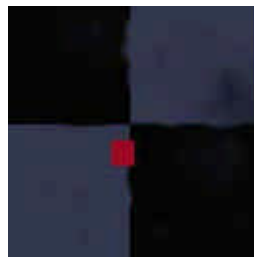


Extremely boring to look at!

LV 1, D zero, would be when there's a noticeable difference on some pixels; a variation, that's more or less repeated throughout the image. One example would be a chessboard - still boring though.

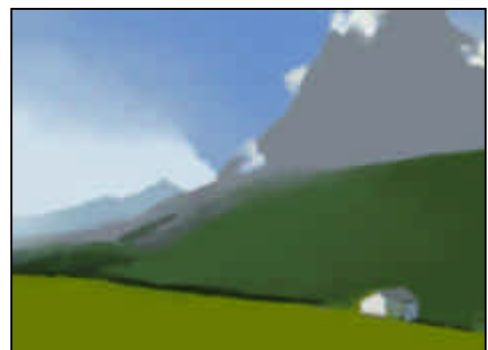


LV 2 (below) is a variation on the variation: in this case maybe adding smaller squares. A Discontinuity would be introducing another area in the image with a very different type of variation(texture). Another important factor in composition is the border between two D's (a DB), how it's shaped, how blurry it is etc.



Lastly, a third factor is the Randomness of the V's, D's and BD's.

We humans seem to like large views - why? The landscape below on the left has 4 large Discontinuities (and many smaller ones) of very varied size, color and shape, most of which are Level 3 or 4, and the Borders between them are very varied. It also has a high degree of Randomness (R) all over. A high number of LV and D's, varying DB's, and high Randomness = a more interesting image. I've constructed another image (below on right) with low LV, D# and R from the first one. Which one of these could hold your attention longer?



I suspect you chose the image on the above left. The reason for this is that the brain likes "goals", targets and paths for the eye-movements, foci of interest. There should be plenty of them, spaced irregularly and not too closely as a group, and one focus has to stand out in weight or "importance".

Standard compositional layouts

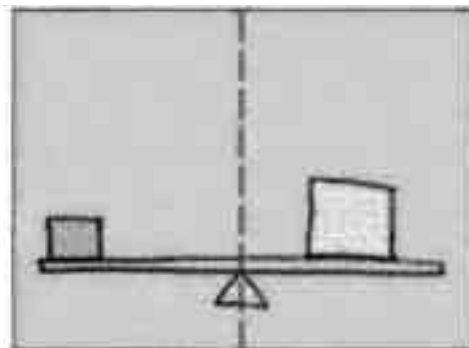
Asymmetrical or dynamic balance

This sort of composition relies on creating balance between the two sides of the picture. In this one the negative space, or area on the left where there is no rectangular object, has equal visual weight to the right side. Think of it as you would a scale. On one side of the scale there is eight one-ounce cubes and on the other is two four-ounce cubes. They both weigh eight ounces, but look different. In a composition this could be shown as two large dark squares and eight light squares. Try to move the elements around to lead the viewer around the composition.



The most satisfying images are those in which a balance is struck around the central vertical axis of the composition. Weight here is judged in terms of surface area, colour and tonal contrast. Thus an architectural subject on the left might be balanced by an area of sky or cloud on the right. Edges with greater tonal contrasts tend to register as having greater weight.

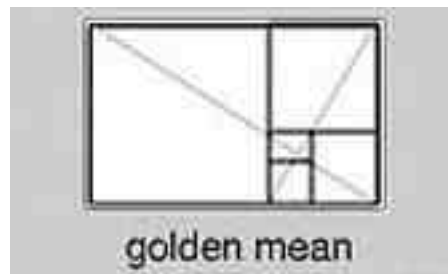
This can be adjusted a lot by just changing the lighting in the scene a bit, if for some reason you don't want to move your objects. In a successful image this balancing act



may not be immediately obvious, but if we analyze it carefully we'll discover how the artist has done it.

Golden mean

This mathematical composition is created from a 1 to 1.61804... ratio. You will find this particular ratio works well in creating an interesting balance in a picture. The system is made up of a series of square areas which diminish in size and curve in toward the center, much like a snail's shell, or the structure of a flower or a pine cone. Our finger bones, among many organic things, seem to follow these proportions. (Look up the Fibonacci series.) One can recreate this by starting with a 1 to 1.618 rectangle. Divide a square section on the left side with a vertical line. Draw a line from corner to corner. At the point that the diagonal meets the vertical line draw in a horizontal. Draw another diagonal from the top right corner to the bottom of the vertical line. Draw a vertical from the point where the diagonal meets the horizontal line and continue the process until the squares become too small to work with. (A quicker, more simplified compositional device is called "intersection by thirds" - you divide your image into 3 equal parts both horizontally and vertically, and where those lines cross are good places to put a focus.)



Cropping

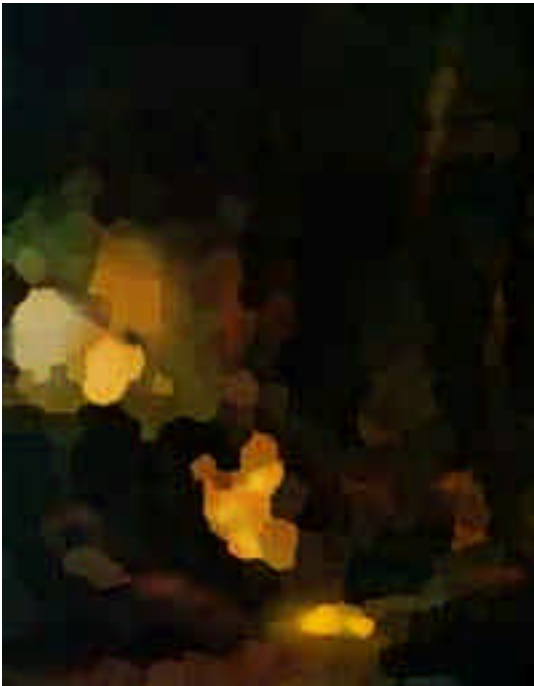
Refers to how painters and photographers started to experiment with cropping, to leave more of the main subject outside of the picture frame (and/or perhaps more empty background inside) in the late 1800's and forward. Be careful with this at first, it's easy to screw up.

Offset overlaps

This refers to the accidental 'touching' or 'framing' of two overlapping forms, for instance the left edge of a man's face exactly touching the right or left edge of something behind, like a window. Always offset overlapping areas. In the same example, the man's face should not be in the center of the window either - the parts of the window that are visible on different sides of his face should always be unequal, especially if the window is bright and highly visible.

Most compositions use a combination of two or three of these techniques.

Study other artist's compositions. You will notice that repetition of an element occurs as a way of holding the composition together. One may see a small hint of red on one side of a painting that is there to balance and compliment a larger area on the other side. A curved or straight line that is reproduced in different sizes, thicknesses, and places throughout a work can visually hold the piece together.



Look at the image on the left, and note how the composition balances perfectly. Also note how the image breaks down into blocks of color of very varied size, shape and placement and color, but sort of clotting together creating very organic, natural, curved, slanted edges - no verticals or horizontals at all, in fact not even a straight line.

Be very careful with these things - the horizontal and vertical straight line or shape. Be extra careful of making a focus of such an edge, and putting 2 or more together in one image.

The images below shows the eye-movements we use to "read" an image (saccade, and head-free gaze-shifts) - the eye should probably be "led" around the image in as wide and varying a path as possible, preferably using slanted paths (for compositional reasons, see above).



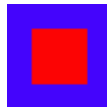
About symmetry

Asymmetry: when symmetry is used it should be combined with variety of detail, like a mandala for instance, and there should only be ONE main focus. Symmetry quickly becomes very bad if it is combined with a lack of detail/diversity - because that usually creates 1 or 2 foci of equal importance, and very few (and weak) other foci. That's irritating. It captures the eye movements in a tight, small linear pattern in the centre of the image, covering relatively little area - the brain is then gathering info inefficiently.

About colour

I think the use of strong colors should be kept to a minimum, like 1 or 2 % of the image area. A sunset scene will probably have a lot of red, orange and yellow in it, but usually not pure except in a few spots, the rest of the image would have a lot of warm browns and blacks in it. Pastel colors, grey's, browns, dark colors, in short very muted colors, are what should make up 70 - 100 % of an image. The rest of it should never be 2 equal amounts of 2 different strong colors (bearing in mind that pure purple needs to cover an area 3 times larger than pure yellow to seem equal, and pure blue 2 times larger than pure orange - red and green are equals).

For a given lens curvature, longer wavelengths have a longer focal length, i.e., red is the longest focal length and blue is the shortest. Since to have an image focused on the retina, the lens curvature must change with wavelength, with red light requiring the greatest curvature and blue light the least curvature. This means that if pure blue and pure red hues are juxtaposed, the lens is constantly changing shape and the eye becomes tired.



Ouch - that hurts!

Notes

(This space has been left intentionally blank.)