

PIXELS FOREVER

WATT
DESIGNS

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PIXELS
FOREVER

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INTRODUCTION

Pixel art is a peculiar artistic style. To begin with, it revolves around a basic element: the pixel (obviously). A px (pixel) is the minimum unit of the digital image. Or, in common terms, a square of solid color that is displayed on an electronic medium, such as a screen.

Pixel art is about harmonizing these squares to form compositions of different sizes, complexities, and resolutions.

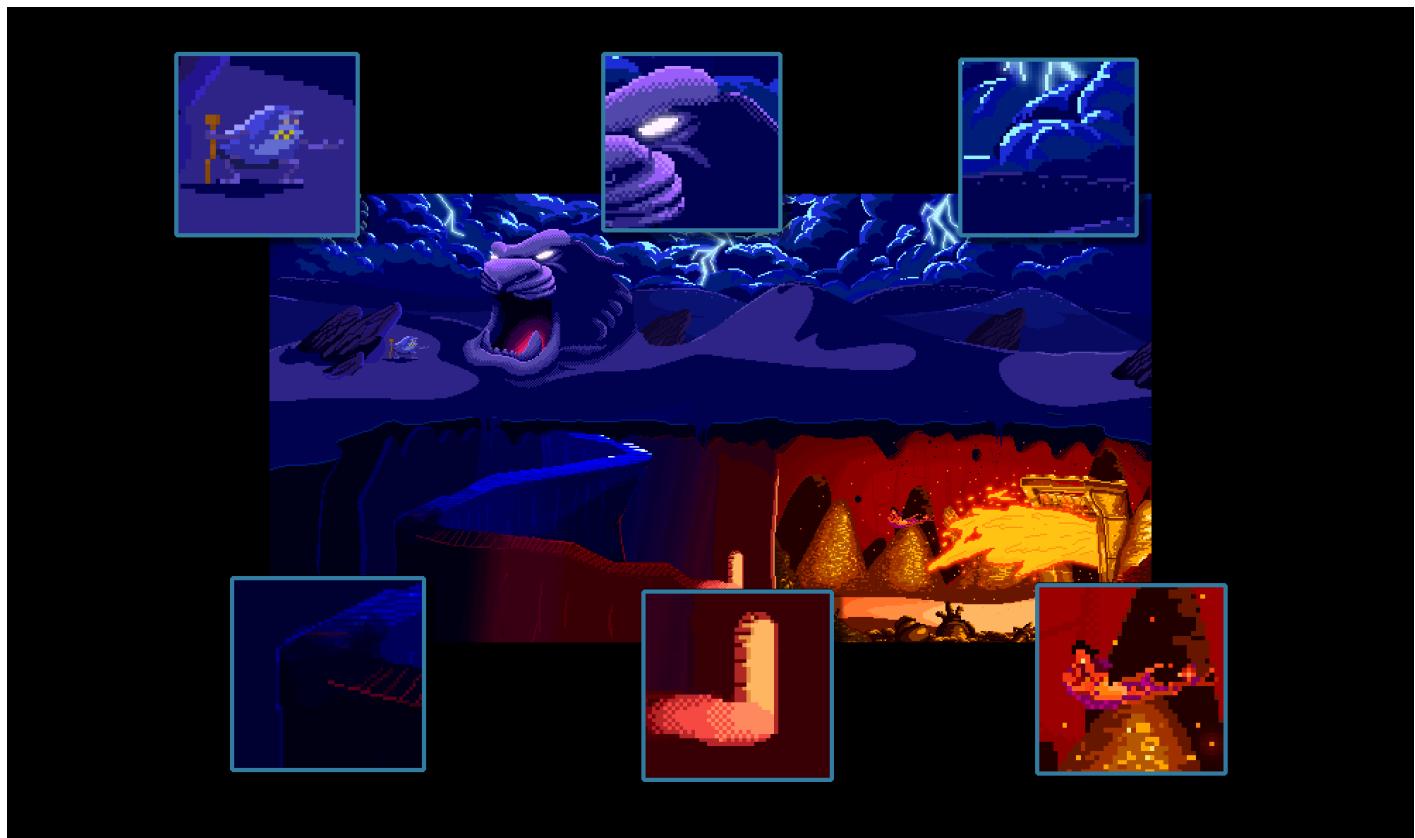
At first glance, it looks like an effortless art but it is full of peculiarities. One of them lies in its **versatility**, since from these small colored squares, an artist can create all kinds of works – from photorealistic illustrations (after all, any digital image is a composition of pixels) to minimal pieces that play with the observer's intuition.

However, if we search for pixel art examples, we will see that most pieces tend toward the minimalist style. Why? For several reasons.

Perhaps the main one lies in the origin of this art: the first video games. At that time, pixel art wasn't an artistic choice but a technical one because its structure (modular, light, precise) offered great ease in controlling and projecting graphics on those early devices. This motif persists today. Both as a gateway to video game development and

as a development tool, many artists choose the pixel to shape their creations.

This accessibility is another one of the peculiarities of pixel art. It is an **affordable** art. Any of the readers of these lines could start practicing pixel art in a matter of minutes: it is as easy as opening any image editor on a computer or downloading an app on a cell phone and painting the first pixel. It doesn't require powerful equipment (for example, 3D art) or specific material (for example, canvases or paints). It's even



funny to think that the best pixel artists in the world and any newcomer to this art form are going to use the same tools to create their art: a digital editing program (no matter which one) and a pointer (either a finger, a mouse, or a digital tablet). The result is hopelessly similar if someone asks a beginner and a veteran artist to both draw a black square.

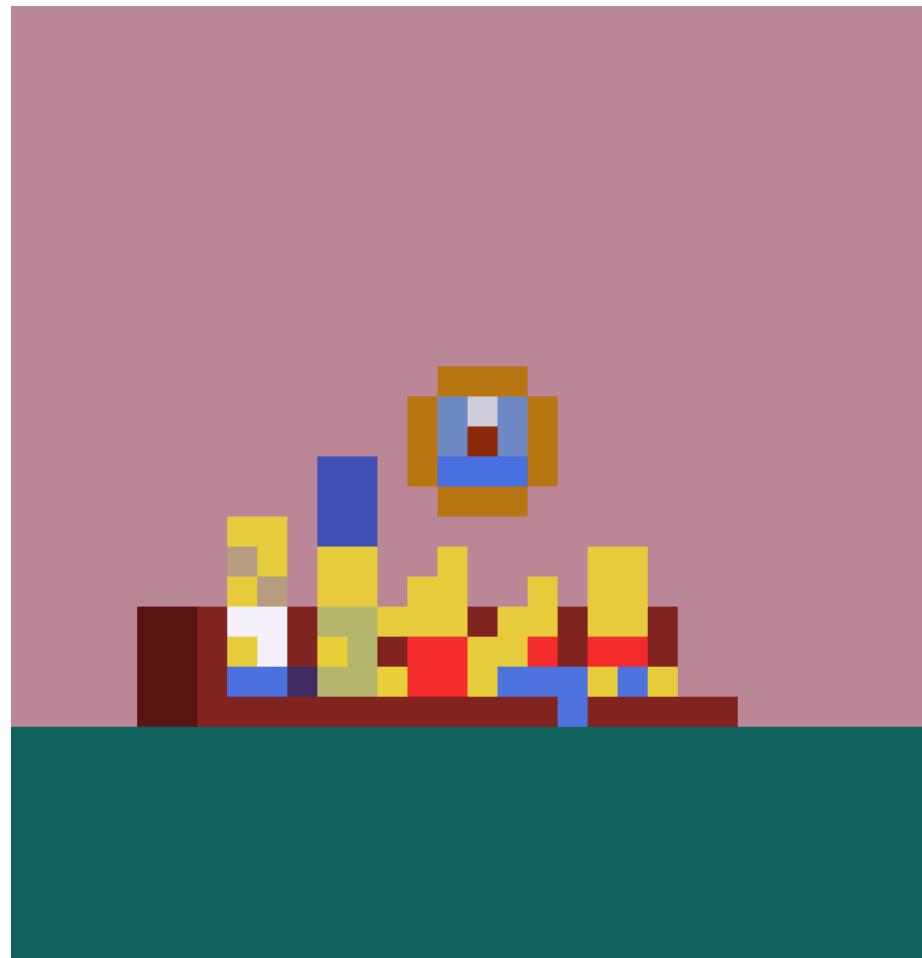
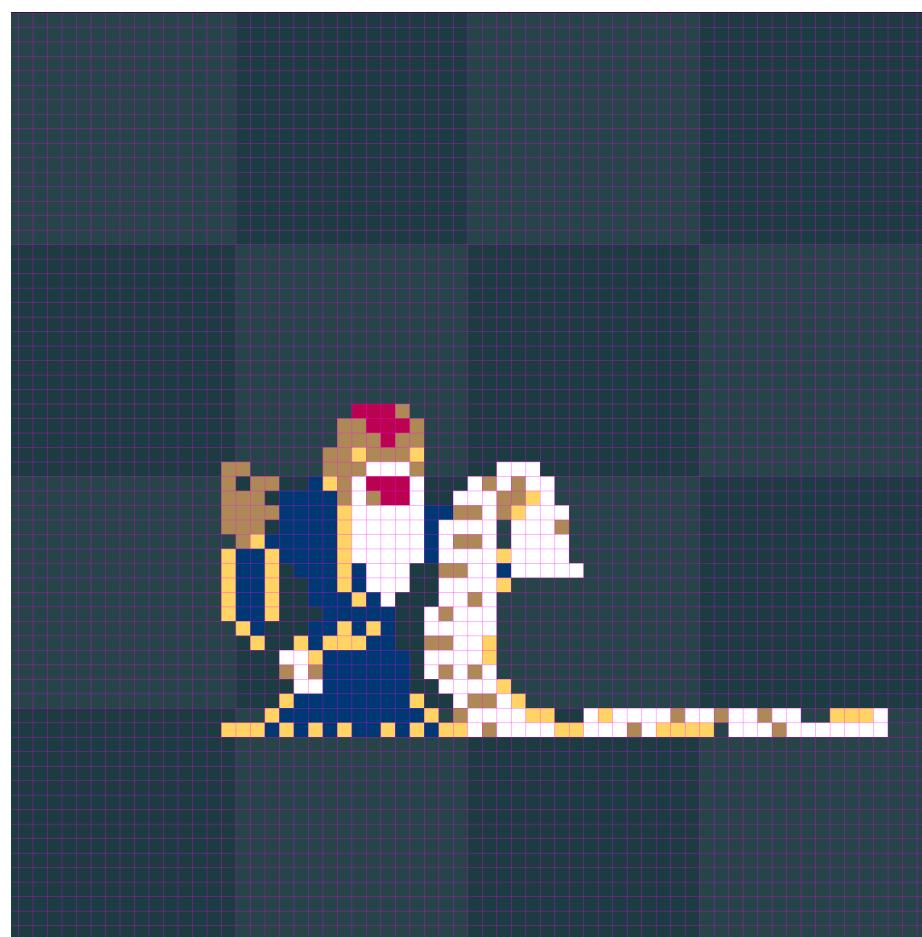
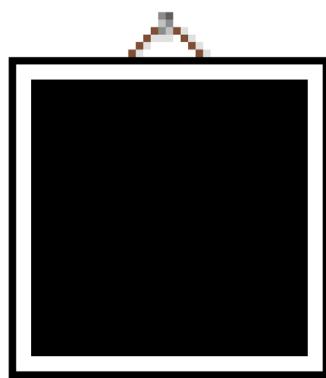
Because another one of the great qualities of pixel art is that it has **very limited initial rules** – it works only and exclusively with squares of a specific size. The size of a square defines the grid which arranges all. Each square also occupies a space that no other can totally or partially occupy. Vertical and horizontal lines can only form squares, so no diagonals or curves are allowed. Finally, only a single color can make up each square.

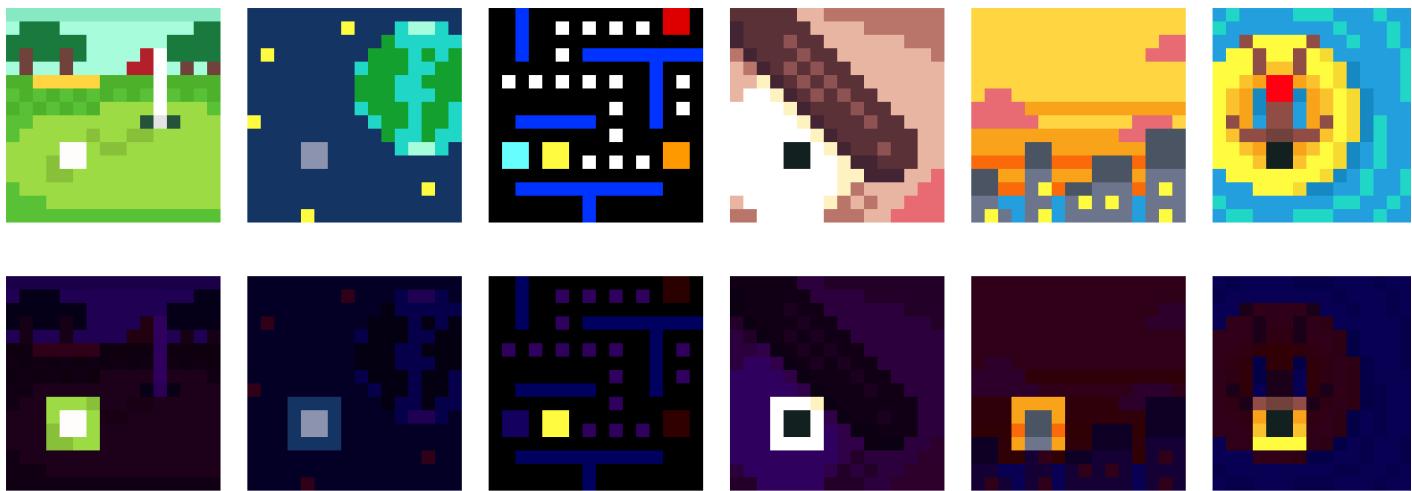
Of course, these are not rigid rules since – as in any art – an artist can and should adapt. However, they define an exceptionally useful and clear starting point to develop an individual's style.

But besides being affordable from the technical point of view, it is also from the artistic point of view. Having an artistic background is unnecessary to start experimenting with pixel art. Obviously, professional artists who know composition, color theory, and lighting may approach their creations from another perspective. However, the reality is that anyone can achieve a solid, entertaining, and coherent piece on their first attempt.

Conceptually, pixel art is an art that plays a lot with intuition, which is why anyone can master the art form. The same design can represent infinite concepts since, in many cases, the art itself is not as important as the context which interprets it: proportions, points of view, perspectives, colors, etc.

Example: Playing with a 2x2 square on a 16x16 canvas.





Magic! It is curious how excellence in complexity is rewarded in most artistic disciplines, while pixel art often happens to be the opposite; a lack of detail, subtlety, insinuation, abstraction... is the goal.

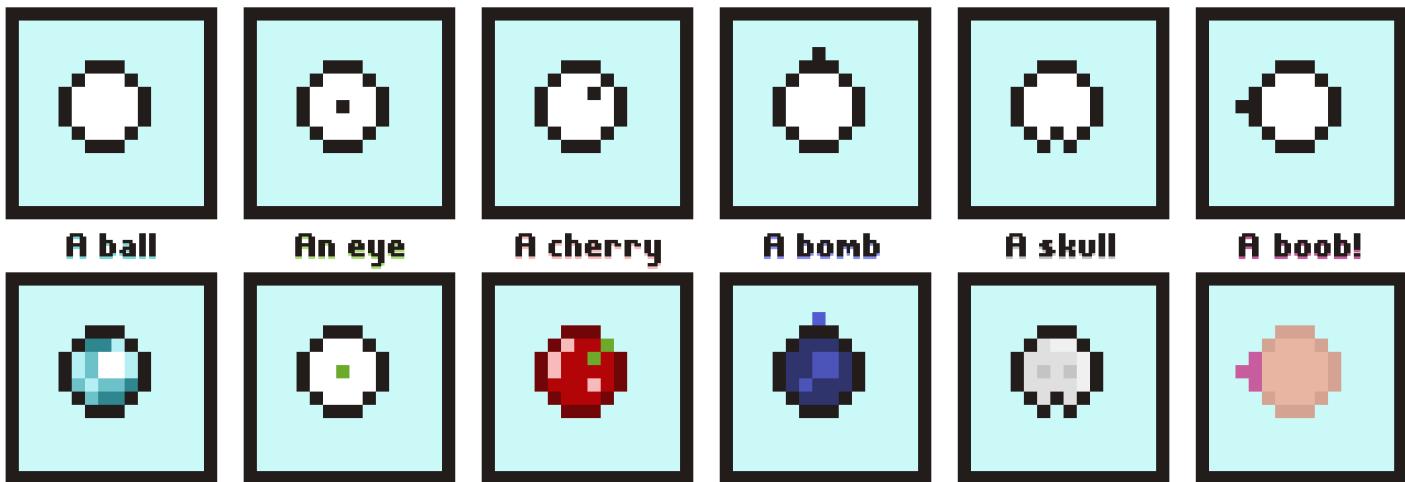
There is even a debate about considering a pixel artwork above a certain level of complexity as a low-resolution illustration as if it belongs to another discipline.

It is easy to find many similarities between pixel art and Lego, the construction game: simple rules with infinite possibilities of combinations and creations, ranging from absolute minimalism to colossal constructions full of nuances. But let's not forget that in pixel art, everything depends on the artist, even the lights and shadows. The creation process is very **handcrafted**.

Being an art focused on low resolutions, each pixel that makes it up has been placed with intention. One more or one less pixel or one with a different color can completely change the conception of a piece.

If we think about animation, craftsmanship becomes even more evident – because the easiest way to move or transform a pixel is to erase and repaint. An artist could





automate some aspects and add post-processing effects (for example, look at the video games *The Last Night* or *Replaced*), but integrating them properly without losing the pixel art charm is difficult. If an artist wants smoke effects, the best (and more fun) way is to paint it frame by frame.

So, it's not all good news when becoming a pixel artist. The entry barrier is easy to

overcome, and it is possible to achieve good results early on. But the learning curve is far more complex than it might seem. The fact that pixel art is a self-taught discipline and that the creation processes (painting, erasing, and moving pixels) hardly vary at any level leaves all the progress in the hands of the artist. Because of this, many artists quickly settle on a specific style and stop progressing artistically to focus on the conceptual.

This fact brings us to one of the objectives of this artbook: to encourage inspiration through the ideas and processes that different pixel artists – from around the world – use to create their pieces.



Scan for
“Dust”
Animation



OCTAVI
NAVARRO

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LESSON 1



WORKFLOW

One of the most important components an artist develops is their workflow. Another word for workflow is simply “process.” Whether an artist realizes or not, they’re using a workflow when creating anything. The key is to be intentional and optimize it.

An artist’s workflow might change from project to project, but generally, finding a consistent process is good. This way an artist doesn’t have to invest brain power into finding a new working path for each project. The best workflow should be a helpful series of steps following a logical progression. More importantly, an artist follows a pattern for all their projects. The written process/workflow below is perhaps the most straightforward demonstration:

1. Gathering references and ideas.
2. Sketching.
3. Fine-tuning perspective/composition.
4. Adding large elements (e.g., color).
5. Adding small details and flourishes.
6. Fine-tuning and polishing the final result.

Engaging in any creative endeavor, whether pixel art creating, sculpting, jazz flute playing, or mash potato sculpting, can all follow this pattern.

Artis Igor created this exemplified 90s bedroom through this process: firstly, researching pictures of a typical boy’s room from the 90s – gaining a sense of perspective and aesthetic, but also to spark ideas.

Once the ideas are collected, move to the sketching phase. Artists shouldn’t be married to their initial ideas; that would go against the whole point of sketching. Think of sketching as one level up from

thinking, but on paper (or on a screen), not deliberating over the quality. The piece will become clearer once an artist sketches and plays around with the concepts, shapes, and ideas. The next step is to clean up the sketch and solidify the line art. Here is where to make sure that the perspectives are all correct. The line art is a foundation upon which a creator builds the rest of the piece, so if the perspective is wrong, it doesn’t matter how well they complete the rest of the steps – because the viewer will always feel it doesn’t sit right and looks “off.”

Once the line art feels good, it’s time to start laying in colors. Not only continuing



to create the illusion of shape and depth but revealing errors in the perspective and line art. It's still not too late to go back and fix it, but the further an artist gets into the piece, the more difficult it becomes.

The next step is discovering the right shapes. Remember, when two different places meet, those connected planes must be different colors (except very rarely in certain lighting conditions). It doesn't matter what colors an artist chooses to lay down initially – in fact, it's often helpful to disregard them entirely – so use high-contrast colors to read shapes. Once everything has its own color, a creator can easily select and change different parts using the magic wand and paint bucket tools.

Once happy with the shapes, it's time to start laying in the final colors for the piece. Start by placing all the flat colors and then add the details on top – remember to use separate layers, ensuring zero pressure in experimenting or getting detail colors correct. An artist can simply delete and rework a particular layer; perhaps even consider creating layers just for particular elements instead of a global detail layer for everything. Additionally, if there's time and inclination, create an optional detail or lighting scheme to easily compare by turning on and off, then observe how the piece feels with each option. The point is always to practice non-destructive editing and make it second nature in a workflow.

The final step is typically the most gratifying – the fun of adding special effects and gradients. For pixel art, there's typically anti-aliasing here and general polishing. This stage is where the piece comes together; similarly to a movie that finds itself through final editing, so does an art piece. Tie the elements together with lighting, filters, and global adjustments. Remember, while creators can alter the feel of the image, it's more or less polished. Avoid fixing mistakes made in previous steps because it means going backward again. The polish step should be to accentuate the correct elements.





RESOLUTION AND SPRITE SIZE

The gaming genre determines the character's sprite size within their setting and next to other characters! However, an artist not using proper upscaling techniques with integers will make their character appear distorted.

SCREEN SIZE

In the past, the screen resolution was determined by which game-playing platform a developer was creating for – each had its own specific size. Nowadays, there is no longer a focus on screen sizes because developers create games for multiple platforms. To make them compatible with as many platforms as possible, artists must focus on screen resolution ratios – “16:9” being the industry standard.

Pixel art is a collection of tiny squares, resulting in pieces prone to distortion

when upscaling incorrectly. Look at the poor example below. The left side image exemplifies a canvas with a “4:3” aspect ratio, and the canvas size is 40x30 px. If resizing to match a “16:9” aspect ratio on the right side image, the pixels are no longer squares! Artists want to avoid this problem.

Now that it's known that the canvas size is a “16:9” ratio – which resolution is best to pick? Choosing 1280x720 px and upscaling to 1920x1080 px has some distortions. Why? Despite keeping the ratio the same,

upscaling happens through fractions. From a 1280x720 px canvas, artists need to upscale every pixel 1.5 times to get a canvas of 1920x1080 px. This transformation results in pixels appearing longer than others. To fix this, choose a smaller resolution of the “16:9” ratio. Multiply with integers (whole numbers) so there are no distortions. Two resolutions fit this well: 320x180 px and 640x360 px. See the exemplified multiplication table below. ↴

Multiplied By:

4	=	1280x720 px
320x180 px	x	6 = 1920x1080 px
		8 = 2560x1440 px

4:3 (40 X 30 PX)



16:9 (40 X 30 PX)



CHARACTER SIZE

Choosing the character's size closely relates to the created game's genre. The total character's sprite size isn't essential information; what is vital is the character's size compared to the overall scene. Artists follow one sizing rule: the more important a character is, the more screen space is used up! Take a look at a few of today's examples:

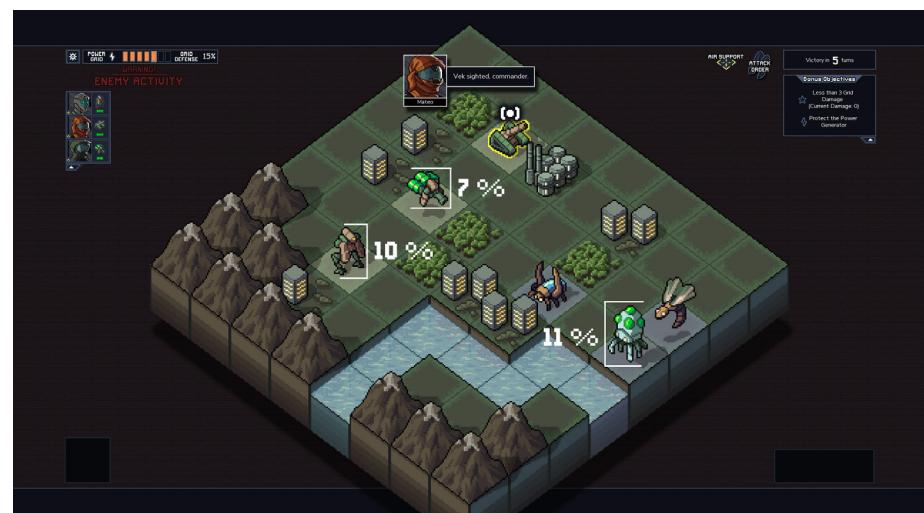
PLATFORMER

Celeste is a well-known game where players receive information while going through levels – how to jump and move through a terrain and where to find obstacles, traps, and enemies. During gameplay, a player can plan a movement route since they see the character's surrounding elements. If the character took up half of the screen, the viewer wouldn't know where to move and wouldn't have time to react to elements as they appear. For Platformer games, the main character's height should be about 10% of the screen's height. ➤



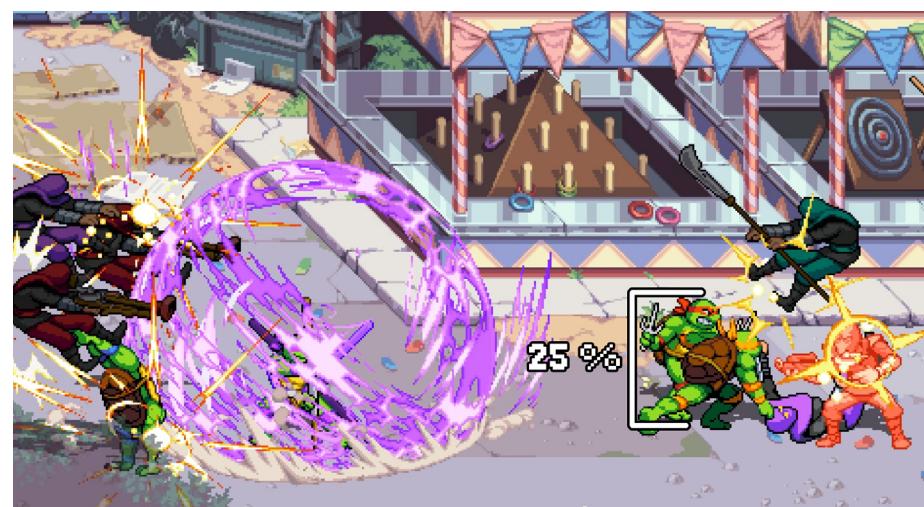
TURN-BASED STRATEGY

Into the Breach is a turn-based strategy game. The player needs information on the position of enemies, possible commands, and space for UI elements. There needs to be a good overview of the entire scene so that each strategic player can make well-calculated decisions. A single character is not as important as the presented situation, so naturally, each character is fairly small on the screen – the height ranging from 7-11%, depending on the design. ➤



BEAT 'EM UP

Teenage Mutant Ninja Turtles: Shredder's Revenge is a modern beat 'em-up game. In this genre, the game revolves around close-range combat, and there is massive importance to each character. The player doesn't care about knowing their surroundings and obstacles as much as focusing on the fight before them. So characters take a lot of screen space – around 25% is the character's height, allowing the viewer to appreciate each animation and easily recognize subtle movements. In fighting games like Street Fighter or Tekken, the characters take up even more screen space for these reasons. ➤





OUTLINES

Lines surround an object's outer edge (or part of it) to make it more visible by separating it from the background or other elements in the image.

CLEAN OUTLINES

When creating outlines, keep the thickness consistent. Usually, an outline is one pixel thick because if it's one pixel thick in some places and two (or more) pixels in others, it will look messy. ✓



INNER EDGE

The purpose of inner edge outlines is to separate parts of overlapping objects. Pixel art uses limited color palettes, so objects are often identical colors. If these objects (or parts) overlap, they blend and create difficulty in readability. The two spheres on the

left merge unless separated with outlines. To accentuate the importance, see the example's unshaded rope. Notice how the outlines on the inside determine which part of the object overlaps the other.



OUTER EDGE

Outer edge outlines are a good way to make an object stand out in the environment. However, outlines will often affect the shape of the object. Artists can consciously create an extra pixel in a specific place to create a sharp edge, even when the object isn't sharp. See the sword as an example! "A" is the starting point. "B" uses outlines, but it makes the tip of the blade rounded. To fix that, "C" has an extra pixel on the edges to create sharpness, but now the gem on the pommel looks square instead of round. "D" style uses the pommel from "B," and the rest from "C." When the outline significantly influences the object's shape, it's also considered part of it. ➤



Sometimes the outline will make an object look unnatural – see this rock's example. If the outline is around the entire rock, it stands out too much, appearing sticker-like. Removing the outline where the rock connects to the ground makes it blend in with the environment. This way, it's the best of both worlds – readability from the outline and cohesiveness from the lack of. ➤



ONE COLOR

The most commonly used outline style is a single-colored outline. As the name suggests, use only one color for the entire outline, usually a black or white shade (although the amount of colors an outline can be is limitless). When working with extremely limited color palettes, an object can become invisible without outlines or completely change its look and shape. See this exemplified with a simple spear and stick. ➤



SHADED OUTLINES

As an alternative style, use shaded outlines. In this case, the color of the outline changes depending on the color of the object next to it. In the example's color palette, the outline's color is one tone darker than the object's color next to it, so it's more subtle than a single-colored outline. ➤





SHADING

Shading is the act of drawing or painting shadows on an object, which gives it volume. It creates the illusion of three dimensionality, even though it's a drawing on a 2D surface.

We have five “primary forms” in art – cube, sphere, pyramid, cone, and cylinder. By following two simple rules, it’s easy to properly define forms even in low-resolution pixel art.

RULE – FLAT SURFACE

USE 1 COLOR

When shading flat surfaces, artists use only one color. For now, don’t add any texture; only give form to the object.

Notice how each side of the cube and pyramid uses only one color. ↴

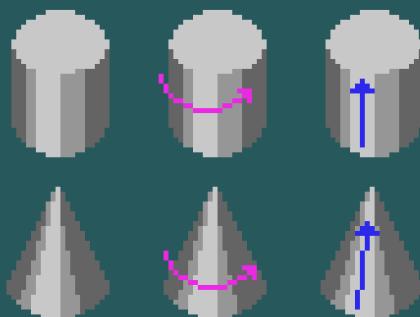
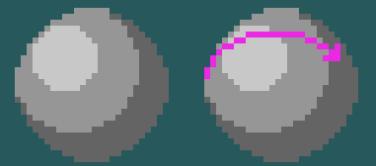


RULE ROUND SURFACE

USE MULTIPLE COLORS

When shading rounded objects, use multiple colors to give form. A simple sphere is a good example.

A circle is a 2D shape, but if an artist adds shadows, it transforms into a sphere. ↴



CYLINDER & CONE

Cones and cylinders are specific because they have both flat and rounded surfaces on them. In this case, it’s important to recognize every part of the form and shade it accordingly.

A cylinder’s top and bottom sides are flat, so only use one color. The middle section is rounded, so use multiple colors for shading. Keep in mind the direction of the curvature of this middle section. The color change must follow the shape of the curvature. Since the curvature is from left to right, the colors change in this direction. This same section is straight from top to bottom, so it’s in one color, resulting in vertical stripes.

The cone has only one flat side on the bottom, but the rest is rounded. It has a pointy tip, so the shadows are naturally thinner at the tip and become wider as they travel down the body of the cone. ↴

CONSTRUCTION

When drawing anything, it's easiest to first construct the subject from the previously mentioned five "primary forms."

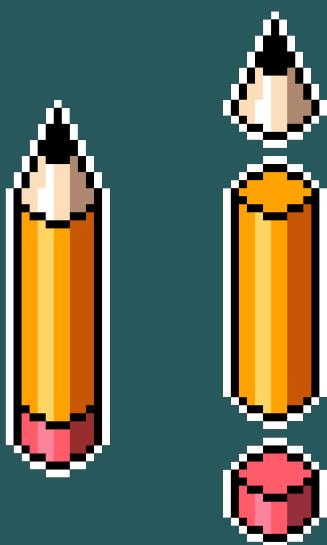
Take a look at a few simple examples:

TRUCK

Artists can usually construct vehicles with cubes and cylinders. A trailer is simply an elongated cube: a box. The truck's front section is a cube modified by cutting out a small section. Notice how the shading is applied before adding color and detail – ensuring good values and readability of the object's shape. ➤

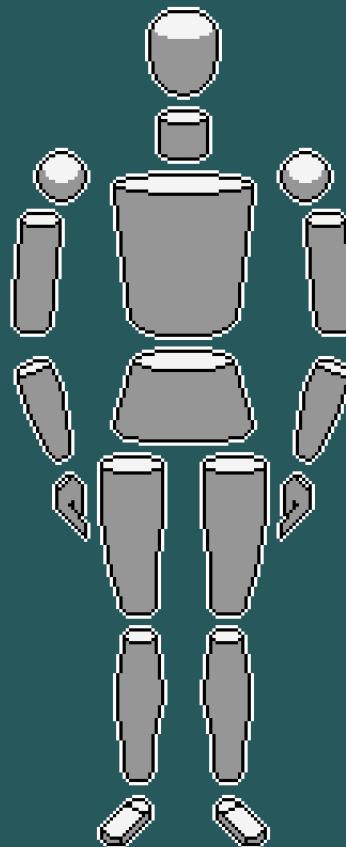
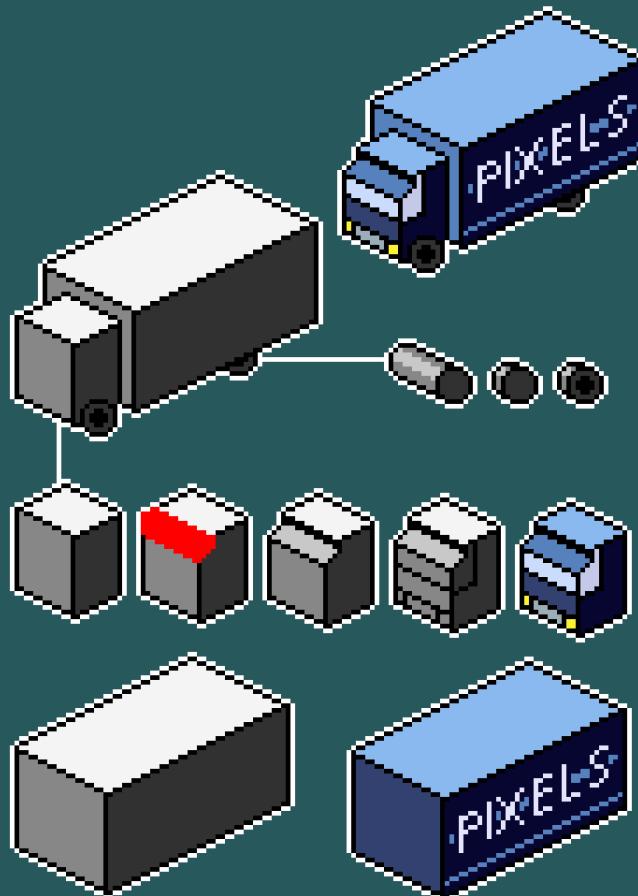
PENCIL

A simple pencil is a combination of cylinders and a cone. Use cylinders for the body of the pencil and the eraser, while the sharpened tip of the pencil is a cone. ➤



HUMAN BODY

Create even organic shapes with simple shapes, such as animals, plants, and humans. To construct the human body, use slightly modified cylinders, spheres, and cubes to represent all major body parts. The cylinders work great for arms and legs, spheres for head and joints (e.g., shoulders), etc. Even though this example only shows the human body as a whole, apply the same principle to smaller objects too: eyes are spheres, lips are curved cylinders, a nose is a pyramid, and so on... ➤





ANTI- ALIASING

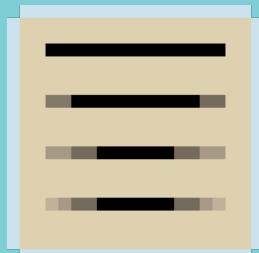
What is it? Think of anti-aliasing as a manual blur tool. It's a technique to smooth the edges of lines, curves, shapes, and transitions between planes on an object.

LINES

Anti-aliasing a straight line is pretty straightforward. Take into consideration the color of the line and that of the background. The color of an AA px (anti-aliasing pixel) is the midtone between the line's color and background color. And if an artist wants to use multiple colors for anti-aliasing, they simply create more midtones.

In the image below, starting from the top, there is a simple line. With each new line down the image, see the different levels of anti-aliasing. The more colors an artist uses to anti-alias, the smoother a line's edges.

Anti-aliasing an edge of a straight line creates the illusion of a thinner edge, similar to usual digital brushwork where the edge of a line is thinner than the rest of the line's body. ↴



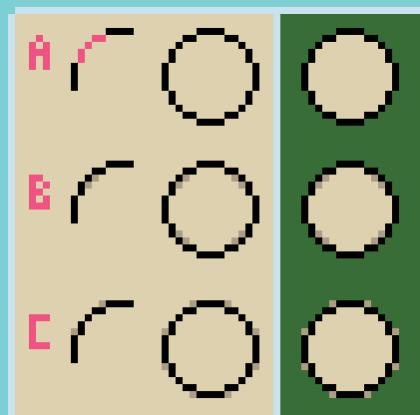
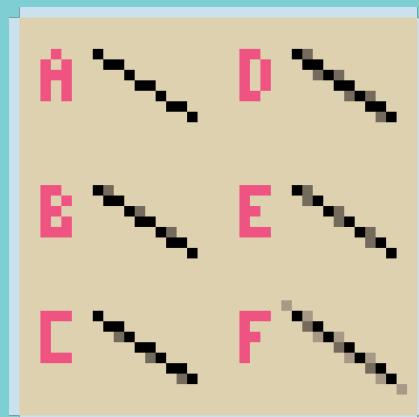
Here's an example where there's an angled straight line: Figure A has no anti-aliasing, while Figures B & C use anti-aliasing on the outer and inner sides, respectively. In contrast, Figure D uses both while not touching the original line. However, Figure E also changes the line by coloring specific pixels in the same color as anti-aliasing pixels. Figure F uses two colors for anti-aliasing so the line can extend even more.

There are many ways to anti-alias — how much, and in what way, is the artist's choice.

CURVES

When anti-aliasing curves, an artist targets the curvature to get it smoother (pink pixels in Figure A). Figure B shows inside anti-aliasing, while Figure C shows outside.

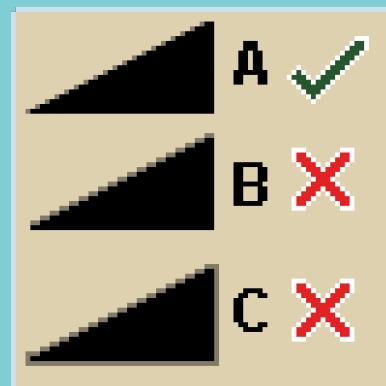
Why are these important? An object in a game will usually be placed on different levels, each with a different background. So, if an artist uses anti-alias on the outer edge of the object and then changes the color of the background, it will look out of place. Only use outer edge anti-aliasing in cases where there is 100% certainty that the background will not change! ↴



SUBTLE USE OF AA

Although artists will use anti-aliasing in different ways, one basic rule to stick with is to use 1 px per 2 px (e.g., 1 AA px [anti-aliasing pixel] per 2 px along the boundaries). Look at the image beside and see how Figure A uses this principle. It's easy to overuse anti-aliasing, which results in a soft outline effect, as shown in Figures B & C.

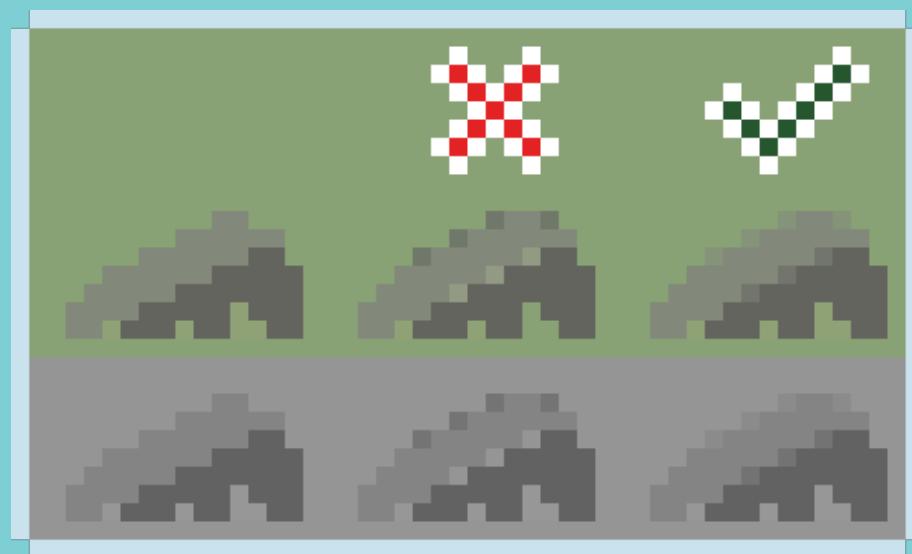
In Figure A, notice that for every 2 px on the upper edge, only 1 px is used for anti-aliasing – a good introductory rule for anti-aliasing. Figure B overuses anti-aliasing as it creates a soft edge, and Figure C even more by surrounding the entire object. >



COLOR VALUE

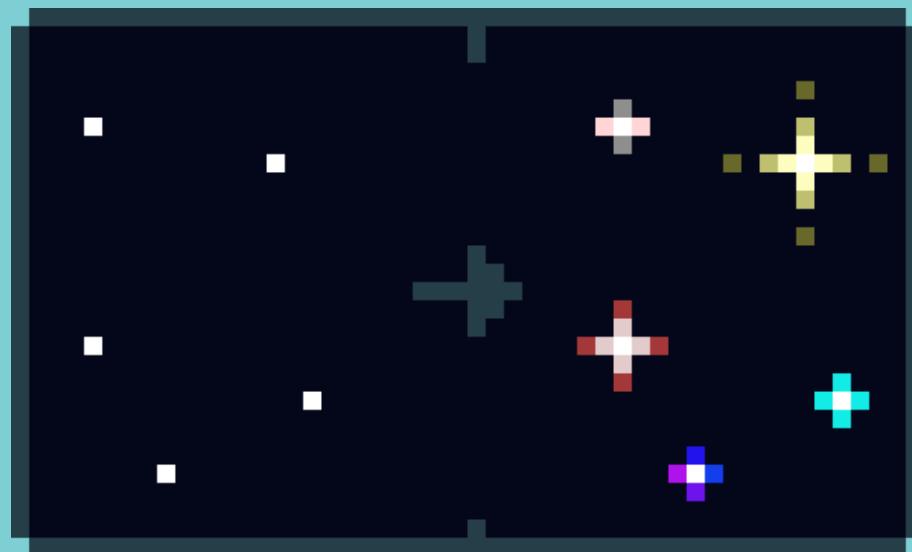
It's important to remember the value of the AA pixel's color. Since AA pixels use midtone colors, artists must keep the values consistent. Here are some rocks as examples. The left rock is without anti-aliasing. The middle rock has bad anti-aliasing because the values are wrong, as they create a sharper edge instead of a softer one. While there's nothing wrong with creating sharp edges (in fact, sometimes an artist might want to do it), this isn't the goal of anti-aliasing. The right rock has good anti-aliasing since the values are midtones between neighboring px colors.

Check the values by turning the image into grayscale mode. Removing extra color information makes it easy to check if values are good. >



The simplest way to have fun with this rule is to draw some stars! Use black for space and white for stars. Since this example uses two of the most extreme shades in terms of value, black being the darkest and white the brightest, any other color swatch used to anti-alias the stars will work! When observing the stars in real life, it's even noticeable how they flicker in many different light colors.

An artist can even anti-alias a single px with multiple AA pixels! Remember, the goal is to smooth the edges while not creating an outline around the entire object. This is why the stars are anti-aliased in only four directions, not eight. >



ARTISTS CAN USE ANTI-ALIASING SO SUBTLY THAT THE AVERAGE VIEWER MIGHT NOT EVEN NOTICE

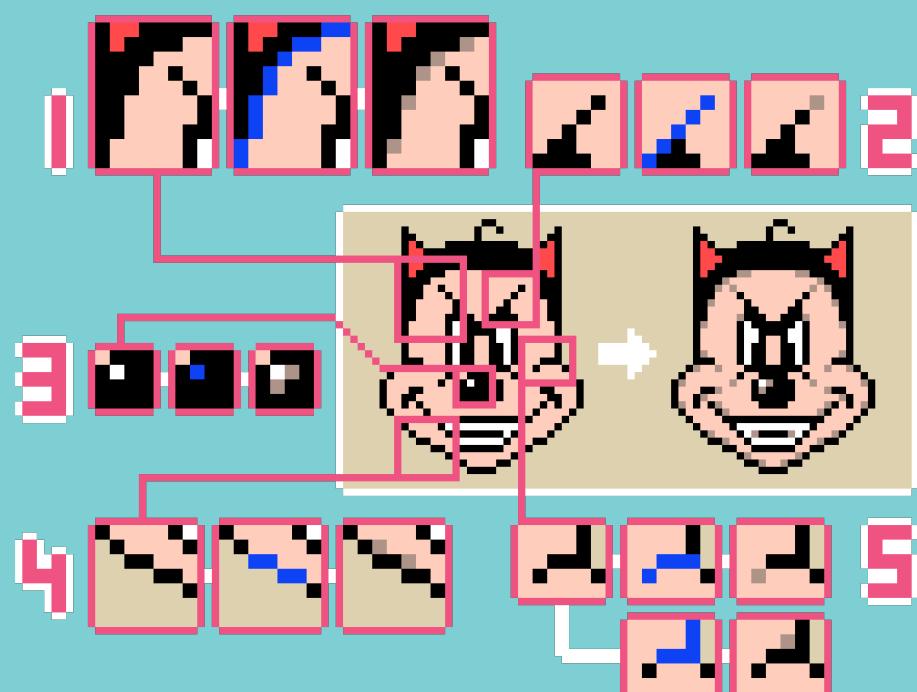
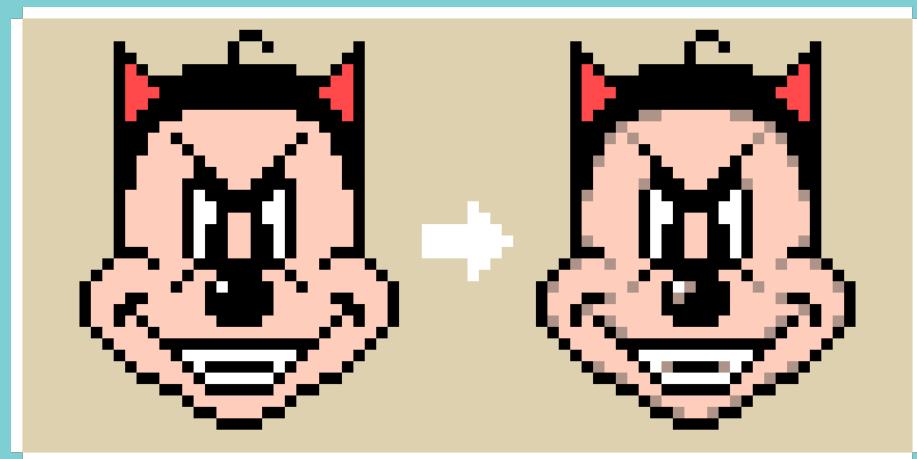
EXAMPLE BREAKDOWN

Why so much focus on lines and curves? The reason is simple. Observers actively search for lines or curves to apply the anti-aliasing technique. Let's look at a drawing of a cartoon-style character providing a simple before and after image. Notice how anti-aliasing creates a softer and more 3D look. ➤

Breaking down the character with examples:

1. The hairline is a curve — so anti-aliasing the inside creates a softer look.
2. The eyebrow is a straight line — so anti-aliasing the edge gives an illusion of a thinner edge on the eyebrow's end.
3. The highlight on the nose is a single pixel — so anti-aliasing in two directions (to the right and down) gives it a softer look. Don't anti-alias to the left and up because these would reach the edge of the nose and connect with the skin tone, breaking the obvious nose shape.
4. This section of a chin is a staircase previously explained.
5. An artist can use a single line for multiple shapes. The upper example targets the curve of the cheek, anti-aliasing the edge (like a straight line) to achieve a thinner edge look. The bottom example targets a 90° between two straight lines. By anti-aliasing an artist achieves a softer, round shape.

These are five examples of anti-aliasing and the reasonings behind them. There are more in the image; see more? ➤



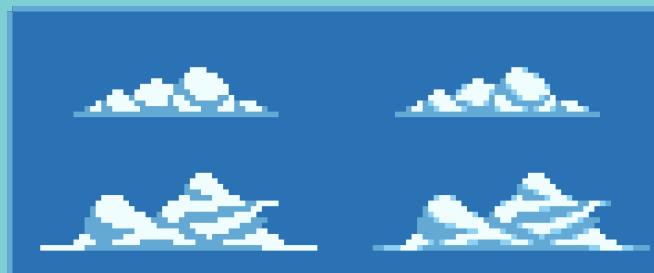
THE MOON

If an object is close, a viewer can see more details on the object, and if it's in focus, the edges will be hard. Since the moon is far away, the viewer cannot see as many details, so an artist should avoid hard edges and use soft edges instead. Artists achieve a softer look by introducing only one extra color and using anti-aliasing. ➤



CLOUDS & CLOUDS

The best way to practice is by drawing some clouds! Cloud shapes are random by nature, so there is a lot of relaxing fun anti-aliasing them! Here are some clouds with and without anti-aliasing. ➤



LESSON 6



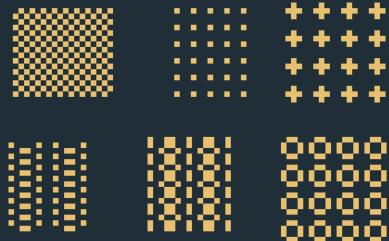
DITHERING

What is dithering? It's a technique that uses patterns to create the illusion of extra colors without increasing the size of the color palette. Dithering is like the comic's printing technique of halftone.

Let's look at some examples.

See the many different patterns for dithering. The first pattern on the left is the most common and the one this lesson focuses on. ▶

Patterns



A BIT OF HISTORY

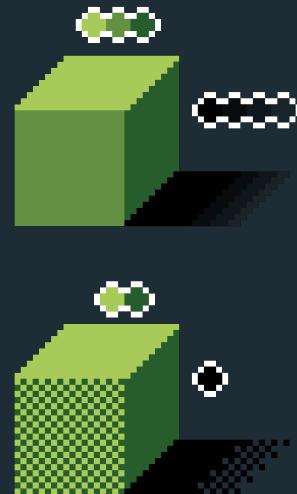
Dithering was invented due to technological restrictions when systems were limited in color palettes. Using patterns between two colors created an illusion of new mid-tones. At that time, CRT display technology further blurred the image, creating an even smoother color gradient.

Let's look at an example to demonstrate the basic concept of dithering. There are only three colors, so if using a checkerboard pattern, the palette's size increases to five. If further diluting the pattern, the illusion of nine colors suddenly exists. ▶

WHY USE DITHERING?

Today there are no longer restrictions on color palettes, so dithering is simply a stylistic choice. In cases where the artist desires the color palette to stay the same, dithering can help create the illusion of extra colors.

Let's see two cubes. Both cubes are identical in terms of what colors they represent. The cube without dithering uses seven colors, while the cube with dithering uses only three. Even though the cube on the bottom uses three colors, it still replicates the colors on the above cube. ▶



HOW TO PRACTICE DITHERING

Dithering is more straightforward than it appears! When beginning, it's best to use the checkerboard pattern for midtones. First, draw the object - in this case, a cylinder. Then add shadows and draw midtones as any artist typically would. Now target the area that midtone covers and fill with the checkerboard pattern of the two original colors of light and shadow. ➤

STEPS



TEXTURES FROM DITHERING

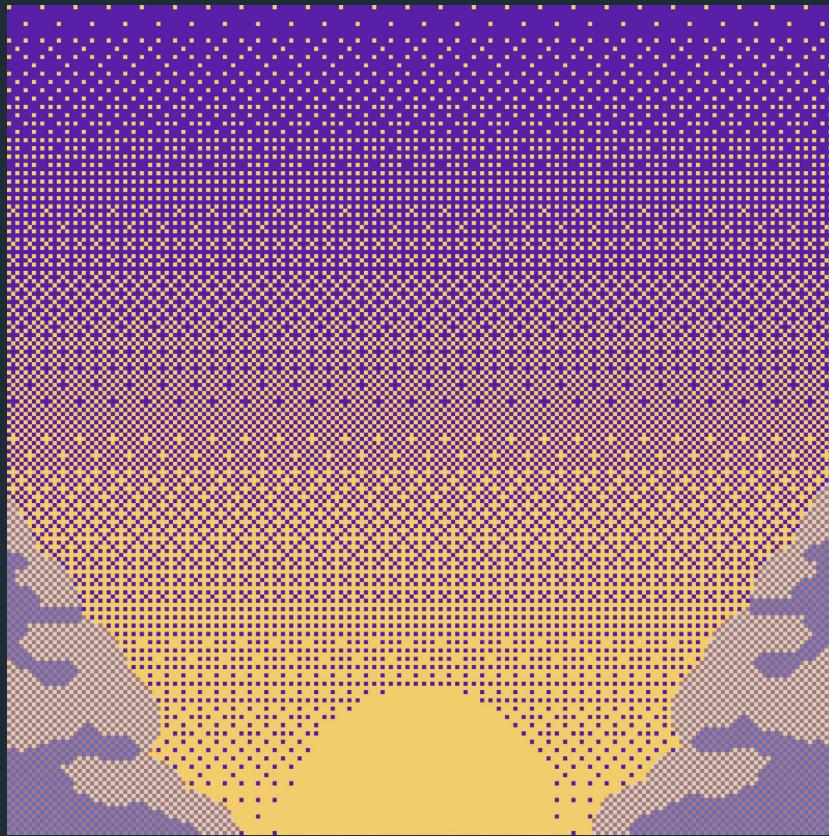
Due to the nature of pixel art, another consequence of dithering patterns is creating textures. For example, the most used checkerboard pattern creates the effect of a slightly rough surface. Technically, these textures are not considered part of dithering since its main purpose is the creation of midtones. However, it's still important to understand how these patterns can influence the surface texture of an object or the overall image's look. ➤



WHEN TO USE BACKGROUNDS

One of the most common ways an artist uses dithering is for backgrounds. This example shows a sky that only uses two colors, but the human eye will perceive more colors.

Here are two stripes – one with a normal gradient (126 colors!) and another with dithering (only 2 colors). Hold the book at arm's length and try squinting! There will be so many dithering pattern blends that the difference between the two is unrecognizable! ➤



CREATING A DITHERING PATTERN

Easily create dithering patterns by using square tiles as a base. The size of these tiles should be to the power of 2 – e.g., 2x2, 4x4, 8x8, and so on.

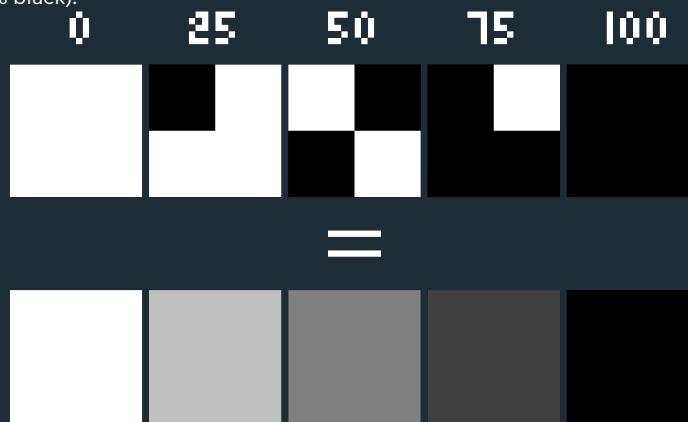
For the first example, see how dithering would work on a 2x2 pixel tile with a checkerboard pattern as a base. Since there are only four pixels and two colors to work with, an artist is very limited in how many midtones to create. Starting on the left side of the image: a proper shade ratio between white and black is the most important. See the above bar, where differing black percentages are present for each tile. The **first** has four pixels and they're all white, so naturally, it's representing a pure white color.

The **second** has three white and one black pixel resulting in light gray color (75% white, 25% black).

The **third** has two white and two black pixels resulting in neutral gray color (50% white, 50% black).

The **fourth** has one white and three black pixels resulting in dark gray color (25% white, 75% black).

The **fifth** has four black pixels, so it's a pure black color. ▶



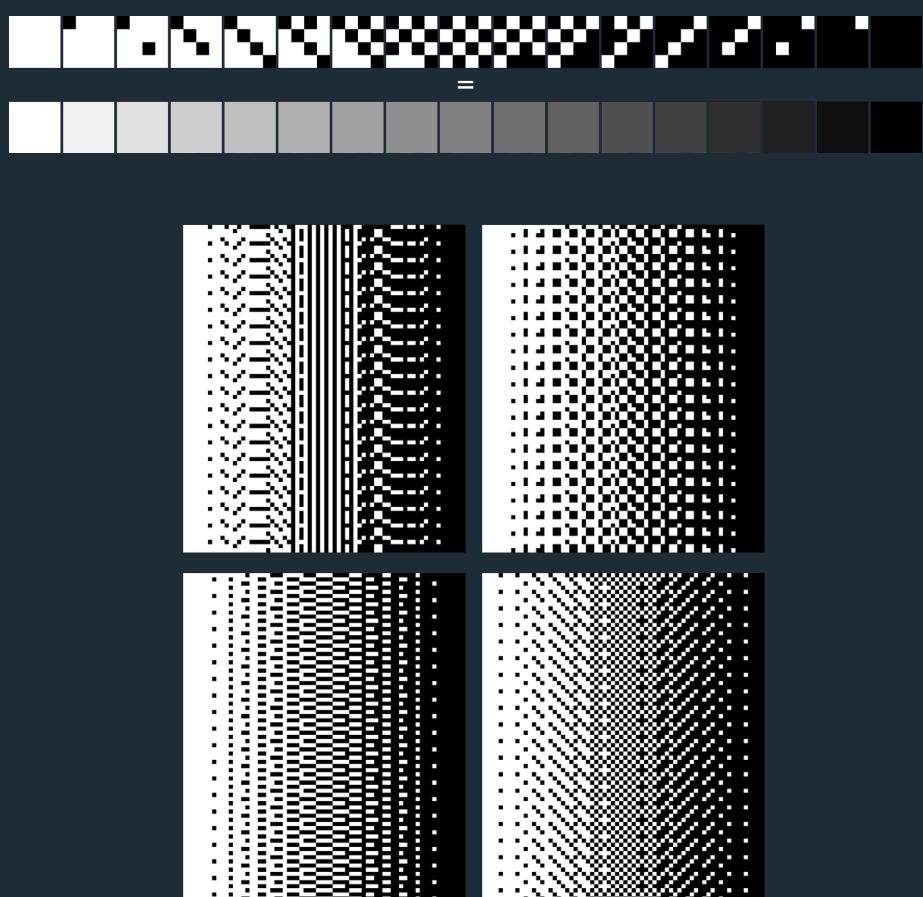
MORE COMPLEX PATTERNS

The larger the base tile, the more complex the pattern an artist can create, so that the result will have more midtones.

A 4x4 pixel tile is a good example of this effect. Though this example only uses two colors, more midtones are created than in the previous 2x2 pixel tile. An easy way to approach the creation of more complex patterns is to start with a pure color on the left side. Then introduce one pixel of another color. Replicate the new tile and add one more pixel. Repeat these steps until all the pixels are now new colors.

Because a checkerboard pattern is only one of many, experiment with different patterns, the lower the contrast in values between two colors, the more the gradient effect will be visible, and less of a texture will appear (and vice versa).

Black and white are two extremes in values, so textures as by-products are quite visible. ▶





COLOR PALETTES

Color heavily influences art's style and mood! In the early days of video games, developers were limited by resolution in technology and by color count.

Restrictions also came from there not being enough space.

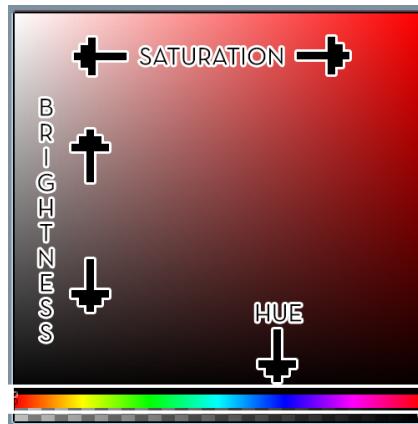
(For example, each 8x8 px tile can only have two colors.)

Today there are no longer restrictions and color palettes; they can be as large or small as an artist wants.

COLOR FORMULA

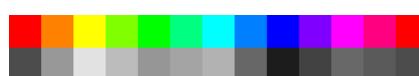
Since pixel art is digital, artists define colors by their RGB values, hex codes, or CMYK values (when printing). A color combines three components: hue, saturation, and brightness. "Hue" is what color is often incorrectly referenced as being. It's defined by where the chosen swatch falls on the hue wheel (for example, a red color results from a red hue). However, two other factors increase the number of colors usable: saturation and brightness. So, a brown color can result from an orange hue, but it is dark and desaturated. The color picker tool in most illustration software supplies a hue wheel, usually found on the bottom or the side. Quickly identify it as a rainbow color strip. The amount of black or white in a chosen swatch determines the brightness. For example, the displayed color picker has the brightness determined on a vertical axis.

"Saturation" is the intensity of the color. The higher the saturation, the more vibrant the color is. In the displayed color picker, saturation is determined on the horizontal axis. In a traditional medium, an artist decreases the saturation of a color by mixing it with a complementary color (a color on the opposite side of the color wheel).



VALUE

"Value" is how bright or dark a color is, not the same as brightness. Humans perceive colors in a special way, where some colors appear brighter than others, even though its brightness is the same in the color picker. Let's pick a few colors at maximum brightness and full saturation. See that in another row are those same colors, but in grayscale. Notice how yellow is the brightest and blue is the darkest? When creating color palettes, individual colors start bleeding if the values are too close to each other. ✅



COLOR RAMP

Ramps often organize color palettes, enabling artists to identify light and shadow tones quickly for a specific swatch. On the color picker image, white and black colors are shared as the brightest and darkest colors. On the below image, there's a more complex ramp. Pink and blue have the same shadow tone (purple), while blue and yellow have the same highlight tone (white). Dark blue is a shadow tone for green and blue colors. Reference these as "shared" or "binding" because they connect different colors and make the palette more cohesive. Create ramps by deciding on one color (for example, blue). Then create light and shadow tones for it with hue shifting. ✅



Highlight Tone ➤ 

 Shadow Tone

HUE SHIFTING

A common beginner mistake is not hue shifting when creating a color palette. This image has two examples. The left column doesn't use hue shifting. The brightness and saturation change, but the hue is locked in, making the palette look slightly lifeless as it lacks color temperature contrast. The right column uses the same middle color in the same color palette. Light and shadow tones use the same brightness and saturation (in the same position in the color picker), but with one important difference – the hue has been shifted. Light tones shift towards a yellow hue, and shadows shift towards a blue hue. Why those? Because in this scenario, the sun is the light source, so the light tones will combine with a yellow, sun-like color. Likewise, the shadow tones will pick up atmospheric light – blue from the sky. Hue shifting brings more dynamic colors but with a realistic approach. Hue shifting can appear pronounced (e.g., on the spheres), or very subtly (e.g., on the foliage). ↴

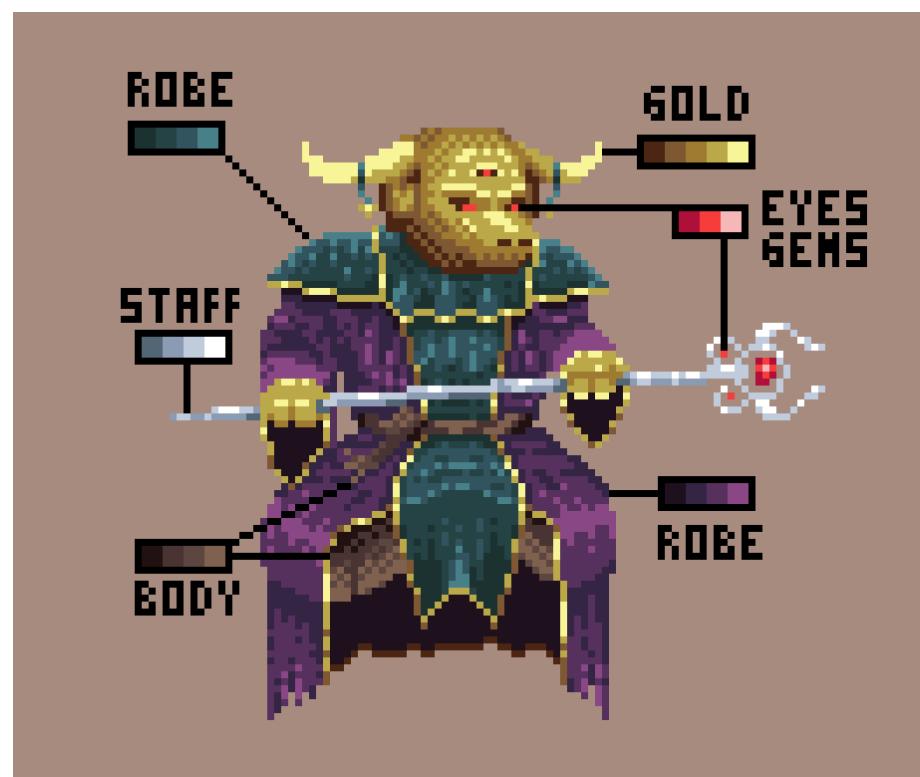


STYLE AND MOOD

Artists have an infinite number of styles to choose to create. However, the most general division by color palettes is through two styles: realistic and cartoony. When choosing a more realistic approach, use desaturated colors so every color has plenty of tones, evoking a serious mood. Almost every part of the character uses different colors in this particular sprite, but this is bad practice because the larger amount of colors, the harder it is

to animate. In pixel art, artists are always optimizing the workflow. But on the other hand, the cute cat character uses bright and saturated colors with very few tones. Usually, artists use one tone for light, and another for shadow. Animators since the old days have used this technique because it's easier and faster to animate a character with few colors. So artists still try to reuse each color whenever possible. For example, the eyes, whiskers, and the sword all use white. Notice how the shadow color below the head is also the highlight color on the backpack. A color can be a shadow and

light tone simultaneously but for different objects. In this palette, all colors have one darkest color swatch in common – black. It's used for the arms, legs, and the overall outline. Black is the shared (or binding) color because it naturally connects the others. The more uses found for a single color, the better. However, if there's a particular area of importance, use unique colors for it to stand out – like a character's green eyes. Though there's only 1 px for each color, use that same color on another object in the game. ↴





COLOR SHIFTING

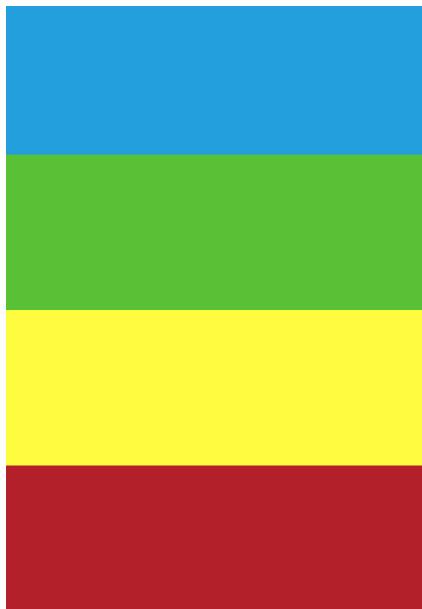
An artist can find creating their own colour palettes daunting, so here are a few tips for helping to understand the elements of color and some methods for creating palettes!

What makes a color?

Let's start with some basics; within digital and pixel art, define a color using hue, saturation, and value. An artist can edit and adjust to create any desired color, so understanding what each does helps improve the picking color process when shading sprites or environments.

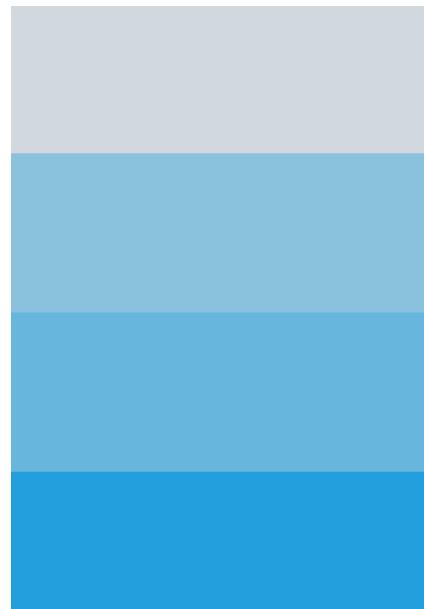
HUE

Used interchangeably with the word "color," but refers to the color family a color swatch belongs to. For example, rose, magenta, and burgundy belong to the RED family of colors! ☺



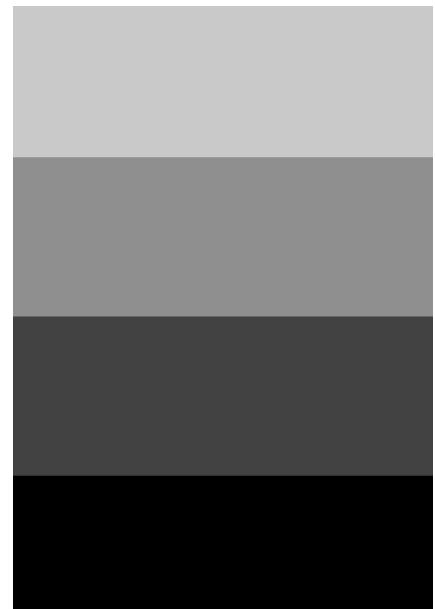
SATURATION

Also known as "chroma," this value reflects the intensity of a color. Artists who use a balanced mixture of intense colors and less vibrant ones create striking compositions. ☺

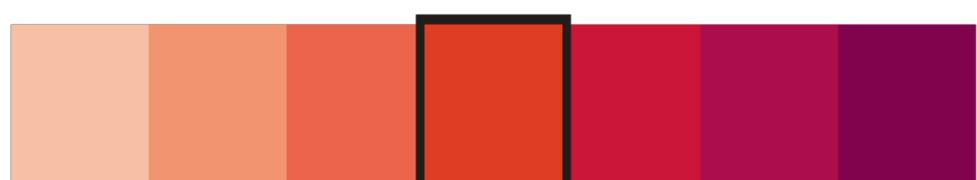
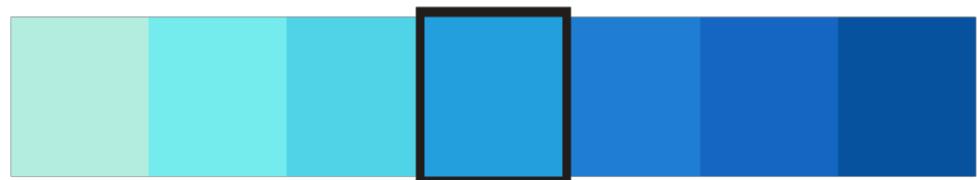


VALUE

The lightness (or darkness) of a color. Basically, how close a color leans towards black or white. The lesson explores value studies and mapping more in the following pages. ☺



After knowing these basic components, begin to create color palettes that are more dynamic and have more vibrant shades of color, in comparison to just adding white or black to brighten or darken a composition. ➤



TO BRIGHTEN COLORS

The solution to this is color or hue shifting, where an artist can adjust all components to create these dynamic shades. Beside is the basic shorthand formula to start creating a palette! ➤

Hue gets shifted towards **Yellow**.

The Saturation **Decreases** (for a less intense effect).

The Value **Increases +** (towards white).

TO DARKEN COLORS

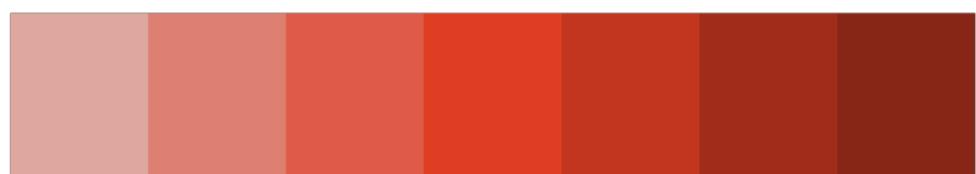
Hue gets shifted towards **Blue**.

The Saturation **Increases +** (for a less intense effect).

The Value **Decreases** (towards black).



See the example without any color shifting. The shades are murky and less vibrant as they only change the value. ➤



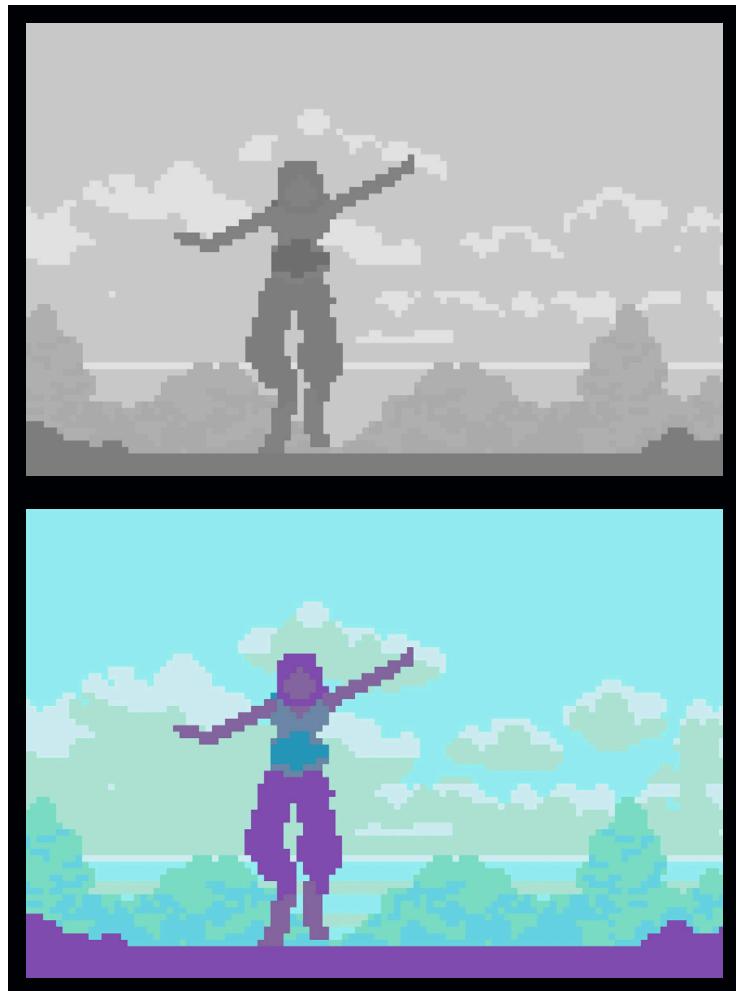
Color and Value

Before hopping into an example, let's emphasize the importance of value when creating a composition or sprite. It's essential to consider value when planning since that is how the eye quickly understands an art piece, so always start sketching with greyscale values, THEN add color!

Good value contrast gives depth to an image, allowing artists to mess around with crazy color combinations, as value and contrast are the foundations of perceiving images. Test this by turning images to black and white and seeing how much information stays or is lost without color!

LOW, BAD CONTRAST

If the contrast is too low, the composition loses focus. It's harder to tell what the focus is vs. the background features. Here is an example of bad contrast with colors added. ➤



GOOD, HIGH CONTRAST

Using higher contrast makes the image's focus obvious and directs the eyes to it first. Allowing the eye to wander through the composition without feeling lost. ➤



VALUE STUDY EXERCISE

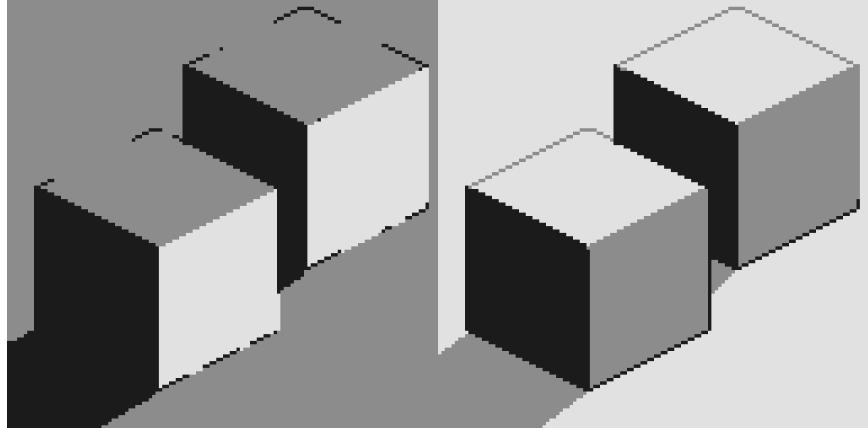
This is a great way to start practicing looking for values and assigning them to each piece. Be playful and keep the drawing loose and sketchy; the point is to train the eye to see value in the colors.

STEP 1

Choose an Object

It can be real item from a photograph or simply a 3D shape – as long as the subject is partially lit and partially in shadow. Make the sketch only using three values: black, gray, and white.

The example's cubes use those three values, but an artist can create anything. ➤

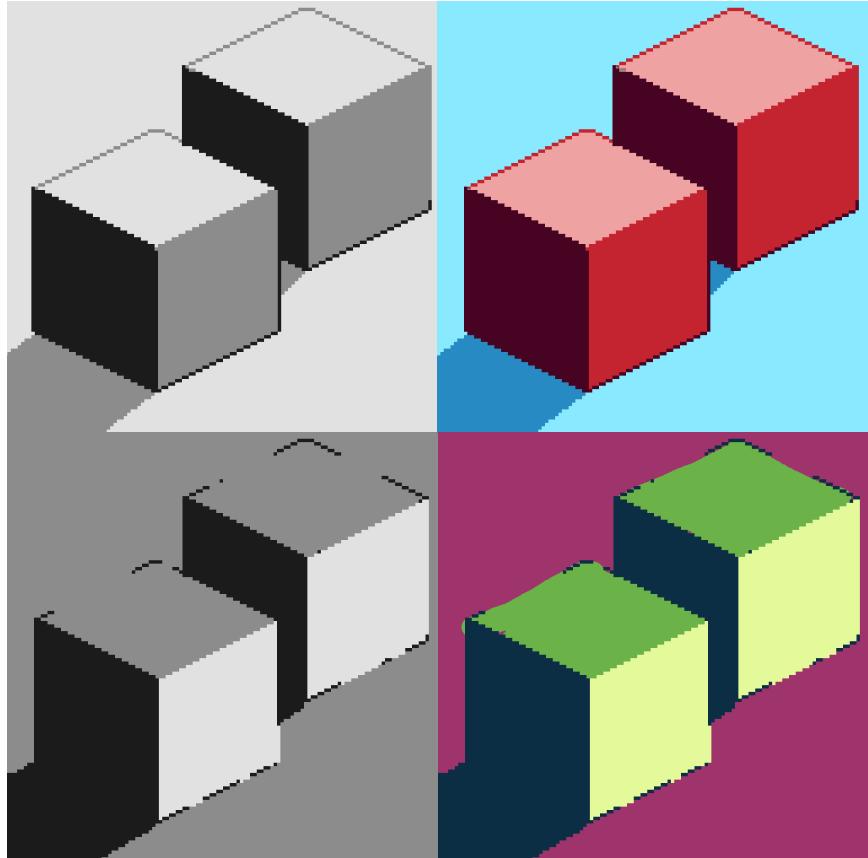


STEP 2

Value Mapping

With these, make a different version with the value swapped around to make a “value map.” For example, swapping the white shades with grays.

Use the value maps to sketch with whatever desired colors! The main point is to match the color’s value to the value map as closely as possible! Place them side by side and squint to see the values better. Double-check the values by turning the images black and white. ➤



CUSTOM COLOR PALETTE TUTORIAL

This shows the basic approach to creating a color palette. Remember that there are basic color schemes, such as monochrome, analogous, or complementary, to help select the base colors, but this shows an artist how to find the shades for the base colors!



STEP 1

Prepare Sprite

Create the sprite with only grayscale values. Aim to use less than eight values, as this will be simpler and keeps the art cohesive. ➔

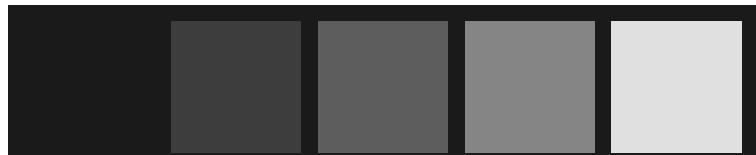
See is the 7-value scale the example uses below! ❤



STEP 2

Choose Base Colors

Reduce the grayscale palette to have a darker shadow (usually a variation of black) and a lighter shadow (darkest hue). ➔



Followed by a light and dark midtone which makes up the main bulk of color, and finally, a highlight that uses a variation of white! ➔



*Note this can have more or fewer colors.

Darker Shadow Lighter Shadow Lighter Midtone Darker Midtone White Highlight

STEP 3**Color Shift the Palette**

Now make hue shifts to the desired colors to apply to the sprite, using the greyscale image as a guide. >

**STEP 4****Color Bridging the Palette**

To clean up the palette, bridge the colors by finding visually similar ones, comparing them, and finding an in-between color that looks close enough to both. Replace the two with that in-between color! >

**STEP 5****Apply the Palette!**

Apply to the sprite! The change may be subtle, but overall the piece feels more cohesive, and easier to animate (since there are fewer colors to worry about)! >

Here's another color palette variation example that uses the same strategy.





LIGHTING

Lighting (or illumination) is the usage of light to achieve practical or aesthetic effects – revealing a scene's surroundings and elements, all while evoking emotion.

LIGHT SOURCE DIRECTION

Any object emitting light is considered an official “light source.” It ranges from tiny objects, like candles and lamps, to gas-emitting stars, like the sun. The position of a light source can play an important role in what kind of emotions the viewer will feel. A good example for the viewer is that the human eye is usually sees people during daylight in nature, so if the light source is above (like the sun), that feels natural. However, if placing a light source below a character, the viewer feels unsettled, that the setting is unnatural, scary even! ☀️

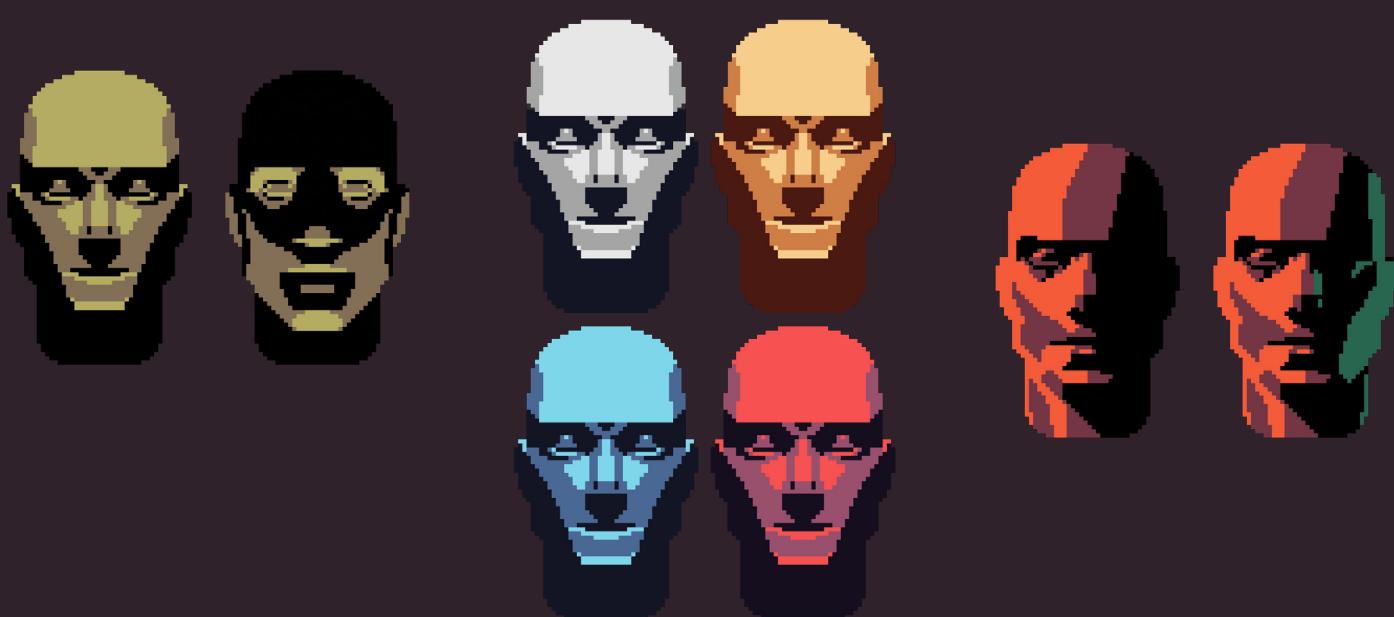
COLOR OF THE LIGHT

A light source will emit a ray of light in a certain color which influences the object’s color that the light hits.

Let’s look at four examples. On the top left, there’s a neutral, gray color on the subject. Then there are three different light colors. The color of the light combines with the color of the object. Notice how each color subtly influences how a human viewer feels – for example, while blue feels calming, red feels intense. ☀️

RIM LIGHT

Often a light source will only be lit on one side of the object, with the other remaining in shadow. If it’s also important to show the detailed shadow side of an object, use a rim light! Artists usually position this secondary light source on the opposite side of the main light source. A rim light’s intensity (or strength) is also weaker than the main light source and often emits a complementary color. This way, an object reveals its previously hidden details from the shadows, and increased color contrast provides further interest. ☀️



EMOTIONS IN COLORS

Even if the scene is identical, changing the lighting alters a scene's mood. A bright, well-lit room feels cheerful, full of life, and playful! A dark room with nearly no light feels cold, destitute, and lonely. Remember that a well-lit room displays more viewable details than dark ones. ➤

FOCAL POINTS

Sometimes the artist wants the viewer to focus on a specific area. This is easily controllable by deciding where to place the light source. Imagine a pitch, black room, and the viewer has a flashlight. The art piece can only focus on small areas where the flashlight lights up. Observe the example's humble tavern to see how an artist can guide the viewer's eye. By lighting candles up near the bar, the attention is drawn here. Why? Because the contrast in values is at its highest in that place. So in a game, if a player were to enter this scene, the viewer's eye would first jump directly to the bar, prompting to engage with the tavern keeper elf. Perhaps the player will get a quest or an opportunity to exchange gold for food and ale!

However, the focus is now on a mysterious, hooded character if the candle lights next to them! Maybe the character has a map of a hidden treasure or the details of a quest – perhaps one that requires an extra party member! ✨

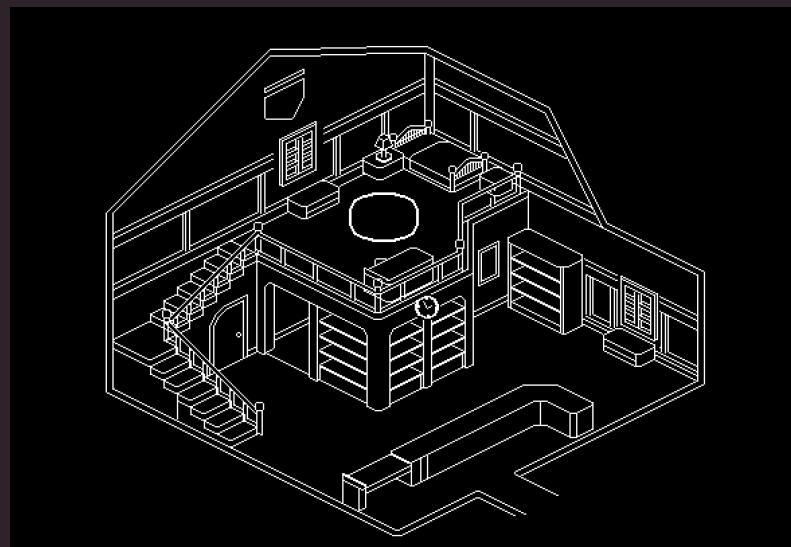


STEP 1

The inspiration for this artwork was a Japanese, traditional house – the first bottom floor is a shop while the second is the living quarters of the shop owner. Ancestors often leave these houses as an inheritance for their descendants.

This example is especially cool since it combines living areas and workspace; the visual angle favors traditional isometry, imitating a 3D room with correct light shadings and giving the scene better depth.

The first step is a line art mock-up, with outlines separating the areas. ➤

**STEP 2**

Once happy with the layout, pick keywords that describe the current work. This example intends to have a “medieval, fantastical, visual style,” so the keywords must connect to those themes.

After deciding on a further visual direction, search for references representing the piece’s vision. For colors, this step uses a set palette so the viewer’s focus gravitates to the story and composition elements, where there is color experimentation. Add small details to the walls and minor colors to the scene.

This example uses lighter colors for the floor and darker tones for the walls. ➤

**STEP 3**

Next, fill the spaces with all types of furniture to tell an unspoken story about the shop owner. Notice this example adds a telescope on the third-floor balcony and a blanket with star decorations to show the owner’s passion for astrology and star gazing. At this point, think about the best placements of the light sources – they have to be practical from the point-of-view of the shop owner yet compositionally appealing.

This final step fills the shop with objects that interest potential visitors, such as maps, swords, scrolls, magic wands, etc. ➤





STEP 4

Add people to bring the scene to life! Human subjects also introduce different focal points where the main action occurs, such as around the stand, at the library, etc.



Scan for
“Lighting
a Room”
Animation GIF

The simple lighting trick is adding dark areas around the lamps and candles so they stand out more. The glowing effect brings warmth to the general atmosphere, making the viewer wish they could visit the shop themselves! ☺



GLOW EFFECTS

What are glow effects, and when to use them? Glow effects are subtly used throughout the pixel art community and often don't get enough love. It's the glow in a demon's eyes, the light above the poker table, the magic surrounding a wizard, and so much more.

Let's dive into how to achieve this look and when to use it. Here's a simple process to achieve the "glow effect." ♡



STEP 1

Make a simple ball (light source) with a chosen background color.



STEP 2

On a layer behind the "simple ball," add a bigger ball (choose any darker color).



STEP 3

Change this layer to "Linear Dodge (Add)."



STEP 4

Using the blur tool, blur the bigger ball. Then it's done!

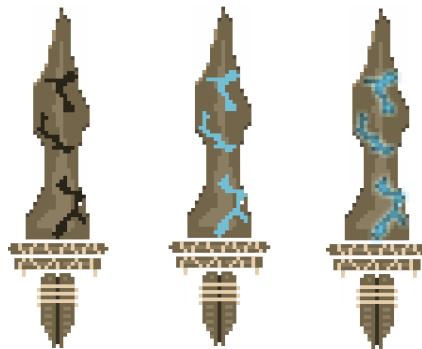
Use this simple ball as a pair of eyes, a sun in the distance, a streetlight, and so much more!

Tip: Simply changing the background color can completely change the mood/feel of the glow effect. ♡



Those are the basics; let's apply it to a more complex and cool object!

Here's a giant sword, probably belonging to a sleeping, rock giant. The sword already has a cool design, but a glow effect spices it up. Let's apply the same method, but instead of using a layer behind the object, let's use a layer on top. Fill in the sword's cracks, switch the layer to "Linear Dodge (Add)," and blur the area. Now the sword has an ancient, magical feel! ♡



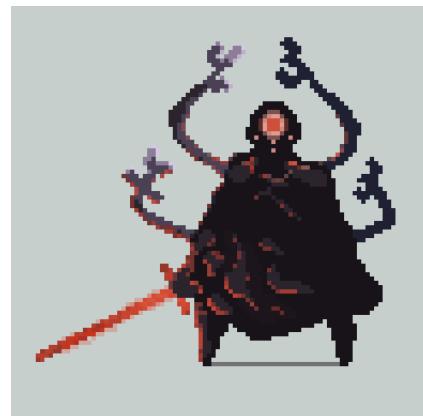
This featured character has a Sci-fi gunslinger with very basic lights – in the pixel world, that's a go-to style an artist could aim for – but let's spice him up a bit. Using the same method as before, apply to the gunslingers' eyes, guns, and the droid! Amazing results in a few easy steps. ♡



Where else to apply the glow effect? Any desired light source to spruce up a video game or pixel art! Signs are a good example, the same approach but a slightly different outcome. Instead of blurring the results, use a clean straight line! ↴



This effect brings more depth to a character concept that resembles a silhouette. The weapon acts as the primary light source, so apply the same glow effect on the weapon and carry it throughout the cloak and arms, giving the character more volume and depth. ↴



Into dark landscape pixel art? Great! It's easy to apply the glow effect here. The glow effect is exemplified in a dark cave environment, bringing ambient vibes throughout the piece. Approaching with a slightly different approach, instead of blurring the results, multiple different shades achieve a slightly different glow!

Where else could the glow effect be in this piece?! ↴





CHARACTER DESIGN

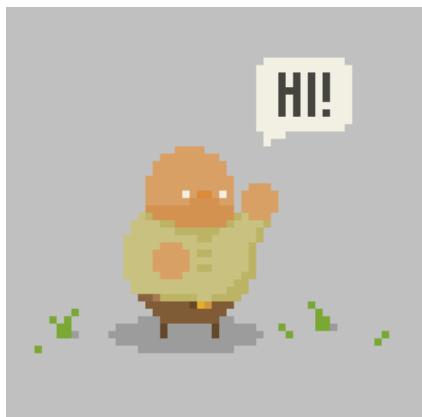
(Setting up a Sprite and Bringing Them to Life)

After designing a character, knowing and understanding the importance of setting up a sprite to optimize workflow and bring the most from a character is important. Let's focus on the elements that give life to a character and how to set up a sprite and layers to optimize workflow.

STEP 1

Analyze the Character

Let's look at this character. It's a fine design, but it's missing something. In its current state, if the character is running, the viewer sees body, leg, head, and hand movements. However, the animation process is quite boring, with no added elements. So, what brings more life to this character? ☺



STEP 2

Add Secondary Elements

Animate background objects or parts to move a frame or two behind the character to add interest. For example, if the character has a backpack and jumps, it will move a frame after the body, bringing depth and weight to the animation. What about hair? ☺



Hair is a huge part of bringing life to a character, as it's rarely static. Short hair bounces while a character runs, and long hair flows in the wind.

Adding a background accessory layer to the animation can be anything from backpacks, swords, shields, guns, capes, and more. These bring so much depth and weight to animation, from weapons moving a frame behind the character's body movement to capes flowing sporadically in the wind. ☺



Adding front accessory layers to the animation also creates a new dynamic similar to background accessories. Mostly used for weapons and items, such as maps, potions, etc. ➤



STEP 3

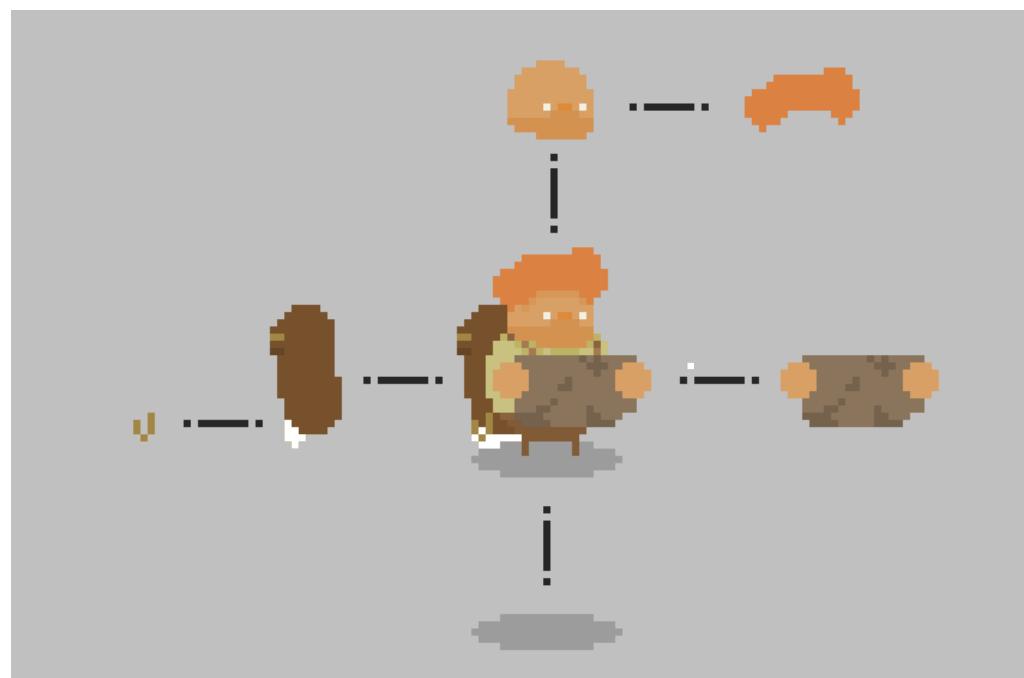
Setting up the Sprite and Layers ➤

Dissecting the layers.

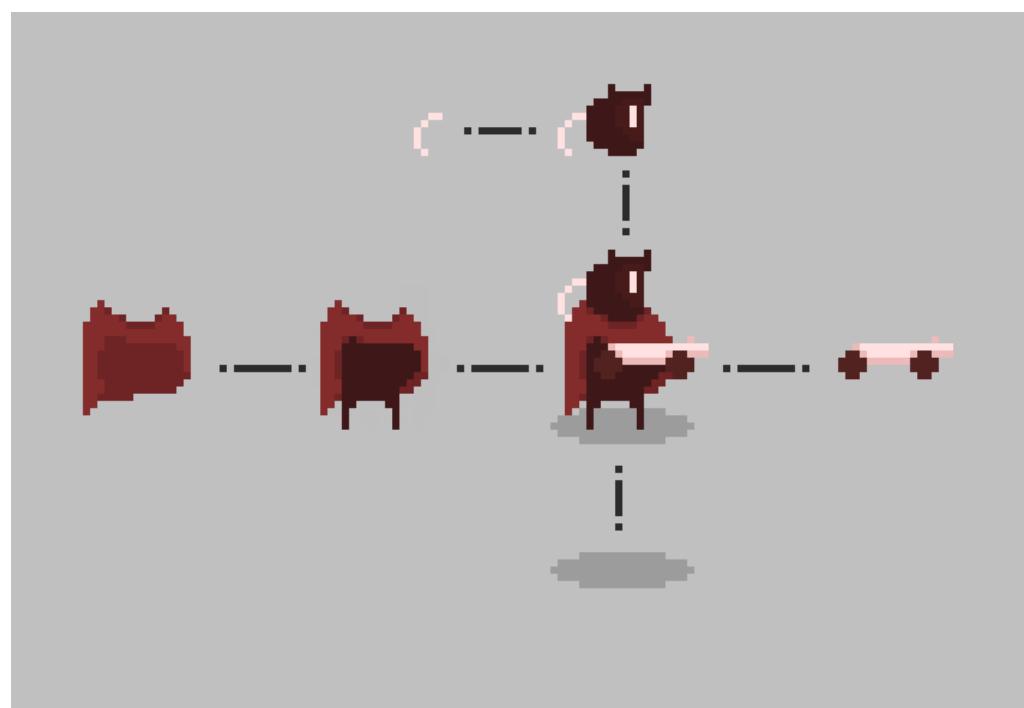
Setting up a character for animation is crucial to maintaining an efficient workflow.

Organize and label layers. Here's a quick breakdown:

- **TOP LAYERS** – Elements, such as hair, hands, weapons, etc., (the character's front accessories).
- **MIDDLE LAYERS** – Body and head (the character's frame).
- **BACK LAYERS** – Back accessories and shadows (the character's background).



Note: Layers are reversed when the character turns away from the screen.



EVERY PIXEL MATTERS!

Even a single pixel can change a character's style and look. For human characters, it's crucial to pay attention to pixels on the face because they can completely change a character's outer emotions. Let's zoom on the head and see how playing with pixel placement influences design.

EYES

Starting from the left, there's a style with no eyes. However, the viewer assumes this character has eyes because once a subject appears familiar (in this case, a human head), the brain fills in the information. Add 1 px for each eye, and now there's extra information to convey where the character is looking. Extend further down by 1 px; now there are 2 px for each eye. Bigger eyes tend to create a look that is more cartoony and cuter. Finally, extending the top pixel of each eye to the left, creates eyebrows!

EYEBROWS

Even tiny movements will show different emotions. Humans are very sensitive to even the slightest movement on the face. Notice how even a single pixel moved up or down changes the emotion – from neutral, slightly confused, sad, and finally to angry.

MOUTH

The same emotion visibility occurs with a character's mouth. Moving just 1 px up or down from its neutral position transforms the emotion – even when the expression of the eyes remains the same!

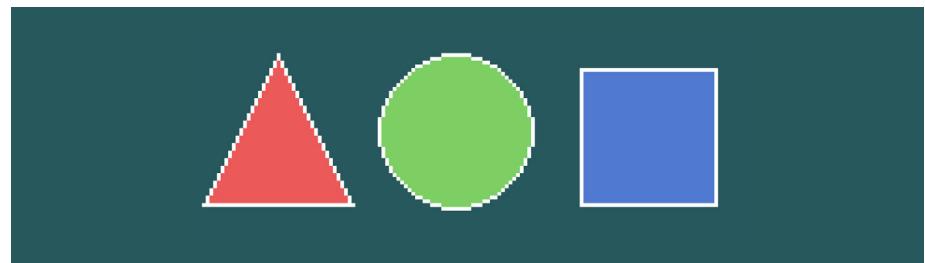
COMBINATIONS

Let's try to combine eyebrows and mouth to get different emotions. Together they make a powerful combo! The more features used, the more expressive the face. The sheer variety of faces by changing only a few pixels is enormous, so remember, always have fun and explore all the possibilities! No one ever knows the results experimentation will bring!



SHAPE LANGUAGE

In pixel art, artists mostly draw stylized characters, and shape language plays a big role in what the character exudes. There are three main shapes to focus on: triangles, circles, and squares. ➤



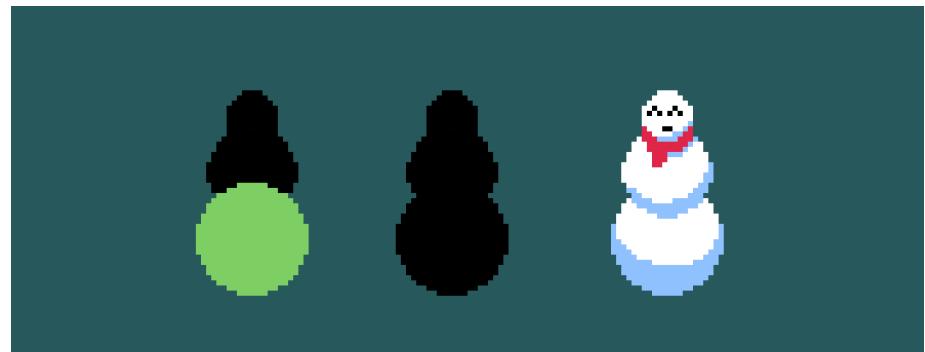
TRIANGLE

Triangles are directional and create energy in a specific direction – full of action. They are sharp and spiky, representing danger (for example, natural spikes send a "to be avoided" warning). They are a good base for creating menacing villains. ➤



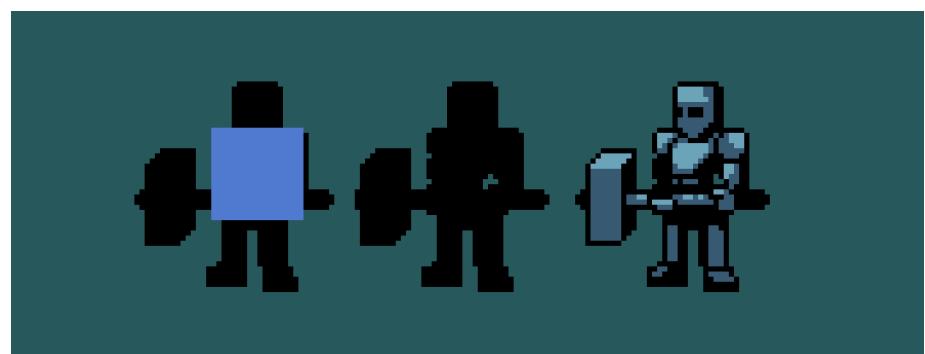
CIRCLE

The opposite of triangles, circles are round and smooth, representing friendliness. Circles are great for creating cute, harmless characters and can specifically create curves for natural feminine qualities. ➤



SQUARE

Squares are solid and represent strength and sturdiness (for example, bricks). Viewers associate security with strong and reliable subjects, and squares are good for creating typical heroic characters. In games, creating tank-like characters as guardians is especially common. ➤



CUTE CAT!

Not many can deny enjoying the presence of a cute cat! Notice how the iteration on the left is milder as it uses a more curved, soft approach coupled with a sad face. The iteration on the right looks way more fierce – sharp angles and bigger whiskers increase the face size in an "X" shape, which brings more attention to the frowning face. ➤





Sprite Posing

Without proper posing, characters feel static, stiff, and unenergetic.

This section covers ways to improve a sprite's pose to give them more energy to tell their story!

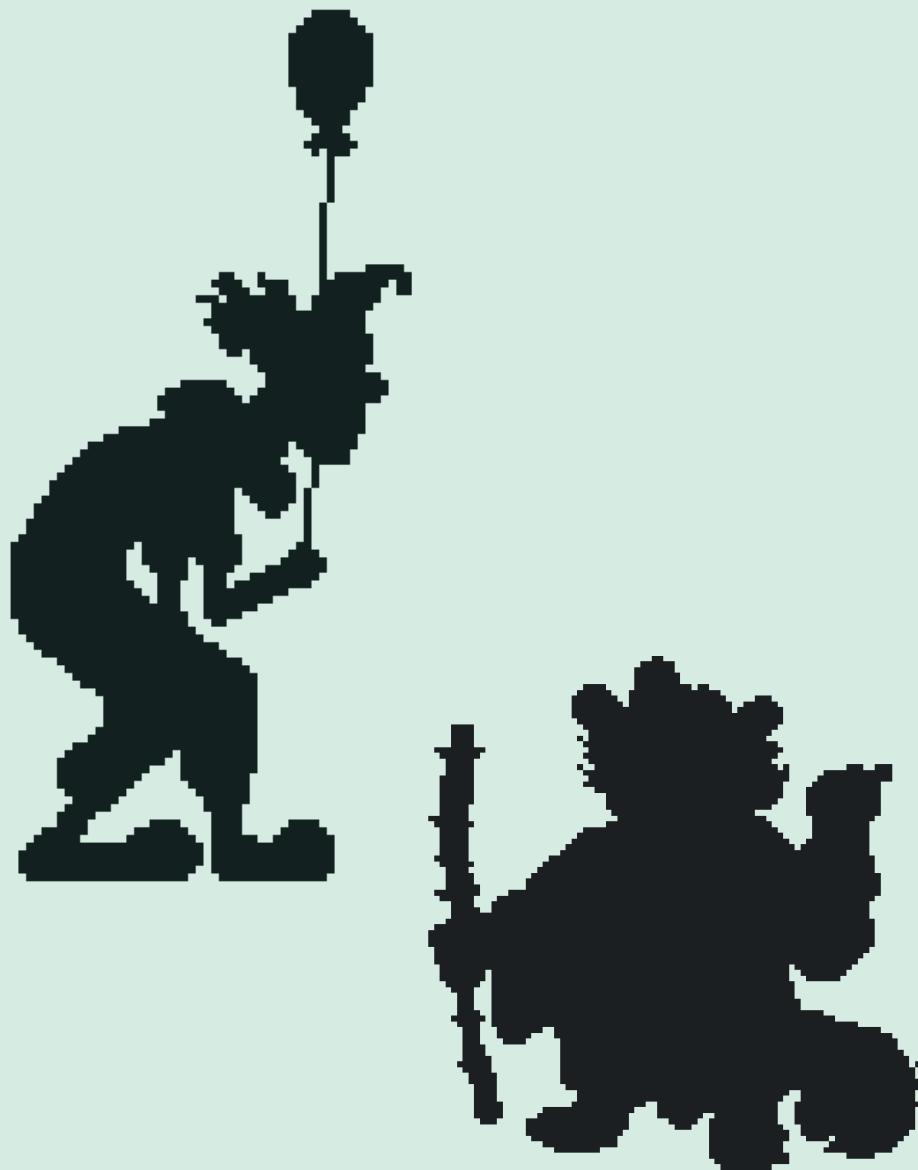
Posing Tells A Story!

Certain poses can help convey movement, emotions, or the characteristics of sprites. They can, for example, show how sad, angry, hyperactive, or evil a character is – just by their silhouettes!

There are a few factors that make impactful posing. See the examples on the right – is it possible to guess who the sprite is and what is their personality?

Looking the first character, the viewer can tell that a clown is feeling sad or, at least, not very happy. This appearance is presented through the sprite's slumped or hunched position and droopy arms, resulting in an unstable posture. ➤

The next image presents a character that appears more confident with an upright posture, their turned head motions towards its hand, so even without eye movement being visible, the pose directs viewers to a focal point – demonstrating yet another great quality of posing: directing the viewer to a character's intentions, just by using body language. ➤



WHAT MAKES GOOD POSING?

Having looked at previous examples, let's examine the four main criteria for good posing in more detail. Artists can try these by physically getting into the poses to understand how an individual feels in differing positions!

CERTAIN POSES CAN HELP CONVEY MOVEMENT, EMOTIONS, OR THE CHARACTERISTICS OF SPRITES. THEY CAN, FOR EXAMPLE, SHOW HOW SAD, ANGRY, HYPERACTIVE, OR EVIL A CHARACTER IS – JUST BY THEIR SILHOUETTES!

1. CLEAR AND READABLE

A viewer can usually tell a sprite's action from just a silhouette. The Mega Man example has his arms up and legs spread, giving the idea of him falling after a jump. *Mega Man, Ripped by Ultimcia, The Spriters Resource.*



3. VISIBLE CHARACTER

Any pose must show how a character may act, think, or feel at any given time, demonstrated through all the presented poses. This Katana Zero example conveys a cool, calm, and confident individual – shown by his hands near his belt, puffed up chest, and leaned back stance. *Katana Zero, Ripped by Maxon4iki, The Spriters Resource.*



2. PROPER PHYSICALITY

A character feeling balanced and having a realistic weight will go a long way in believability. This Metal Slug example has a triangular power stance to support the character's overconfidence by having his legs spread equally. *Metal Slug Ripped by TheHuntress, The Spriters Resource.*



4. VISUALLY INTERESTING

These tips also work for non-humanoid creatures, as they all build up to give a sense of motion by avoiding symmetry and having strong lines of action. This Pokemon example demonstrates a sprite in the middle of an action sequence, conveying its speed and weight. *Pokemon Firered, Ripped by Mishuk9, The Spriters Resource.*



LINES OF ACTION

The basis of rhythm and simplicity in a character pose is through a line, which dictates the energy and expresses body language. Previous examples of posing demonstrate that curved bodies can give a sense of sadness, while an upright line of action depicts intensity and confidence. Looking at old silent-era films and animations demonstrates the theatrics of the body as it squashes, stretches, and moves to express emotions.

FLOUR SACK EXERCISE

This is a great way to practice poses with simple characters. The main principle – get an emotion or expression, such as sad, angry, happy, scared, etc.

Draw a simple action line to represent that emotion; these lines can be as simple as a “C” or “S” curve! Repeat the line to create a rectangular-like shape resembling a flour sack, and add some extra tassels on the corners to give a final realistic touch. The examples to the right all show these emotions; where does each emotion belong?

Figure 1 uses an upwardly-curved line; what does it represent? ↴

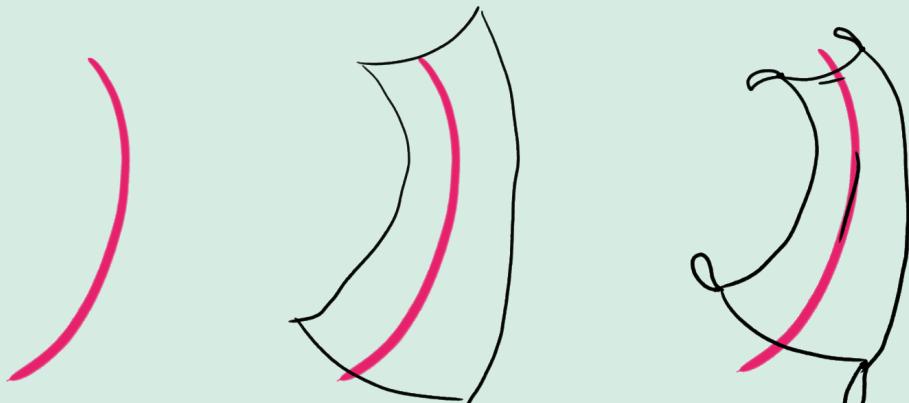


Figure 2 uses an “S”-curved line; perhaps best used to show a scrunchy-up character? ↴



Figure 3 uses a dramatic, downwardly-curved line; what does this convey? ↴

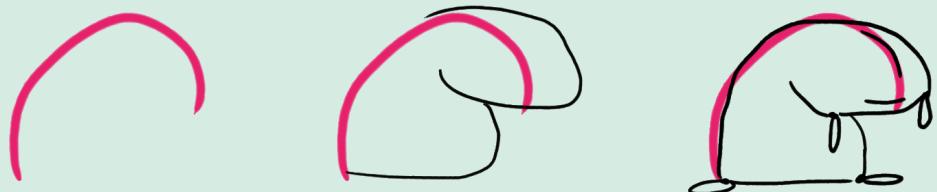
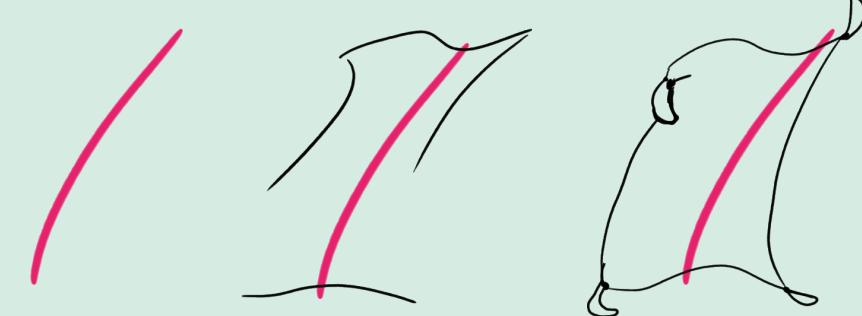


Figure 4 uses a downwardly-curved line, which exhibits what emotion? ↴

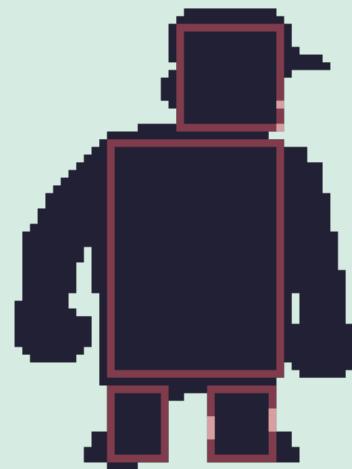
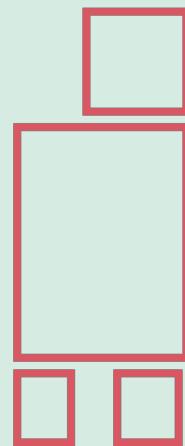
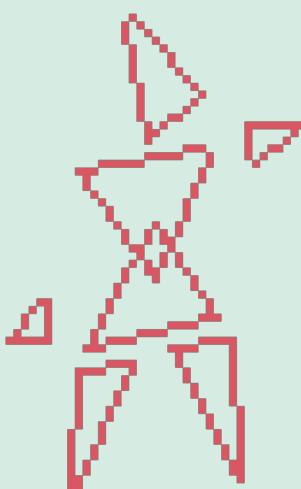


The answers are: **Figure 1** is happy, **Figure 2** is scared, **Figure 3** is sad, and **Figure 4** is angry!

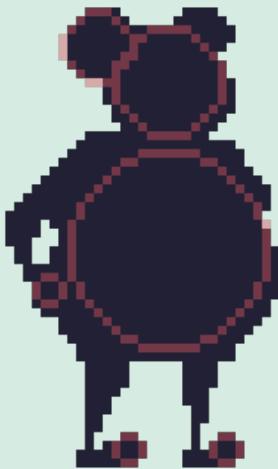
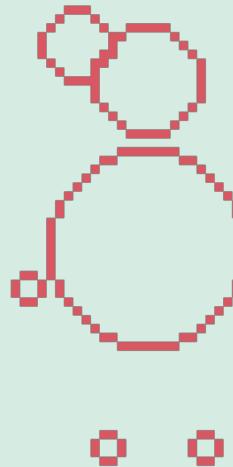
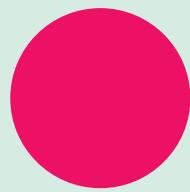
SHAPES SHOW CHARACTER

Another element of posing is using shapes to create character silhouettes. When an artist has a great action line and pose, the next stage is filling in the character by blocking out the shapes of its torso, limbs, etc. Using simple shapes – such as squares, circles, and triangles – conveys character expressions easily. Mix in good posing, and the outcome will be great sprite designs, whether in movement or static!

Use triangles on sprites to convey more menacing or agile characters due to the shape's sharp angles. ➤



Square based characters tend to feel strong and weighty, great to add to a sprite that should feel heavier or confident. ➤



As circles are round, they tend to give off a calmer and more approachable feel to them. Great for characters that are friendly in nature. ➤

USING SIMPLE SHAPES CONVEYS CHARACTER EXPRESSIONS EASILY. MIX IN GOOD POSING, AND THE OUTCOME WILL BE GREAT SPRITE DESIGNS, WHETHER IN MOVEMENT OR STATIC!

PUTTING IT ALL TOGETHER

Let's go through the process of creating silhouettes! These will act as the starting point for the main sprite designs. The example uses quick posing, so don't worry about how perfect the results are since they will feel more dynamic when adding color and clothing.

SILHOUETTE SPRITE TUTORIAL

Before jumping into the tutorial, see the example on the right to view the end goal. Using the same emotion prompts from the flour sack exercise, sketch a gesturing pose with rough lines (either from memory or using an image reference). The next step will be adding shapes to add more depth to the sprite's design (referenced previously). The final steps move to color, detail, and precise anatomy stages. However, for the basics, let's stick to the silhouette stage.

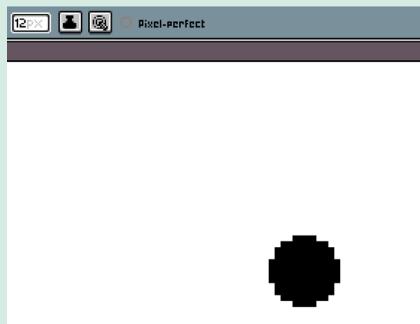


The image above shows the final model with curved edges, making it feel smoother than the final result of the tutorial.

The image above shows the final model with triangular shapes, adding depth to the final result of the tutorial.

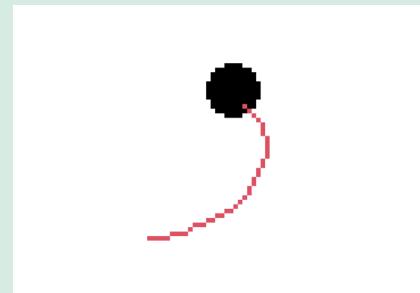
STEP 1

Draw the head. In a canvas of 96x96 px, Start by placing a circle around 8 px wide. ↴



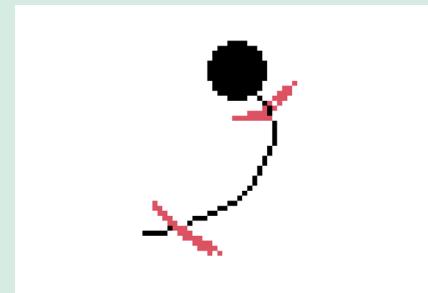
STEP 2

Draw the first line. Starting from the head, draw a line of action to represent a chosen emotion (this example chooses to demonstrate a happy emotion). ↴



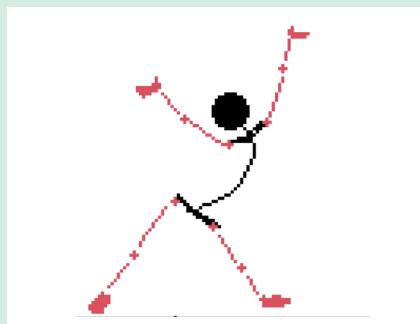
STEP 3

Draw the pelvis. If using a reference, follow that. If working from memory, imagine creating a squash shape to draw the line (similar to the flour sack example). ↴



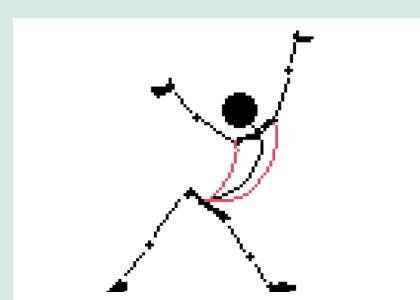
STEP 4

Draw the limbs. Using a 3 px wide brush, block out roughly where the joints will be and connect them using lines of motion. Keep the hands and feet as simple blocks for now. ↴



STEP 5

Draw the torso. Connect one shoulder to the center of the pelvis area to get the torso shape. Repeat this line from the pelvis area center to the other side of the neckline to complete the upper body outline. ↴



STEP 6

Fill the shapes. Finally, fill out the skeleton using basic anatomy to thicken the thighs, arms, and torso. Now an artist can shape the figure to fit the sprite design needed! ↴



LESSON 13



TILESETS

What are tilesets? Simply put, the technique consists of small tiles broken up and laid out in a grid, usually implemented for creating tile-based video games.

The numerous benefits include saving time, space, and device memory.

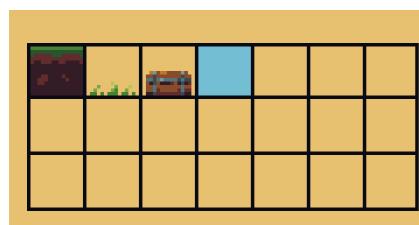
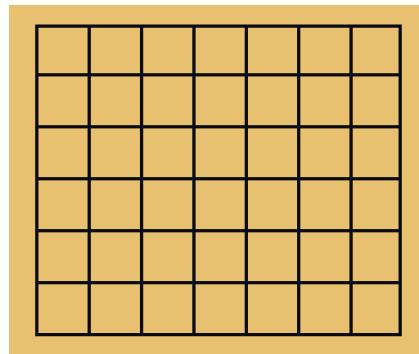
The most common grid sizes are 8x8, 16x16, 32x32, and 64x64, although an artist can create the grid size any way they prefer. Use these sizes for Top-Down, Sidescroller/Platformer, and Isometric tilesets.

Here's a 16x16 grid. Consider each square as a tile, so combining all together forms a tileset. Fill these tiles with desired elements for the game: ground tiles, platforms, grass, chests, trees, etc. ➔

Now let's populate a couple of tiles step-by-step. Design a base ground (platform) tile as the first tile – a solid base for players and enemies alike to walk on. In the second tile, create grass to place on the initial layer and appear in front of the characters. In the third tile, build a chest to appear behind the characters. The final tile to create is a background tile; these aren't as common with parallax and static backgrounds (see [Lesson 22](#)), but create one for learning! ➔

All four tiles are populated, so combine them as if creating a level. It looks good, but it's only one tiny area of a level, so expand to see the beauty of a tileset.

Expand the ground, grass, and background tiles. Creators carefully design tilesets to connect tiles seamlessly, creating a nice, playable level. ➔



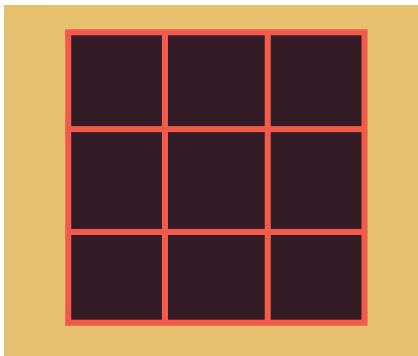
**WHAT'S
NECESSARY FOR
A TILESET?**

**THE BASE
STRUCTURE
TILES ARE THE
FOUNDATION –
SEAMLESSLY
CONNECTING
THE GROUND,
WALLS, AND
CEILINGS.**

STEPS FOR A 16X16 SIDESCROLLER/PLATFORMER

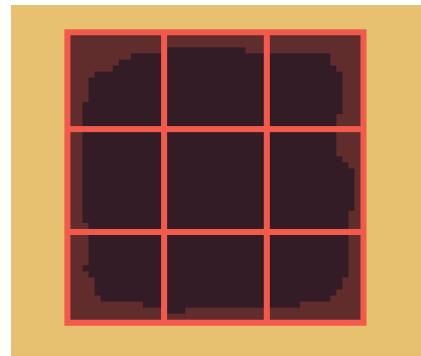
STEP 1

Lay a dark layer down, 48x48 px (this covers nine different tiles). ↴



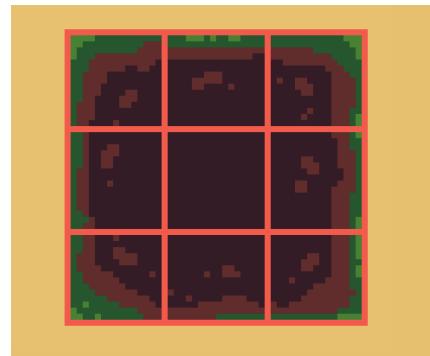
STEP 2

Add highlights to the dirt. ↴



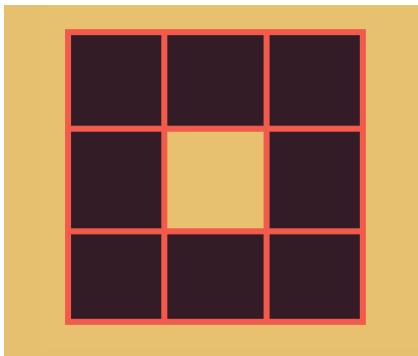
STEP 3

Add dirt specks and grass. Although an artist could create a simple platformer with just these nine tiles, adding another nine brings it together ↴



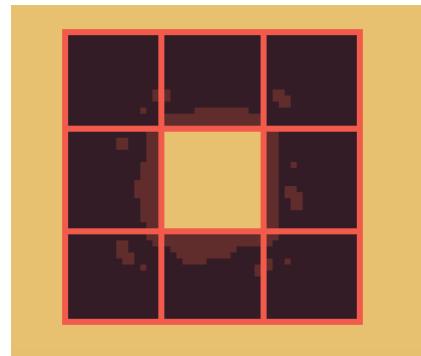
STEP 4

Lay down the exact same dark layer (as **Step 1**) and delete the middle tile. ↴



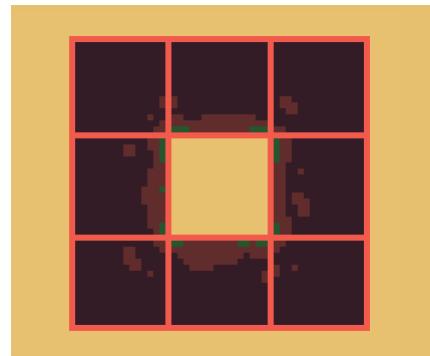
STEP 5

Add dirt highlights and specks around that deleted layer. ↴



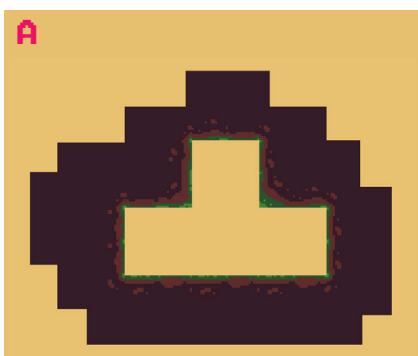
STEP 6

Add grass with highlights to complete the base for a Sidescroller/Platformer tileset. The power of just 18 tiles gives the potential for creating endless levels! ↴



STEP 7 – A, B, C

Add three grass tiles, three vines, one platform, a background tile, and the chest from before! (**Figure A and B**) ↴



In **Figure C**, see that a Top-Down tileset approaches small details differently, such as the grass and chest being more spread out and centered, unlike a Platformer tile where they're touching the base (bottom) of the tile. (Isometric tilesets are covered in a different lesson!) ↴



LAVA TILE SET CREATION

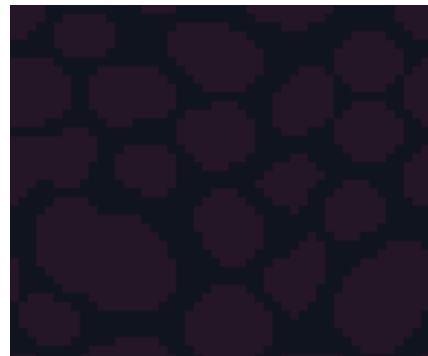
STEP 1

Set up a preferred canvas size (this tutorial uses 48x48). If an artist's used programming has a "Tiled Mode," set to "Tiled in Both Axes." Cover the canvas with black. ↴



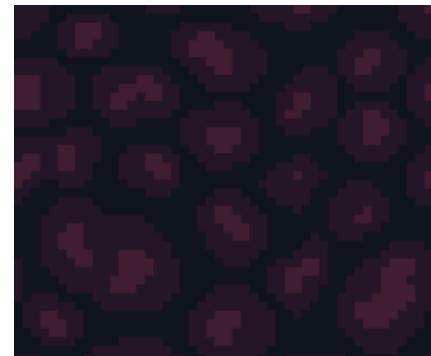
STEP 2

Using a dark red-orange color, make a bunch of blobs to represent rocks. ↴



STEP 3

Add blob highlights! ↴



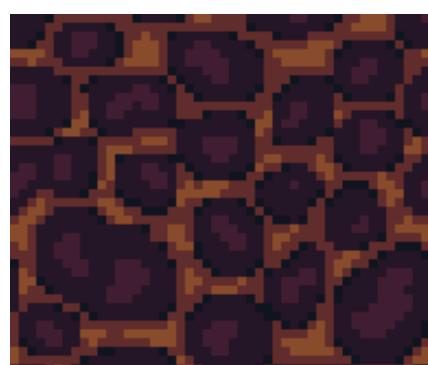
STEP 4

Fill in the space between the rocks with orange. Leave some corners of the original black open to add some depth! ↴



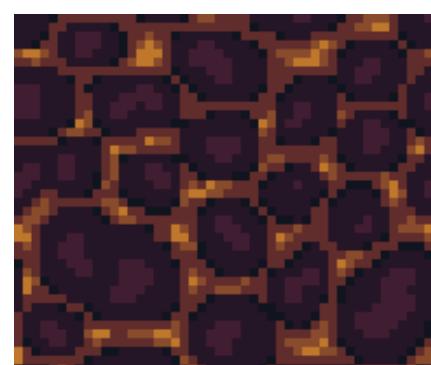
STEP 5

Add highlights to the orange lava. Try to avoid touching the rocks. ↴



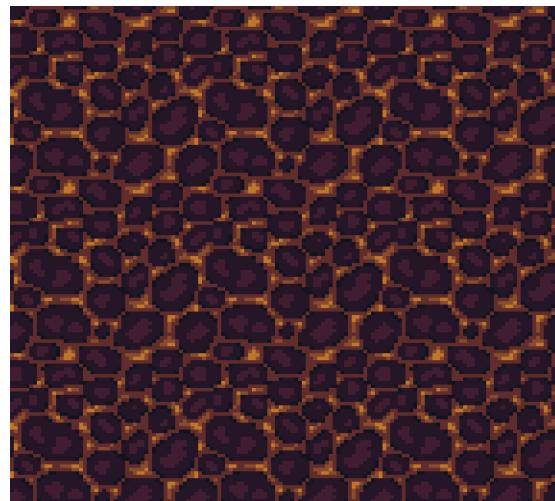
STEP 6

Add even more highlights. ↴



STEP 7

If an artist's programming doesn't have a "Tiled Mode" (Today most software's do), adjust the canvas to 144x144 and copy the tile over. If it doesn't connect perfectly, adjust the rocks accordingly. ➤



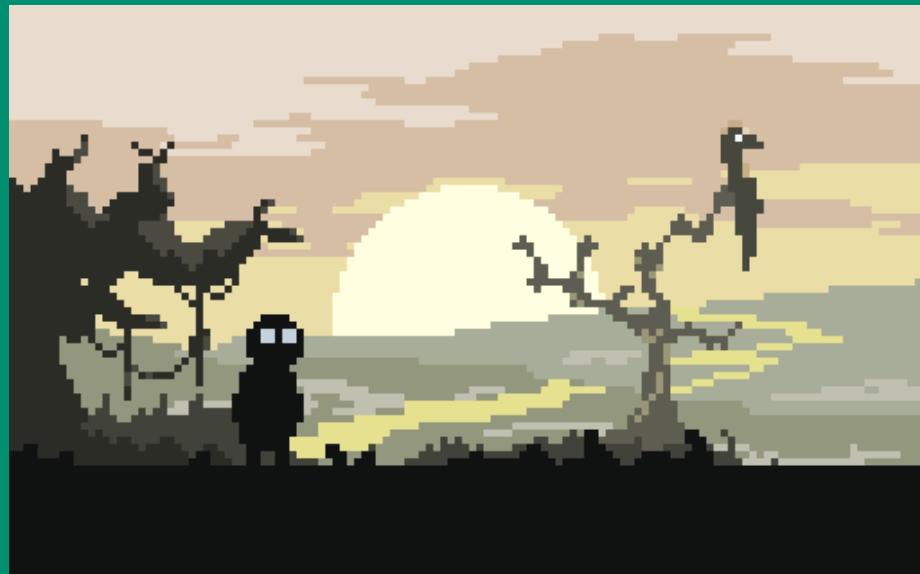


BACKGROUNDS

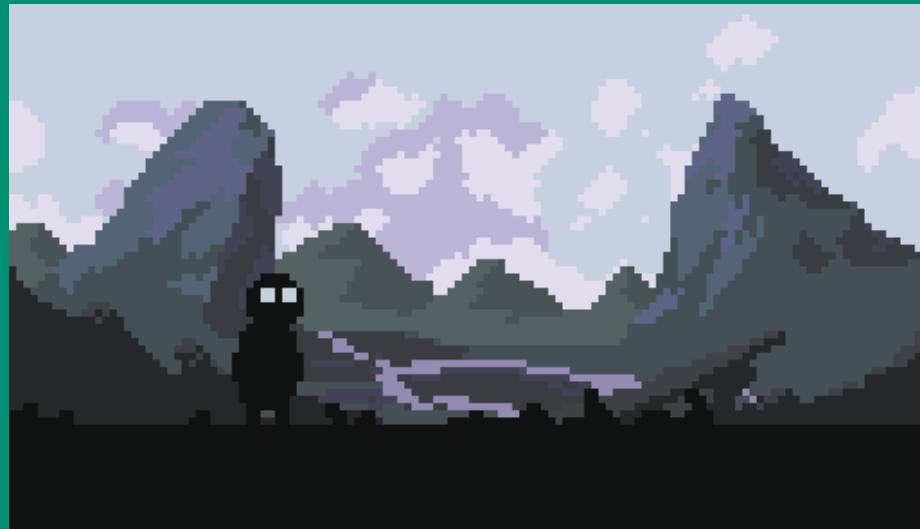
What are backgrounds in pixel art, and when should artists use them? Retro video games typically use pixelated backgrounds that are (most often) long, soft atmospheric landscapes that provide a sense of world-building.

Obviously, without backgrounds, created worlds feel empty and boring. A good way to think about a background's role is as an unnamed character in any given scene. For example, the Ice Worlds found in *Super Mario*. What is it easily referred to as? Ice Worlds. The flying turtle level? Flying Turtle World. The background in any given scene is not just for aesthetic's sake – it provides a scene *character* and often dictates the very game mechanics.

Let's look at some brief examples of backgrounds. Perhaps a desert? ➤



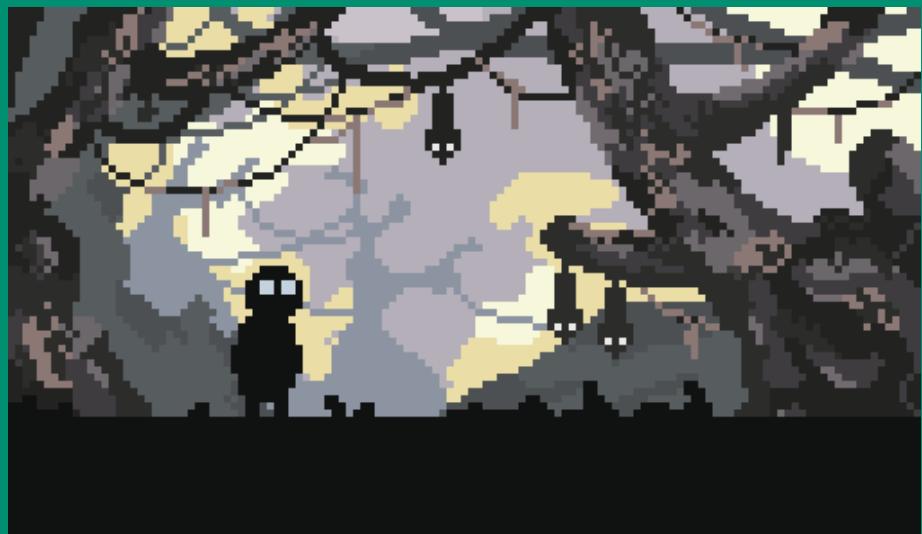
A mystic mountain? ➤



A creepy forest feel? ➤

The three examples have the same base tileset and hero features, yet all leave a different impression on the viewer. Designing a game is extremely convenient regarding time and money, when the background conveys most of a scene's aesthetic.

How to make a background? They can vary from being extremely complex to a simple, small palette. Most of the time, pixel games have simple backdrops with complex objects appearing occasionally, so let's look at the process of creating a simple setting.



STEP 1

Use the paint bucket tool on the back layer to add the sky. Add a bumpy line across to represent the clouds. ➤



STEP 2

Add three layers of grass – starting with the furthest back, use a light green color, then darken each layer that moves closer to the foreground. ➤



STEP 3

Add shading details to the clouds and grass. Artists often loop backgrounds seamlessly, so adding more detail can catch the viewer's eye and take away from the entire experience since the content feels repetitive. ➤



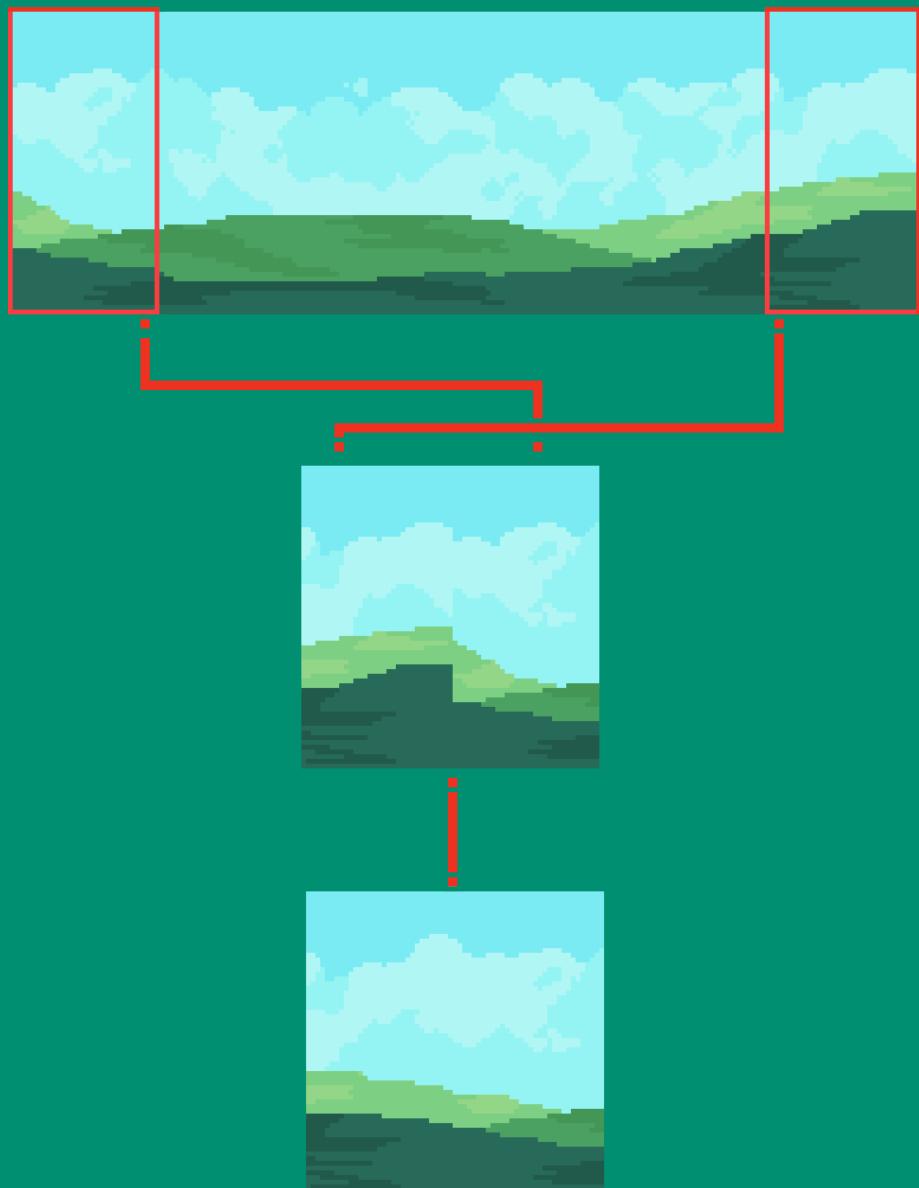
SEAMLESS BACKGROUNDS

Typically in games, artists use roughly a canvas size of 576x192 px (WxH). This way, artists cover a ton of ground, and the viewer sees less repetitive mountains, trees, or other background features. It's essential to make sure that the background's edges connect seamlessly to allow the artwork to scroll endlessly – making the world appear endless.

Let's look at an example. This beautiful landscape with clouds, but where does it connect? Highlight each end and export beside one another to see the impact. Not the best... this would be a huge eye sore in a video game. Let's fix it.

Adjust the height of the clouds and grass appropriately. Artists should prioritize quality time to ensure a smooth transition. Once completed, implement it into a game to see the beautiful result!

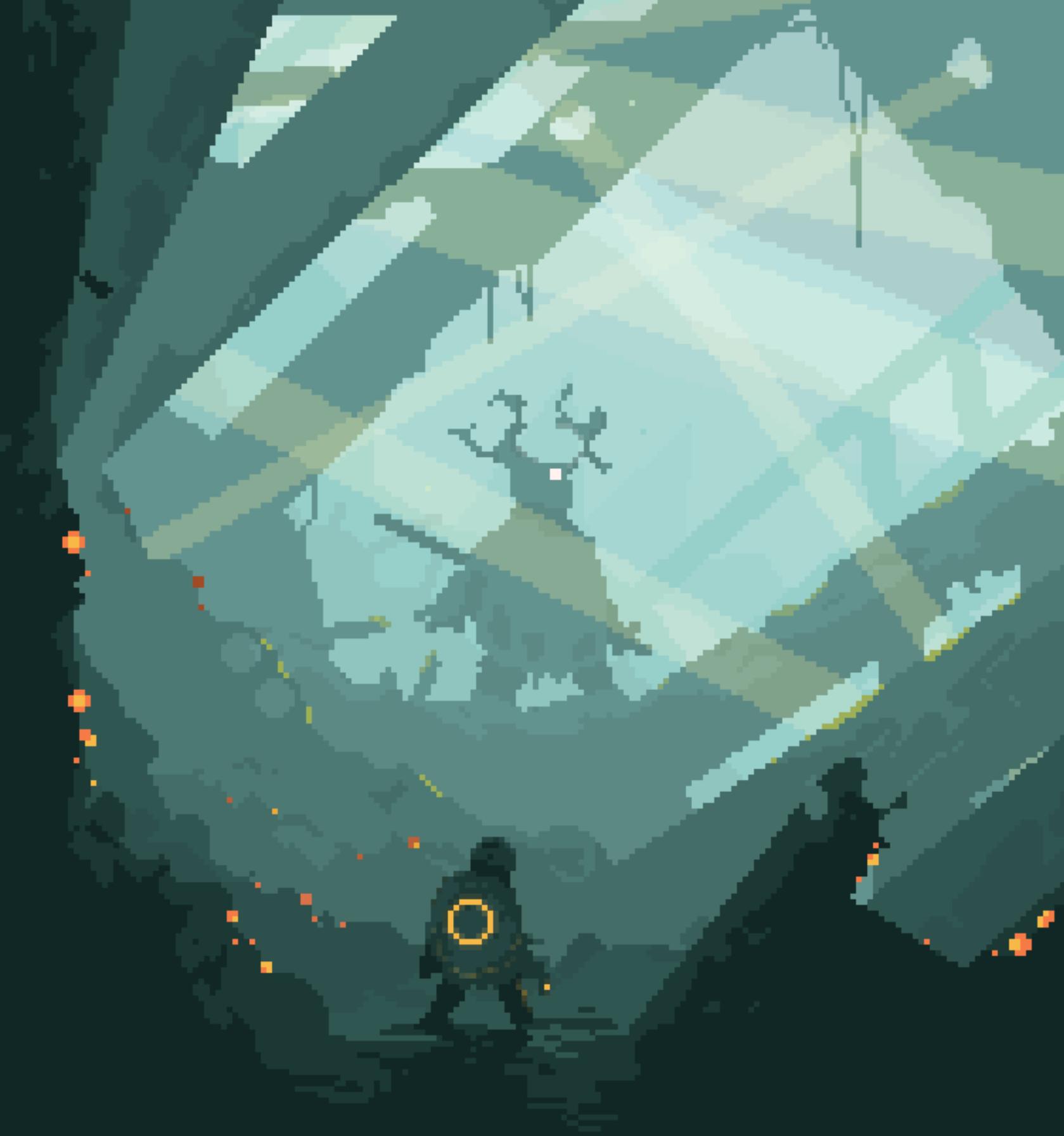
THE BACKGROUND IN ANY GIVEN SCENE IS NOT JUST FOR AESTHETIC'S SAKE – IT PROVIDES A SCENE *CHARACTER* AND OFTEN DICTATES THE VERY GAME MECHANICS.



USING BACKGROUNDS TWICE

The same backgrounds can be used in a game's Main Menu (or another menu!).

Look at the image on the opposite page, the Start Menu could easily adapt its amazing art to be the background of a post-apocalypse Sidescroller/Platformer tileset game. Remove the characters and "Start Menu" text, expand horizontally, make it seamlessly connect, and add to the tileset! ➤



Press Start

PENUSBMIC



USING MULTIPLE SOFTWARES

There are an infinite amount of workflows. Every artist has their preferred layout within each software, and each follows ordered steps to create – using personalized shortcuts and hardware.

A common barrier artists should strive to transcend is using only one software platform. Developers design their software for a specific audience and purpose, each with unique positive and negative aspects. If artists tie themselves to using only one software, they limit themselves to the restrictions of that software. Here's a simple example comparing two different softwares:

Aseprite is the most commonly used pixel art software – designed specifically for pixel artists accommodated with pixel-precision tools. It explicitly has an animation tool with layers to make that process easy. (See Page 67.) It also supports the creation of tilesets, which is crucial regarding game development. However, because of its specialty of pixel art, it's very limited in tools for non-pixel art effects, such as "glow."

On the other hand, **Photoshop** has amazing capabilities for non-pixel effects, and artists can personalize their software for drawing pixel art. Photoshop's weakness is its limited animation tool as it's unintuitive, so creating animations is difficult. Another negative of the software is that it doesn't support a tiling system.

But how would an artist create a tile-based game mock-up using non-pixel art rendering, similar to modern games?

STEP 1

Jump into **Aseprite** and create a tileset with the usual ground, grass, and water combo. Add details, such as flowers, rocks, and mushrooms.

Place the character in the scene and export it as a png image. This step creates the color palette and decides the resolution of the character, objects, game genre, etc.

This example demonstrates a simple RPG scene. Move the image into **Photoshop** for the next step. ↴



STEP 2

Create a vignette effect (**Photoshop** creates this easily) and add dialogue; although **Aseprite**'s previous step could add this, the tutorial takes advantage of **Photoshop**'s capabilities for far greater text manipulation.

Adjust the colors to create a more saturated image – indicating the character has suffered a head injury and just regained consciousness. These overly saturated colors would only last for a cutscene, so the color palette doesn't record them. ↴



See that the water is taking up a lot of screen space and isn't overly interesting? It's simply a blue color, so the artist must enrich the element. It is here that an artist using multiple softwares pays out!

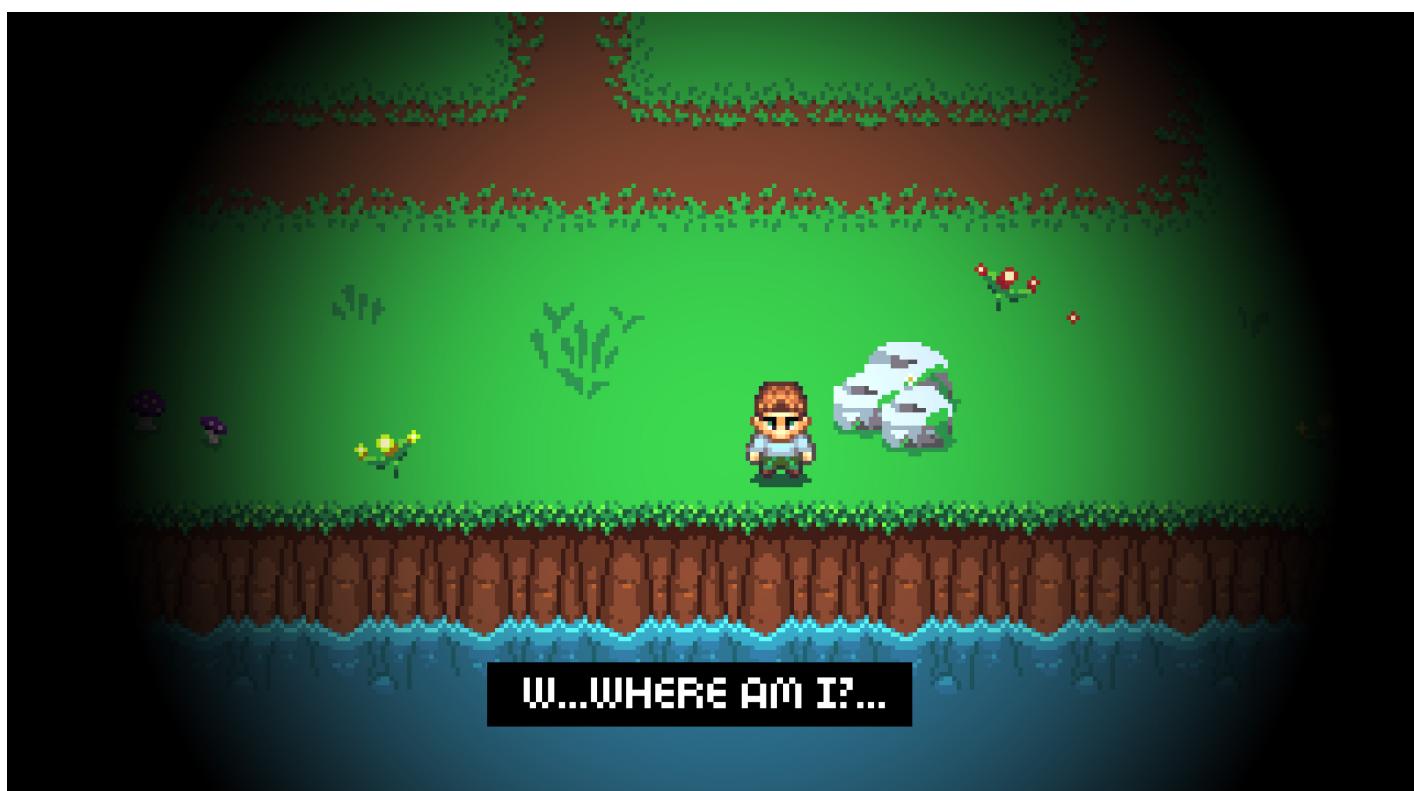
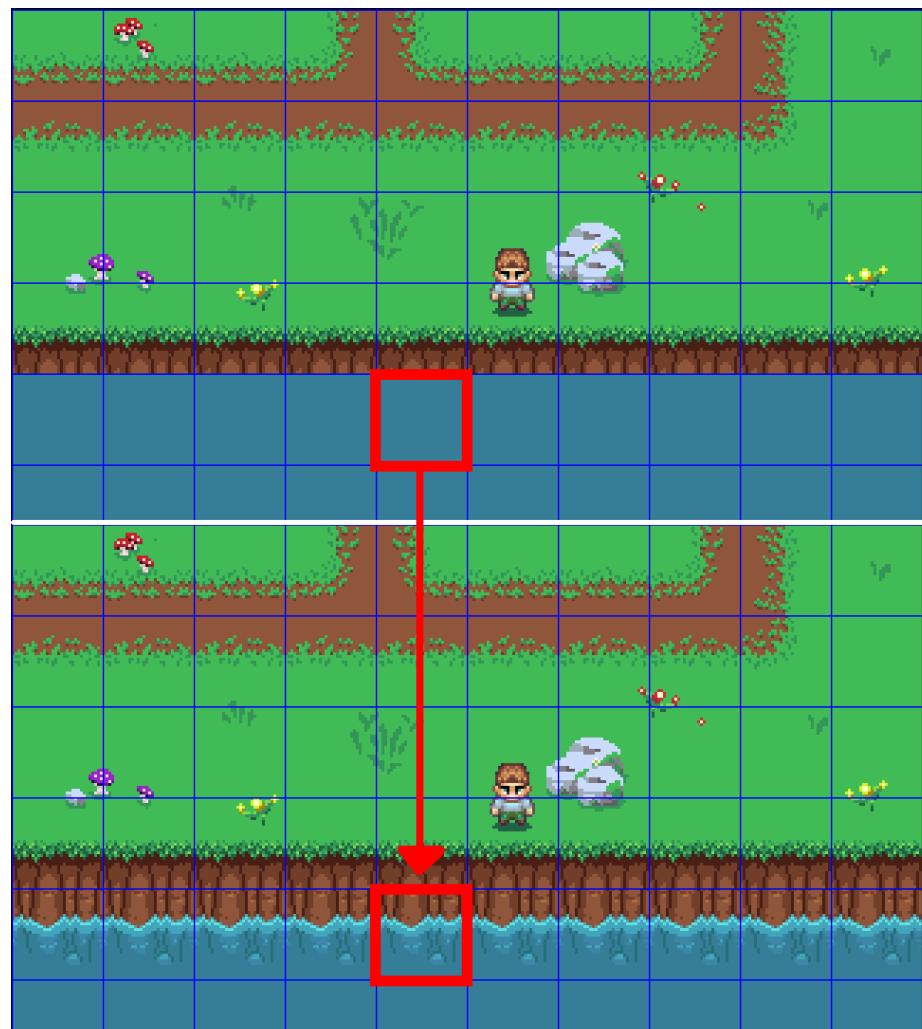
STEP 3

To change the water, return to **Aseprite** and change its tile. Changing only this one tile will automatically impact all the already-placed tiles to be updated with the new look – making seamless tiling easy.

The new water tile has more depth and appears more interesting, making the scene less dull.

Export the pixel art piece again from **Aseprite**, to import it back into **Photoshop** with the new water tile effects applied on the new version. Repeat this back-and-forth process as many times as needed. Although this example only changed one tile. Usually, the creating process would require changing multiple tiles – especially on bigger canvases.

Remember, this is one of the infinite situations, so always be ready to learn new tools! Artists who explore new ways to create discover wonders, enabling them to work better and faster! ❤





AFTER EFFECTS

If it's taking too much time to move the camera around the pixel scenes of the scrolling animation backgrounds, or an artist wants to add more impact, using After Effects will greatly improve the final piece's quality!

THE INTERFACE

Before getting into a particular tutorial, let's learn our way around. The default interface should look like this, but if it doesn't, find these panels under the "Window" tab.

1. PROJECT

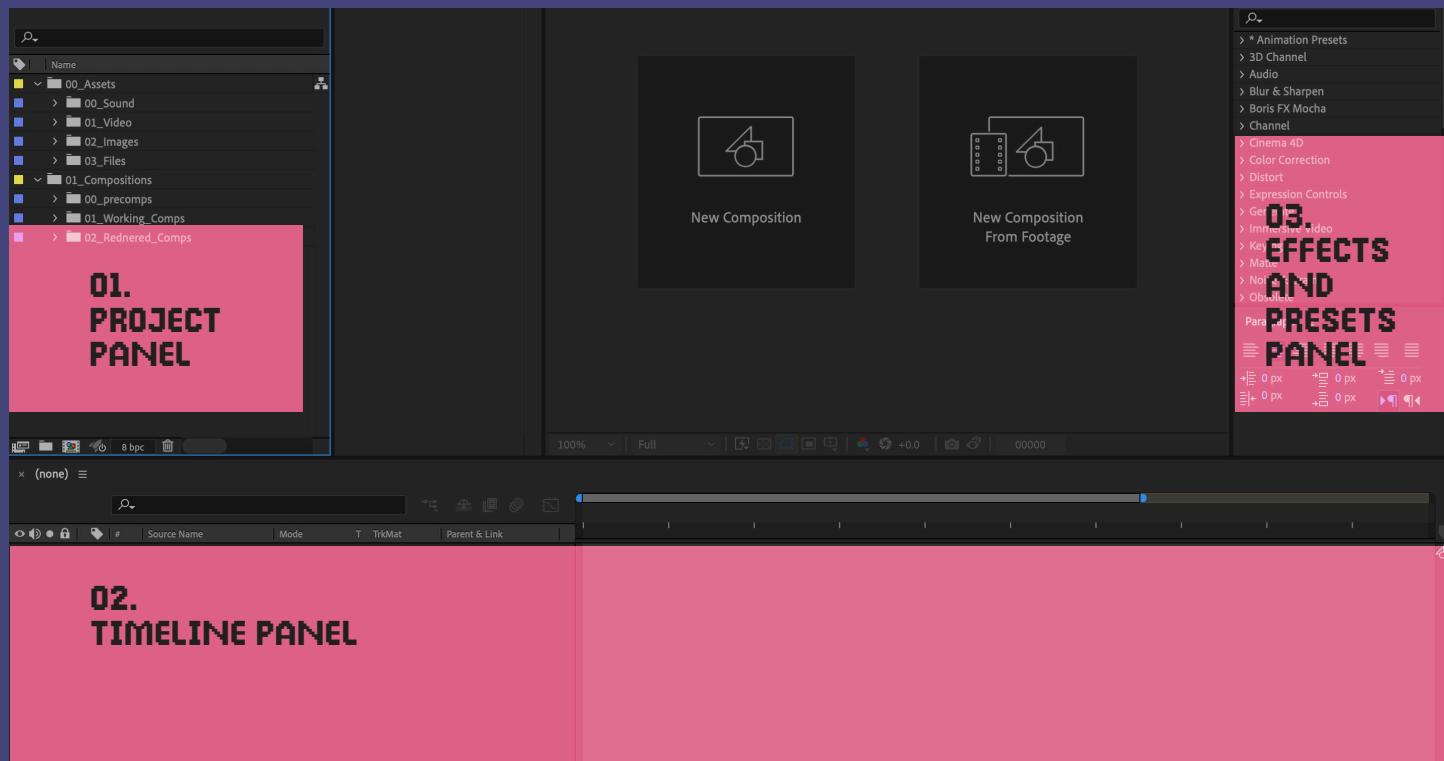
Where all the assets live, anything from images, GIFs, video, audio, or any **Adobe Photoshop** and **Illustrator** files.

3. EFFECTS AND PRESETS

The main tool an artist needs to add is post-production level effects, from rain effects, particle simulation, or noise, to get a CRT effect.

2. TIMELINE

Working like any other video editing timeline, here's the playhead that shows what frame the artist currently works and which layers.



FOLDER ORGANIZATION

After Effects requires any assets or files to be in one location to reference the original document. If an artist moves or renames the assets after importing, it breaks that referencing.

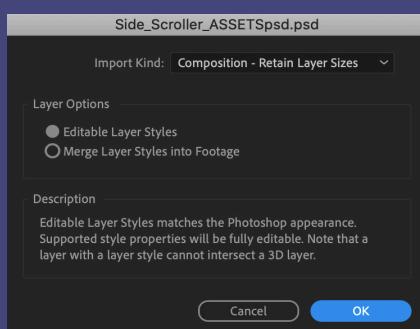
So here is a simple way to organize files!

SIMPLE TITLE SCREEN ANIMATION

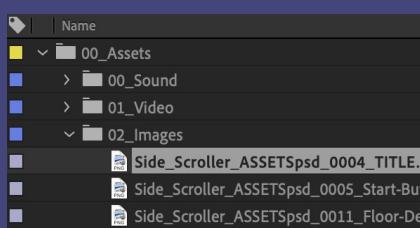
The below example is animating a simple title screen with a main title that fades and slides in.

Before importing files or assets, ensure the layers are separately exported and scaled to 1920 x 1080 px.

For **Photoshop** users, import the file by dragging it into the project panel. A pop-up will appear; ensure the import kind says “Composition Retain layer size.”



If using **Aseprite**, drag all rendered images to the images folder, and drag these into the created composition.



PROJECT FOLDERS

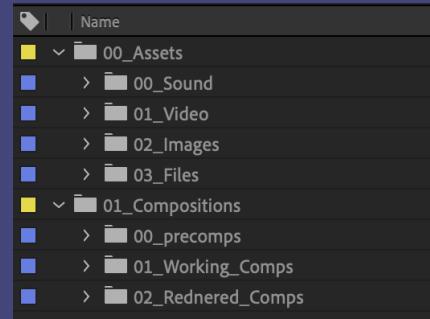
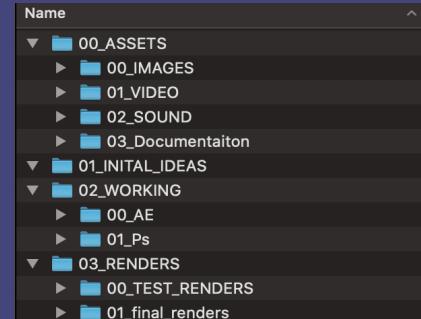
When creating a new project, use this folder structure to keep assets, files, and final renders organized correctly.

Create this exact format and copy-and-paste an empty project folder whenever starting a new project! ↴

AFTER EFFECTS FILE

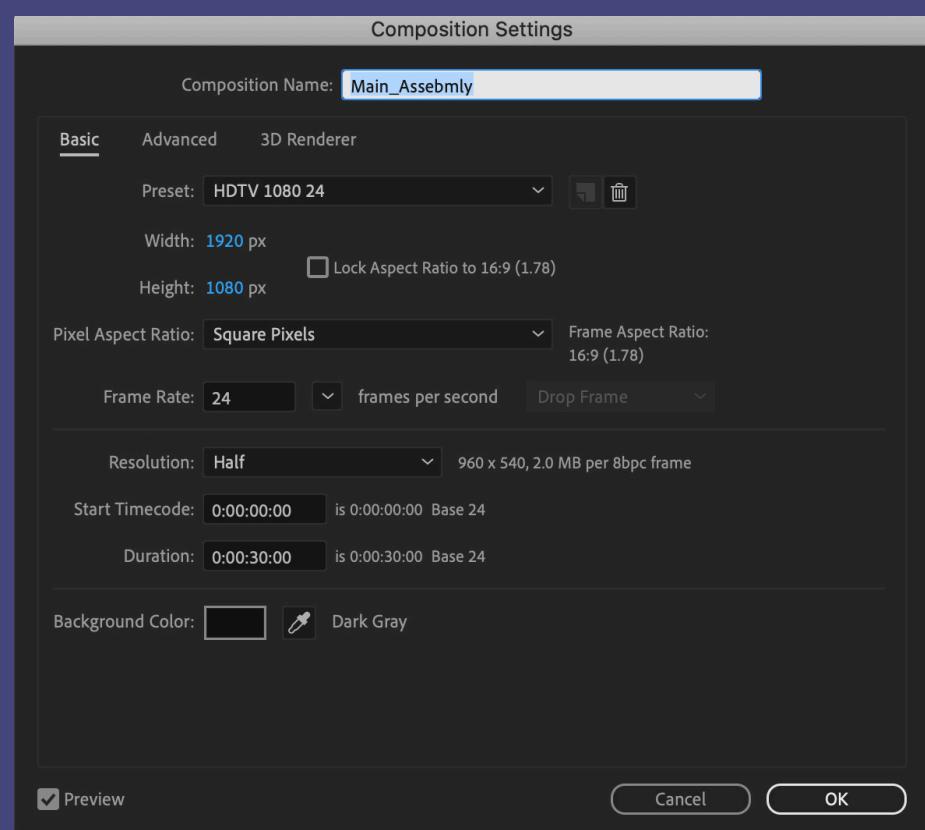
Even in **After Effects**, an artist needs to keep structure as some projects will have dozens of layers and assets. It's quicker to have them all correctly sorted into folders to save time. ↴

Note: “Comps” refers to compositions or sequences an artist creates their animation in.



STEP 1: SET UP

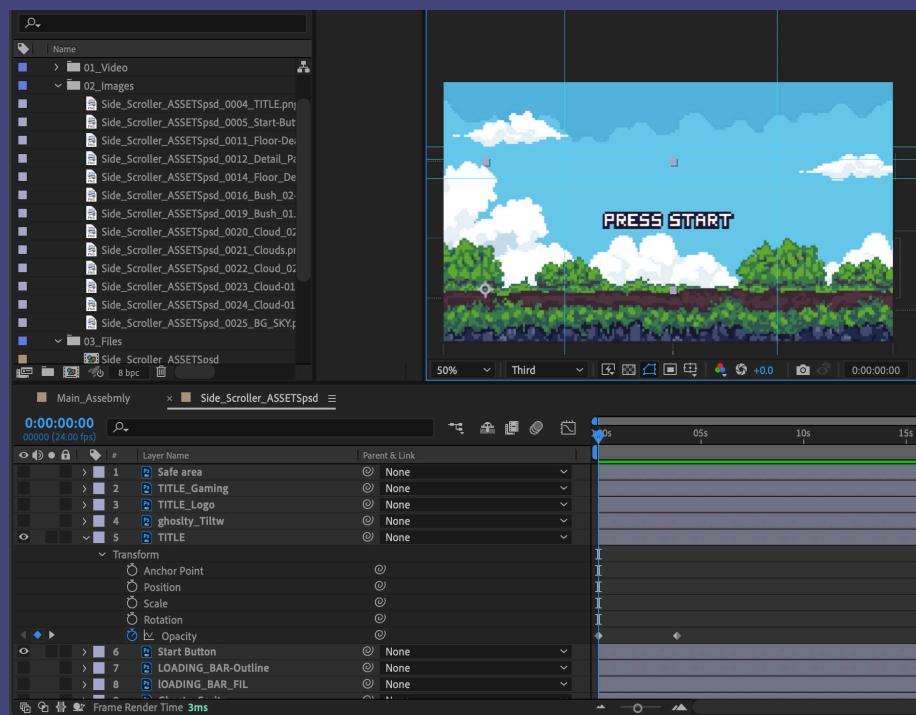
In the project panel, create a new composition by right-clicking. Use the preset “HDTV 1080 24” and edit the duration to 5 seconds. Label it “Main assembly” and drag the new composition into the folder “01_Working_Comps.” ↴



STEP 2: OPACITY

To fade in the title layer, select and click the drop-down to open the Transform Menu to find the transform properties – including opacity.

Press the stopwatch to set a keyframe and opacity to 0%. Move the playhead on a few frames and change the opacity back to 100%.



STEP 3: POSITION

To make the title layer slide as it fades in. Keyframe the position property and then drag to align with the opacity-end keyframe.

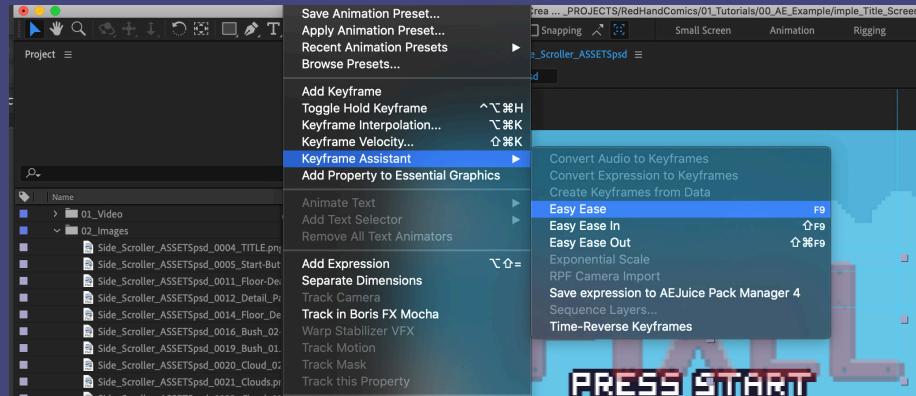
Drag the playhead back to the frame where the first opacity keyframe is, and change the position by dragging the layer down. Press the space bar to play the animation created!



STEP 4: EASING

Now that there is a basic animation let's ease the keyframes to smooth the motion. Highlight all the keyframes so they turn blue.

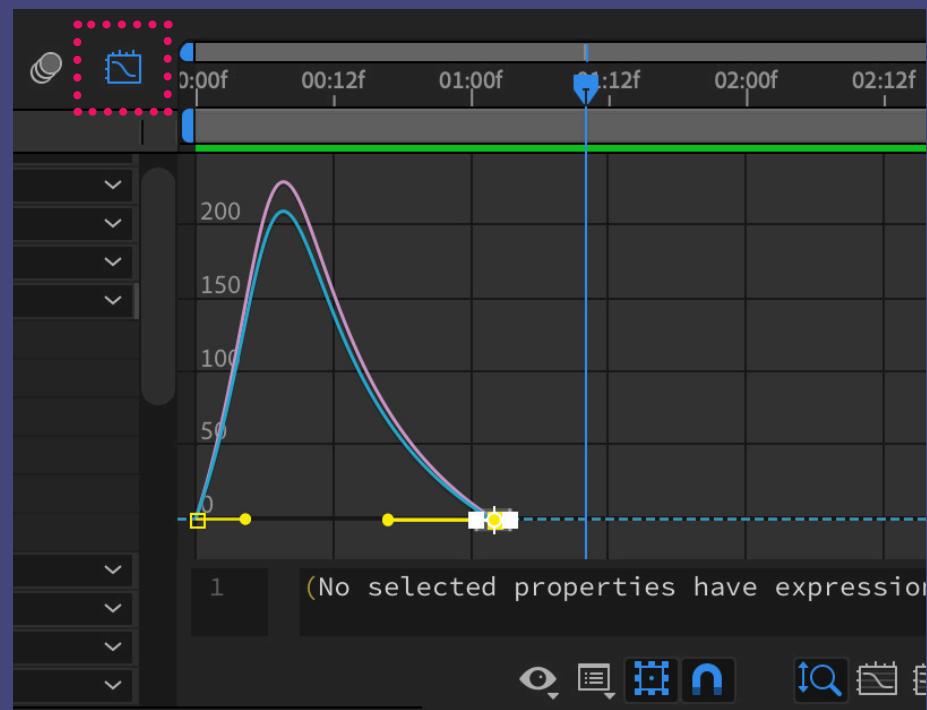
Go to, “Animation → Keyframe assistant → Easy Ease” to adjust the timing for an ease-in and ease-out.



5. GRAPH EDITOR

Press the **Button** shown, and drag the yellow handles to edit the easing with more control.

Play around with it and choose something that works best! >

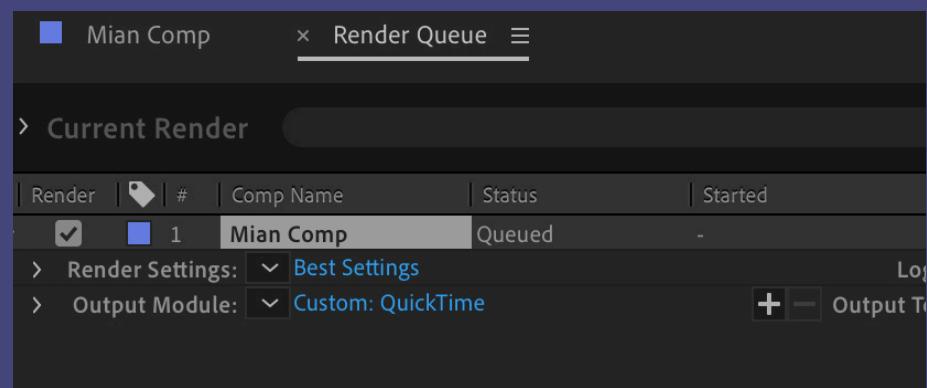


EXPORTING

Now it's time to export the animation! Go to "File → Export → Add To..." After reading the options below, choose which desired way to export the final file!

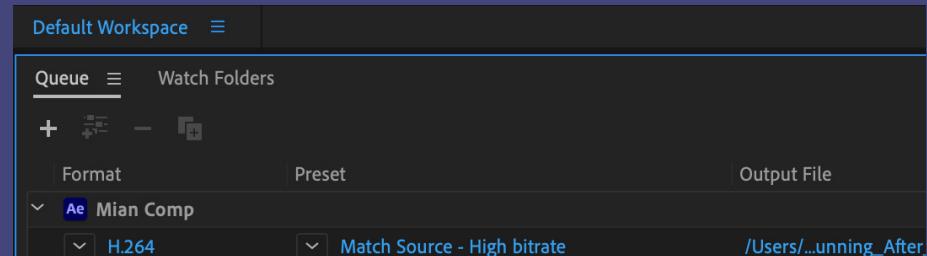
RENDER QUEUE

The main way to export within **After Effects**, as the settings are self-explanatory, so they don't need to change much – other than output location and file size. The only issue is that an artist can't render and use **After Effects** simultaneously. >



MEDIA ENCODER

Another **Adobe** software that allows rendering files and using **After Effects** saves a lot of time. The export settings selection is also much easier to understand and has more preset possibilities for different formats, like YouTube and Twitter. >





WATT
DESIGNS

ANIMATION

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KEYFRAMES

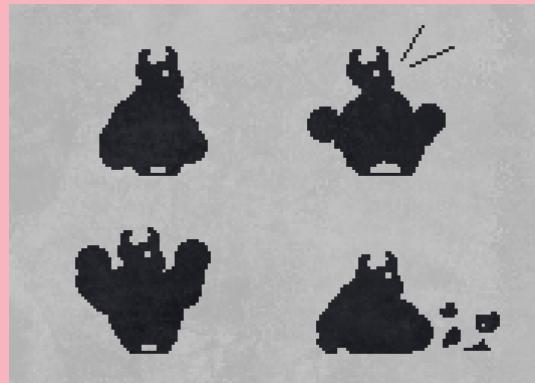
What are keyframes? They are the most important moments in an animation, so strong and readable poses are crucial. This way, the viewer's eyes can focus and easily read **what is** happening while anticipating **what will** happen.

Here are three keyframes. The first is nearly an idle pose, the second is an action pose, and the third is a finishing pose. With these three positions, the viewer can form a general idea of what will happen in the animation.

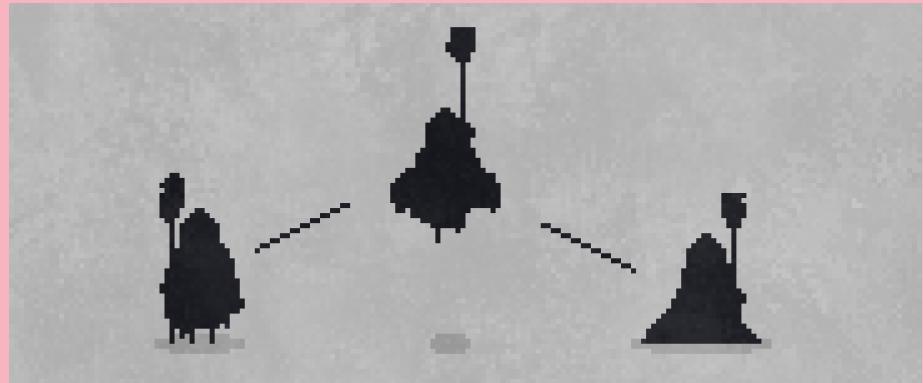
When drawing keyframes, use silhouettes for a quick representation of what the pose will be and fill in the details later. ➤



Let's use the example of animating a big, horn monster – say an artist desires to have the character raise its fist, let out an enormous roar, and slam the ground. So, running through the keyframes, we've simply just explained them... idle pose, raised fist pose, roar pose, and slamming a fist into the ground pose. Draw each in silhouette form. ➤



These silhouettes don't need to be perfect, but a guide to bringing together each pose. ➤



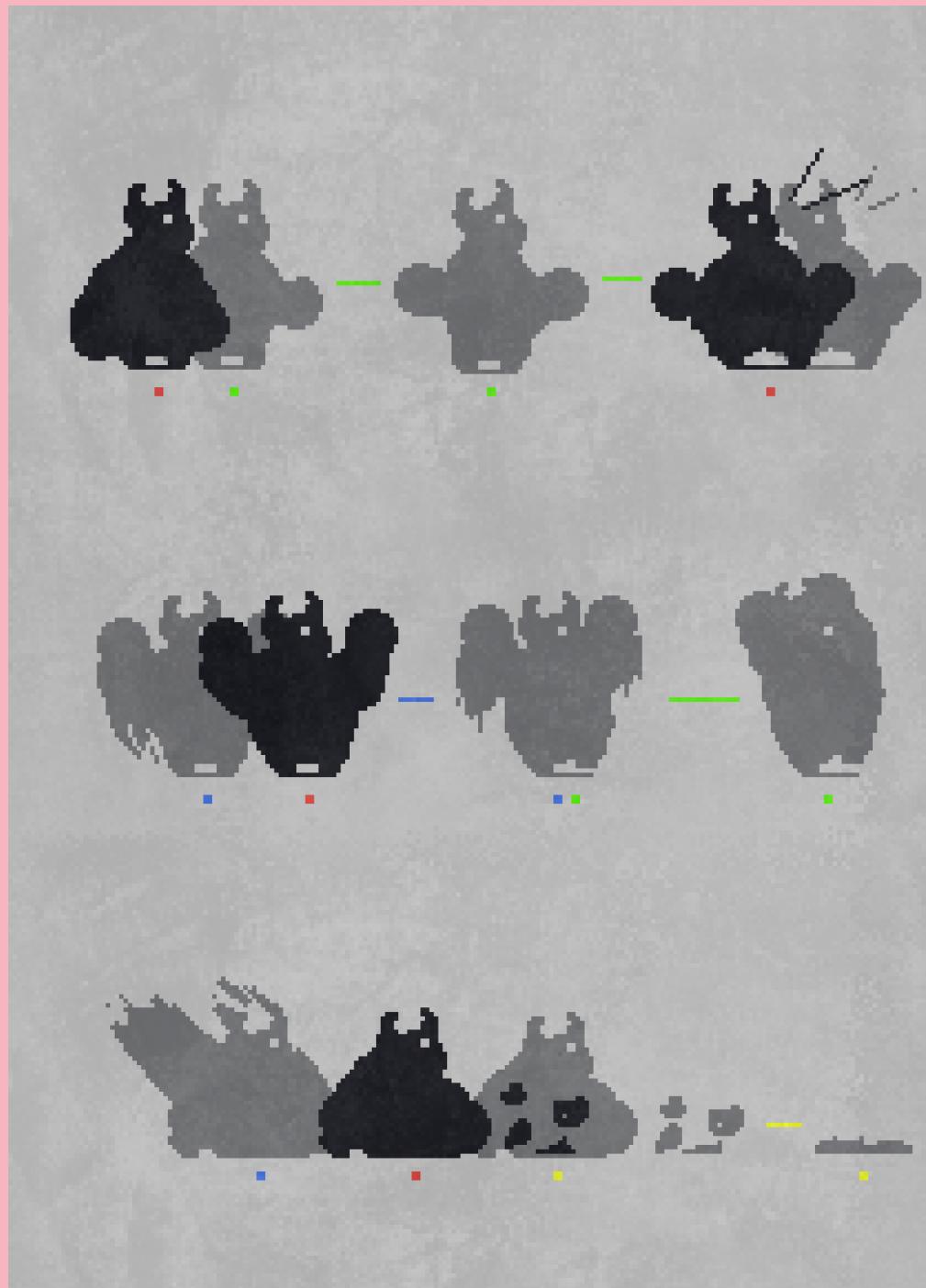
Let's focus on connecting the keyframes and quickly talk about adding the other necessary poses. >



- RED DOT FRAMES – Major keyframes.
- GREEN DOT FRAMES – Anticipation and Sub-pixel frames (used for subtle movement, build-up frames).
- BLUE DOT FRAMES – Smear frames (used for quick movements, usually the last frame connection to the next keyframe).
- YELLOW DOT FRAMES – Follow-through frames (Used for “settling” the animation).

Great Work! As an artist completes the keyframes and now has an idea of connecting them, bring the character further to life by adding details! >

WHEN DRAWING KEYFRAMES, USE SILHOUETTES FOR A QUICK REPRESENTATION OF WHAT THE POSE WILL BE AND FILL IN THE DETAILS LATER.





INBETWEENS

“Inbetweens” are frames between keyframes. They create more fluid animations by providing extra movement information by filling the missing gaps.

TWEENING

Tweening (another word for “inbetweens”) is the animation process of creating frames between keyframes, done manually or automatically. If automatically, an artist inputs the object’s starting and ending position, the software creates the movement on the number of desired inbetween frames.

While automatic tweening is a common technique in animation, it’s rarely used in pixel art because most software doesn’t support the technique (like **Aseprite** or **Pyxel Edit**). But for good reason! Pixel software only allows 1 px movements.

Imagine an object travels a distance of 10 px within 10 frames. That’s easy – simply move 1 px for every frame! However, what if the object travels a distance of 7 frames? An artist can no longer divide the distance into even spacings, resulting in stutters and uneven jumps between frames. Other animation forms don’t have problems due to their resolution, like vector-based or traditional 2D animation.

That said, if transferring the pixel art into another software, an artist can use automatic tweening. For example, if a game engine handles sprites’ movement, it creates smaller movements than 1 px (because sprites are usually upscaled).

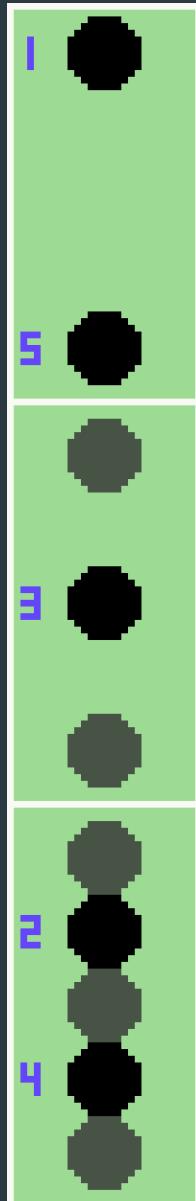
HOW TO DO IT

Imagine there are five frames on the animation timeline. Frames 1 and 5 are the keyframes – Frame 1 features the sphere on the top, and Frame 5 features the sphere on the bottom.

Now there are three inbetweens to work (Frames 2, 3, and 4). By introducing these extra frames, the animation appears more fluid. For this example, keep even spacing between each frame – moving the object the same distance amount for every frame.

An observer might believe that the next frame to draw is Frame 2, but no! First, draw Frame 3 because finding the sphere’s halfway position is necessary. Compare the sphere’s position on Frames 1 and 5 to find the exact middle of the path – the place to draw Frame 3. If an artist skips this step and tries to draw Frame 2 immediately, there would be a lot of guesswork viewed in the final result.

This Frame 3 inbetween will serve as the middle point. Draw the sphere’s position in Frame 2 by comparing Frames 1 and 3. Do the same step for Frame 4 by comparing Frames 3 and 5.



TIMING AND SPACING

2D animators write timing charts to show their spacing and timing – referring to their number of frames (keyframes and inbetweens). “Spacing” refers to the animated object’s position on each frame, or rather the area between each position. How the object’s movement spaces out can greatly influence how the viewer perceives the action.

The first column only has two keyframes, but the other columns have three different ways to “tween” this animation. These are not the only three ways – there are many more – but pixel artists most commonly use these. The second column has an **All Evens** example. In this case, the sphere spacing is even between every frame, creating the illusion of consistent movement. The object’s speed always moves the same, very mechanically, which is quite common for robot and machinery animations.

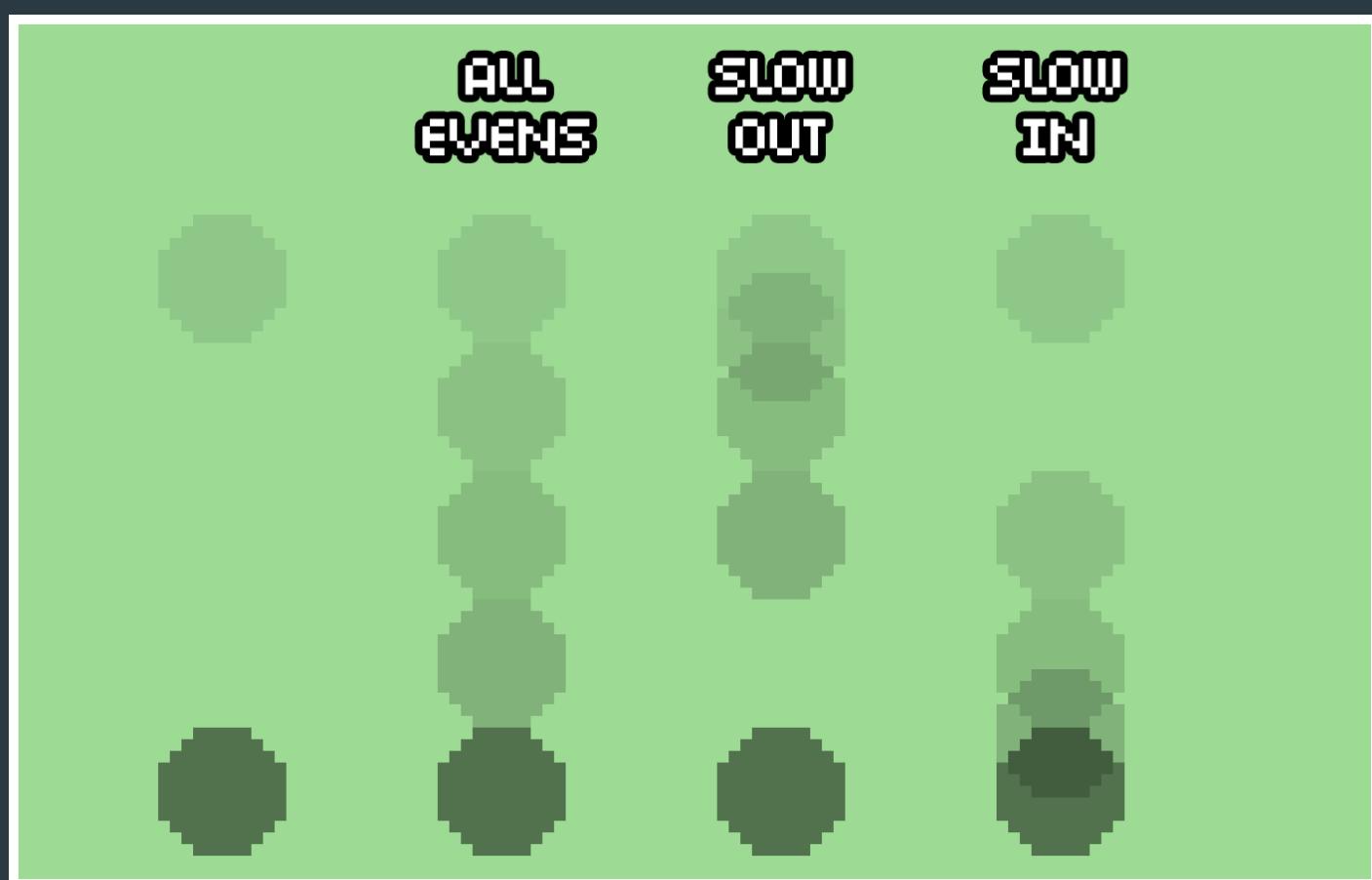
For more organic and believable movements, there are the other two examples. The third column has a **Slow Out** example (or **Ease Out**). In this case, the spacing is very tight at the animation’s beginning and increases over time – depicting an object that starts slowly and speeds over time. In other words, it creates an acceleration effect.

The fourth column demonstrates the opposite with a **Slow In** example (or **Ease In**). The spacing is big at the animation’s beginning and decreases over time – depicting an object that starts fast and loses speed over time (deceleration). The more space between each frame, the faster the movement appears. Likewise, the less space between each frame, the slower the movement will appear.

In 3D animation, artists use their software’s curves to slow in or slow out the animation, but 2D artists have to be very conscious of this technique. Even though an artist works with the same number of frames, the spacing decides how the viewer perceives the animation as a whole.



Scan for
“Inbetweens”
Animation





LOOP CREATION

Introducing Loops and its Differing Types

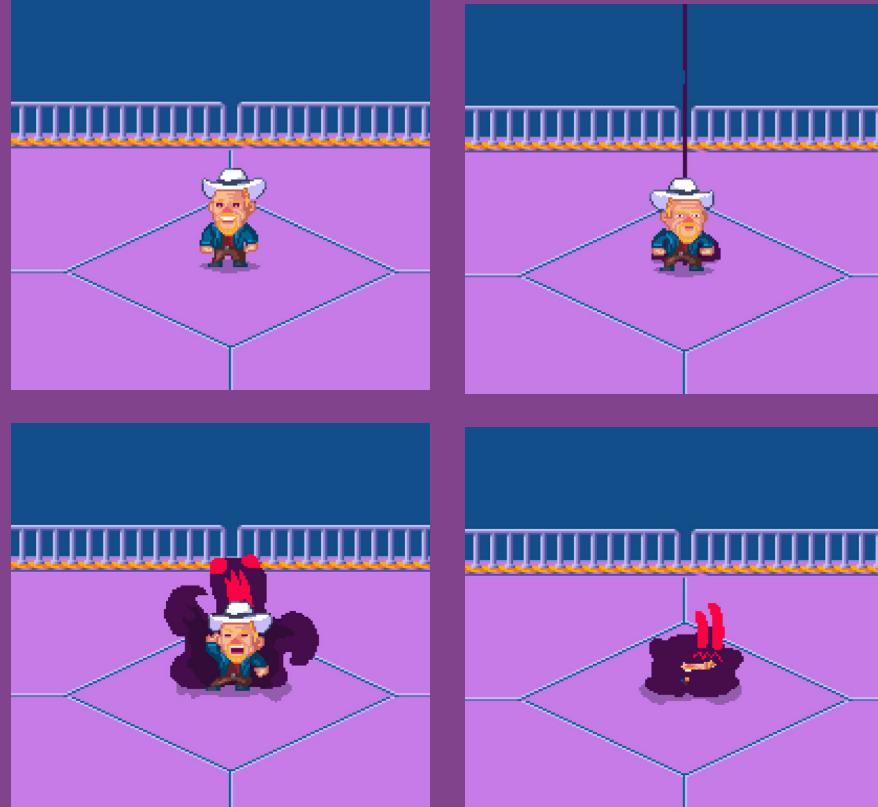
Pixel art loves GIFs. The very art form even seems to be designed for them: working at small resolutions, they can be very light and easy to export while maintaining the quality of the original design. Best of all, GIFs can create infinite animations to repeat endlessly.

A GIF is a sequence of static images (keyframes) displayed sequentially at a normally uniform rate (frame rate).

Usually, a pixel animation doesn't exceed 256 colors – the maximum number of colors a GIF supports. However, when exceeding this number, a GIF export tries to suppress the extra colors by replacing them with similar colors that are more predominant in the composition, which appears in the final result.

When creating, an artist can configure a GIF to repeat indefinitely without showing cuts. A pixel artist only needs to create one good loop to do this. A “loop” consists of an animation where the last frame of action links perfectly with the first, creating an effect of continuous repetition.

Remember: A loop's inside can also have further sequences of loops that repeat inside the main animation (sub-loops) or other animation sequences.



Here's an animation of a stuck cuckoo clock, so it always gives 12 o'clock.

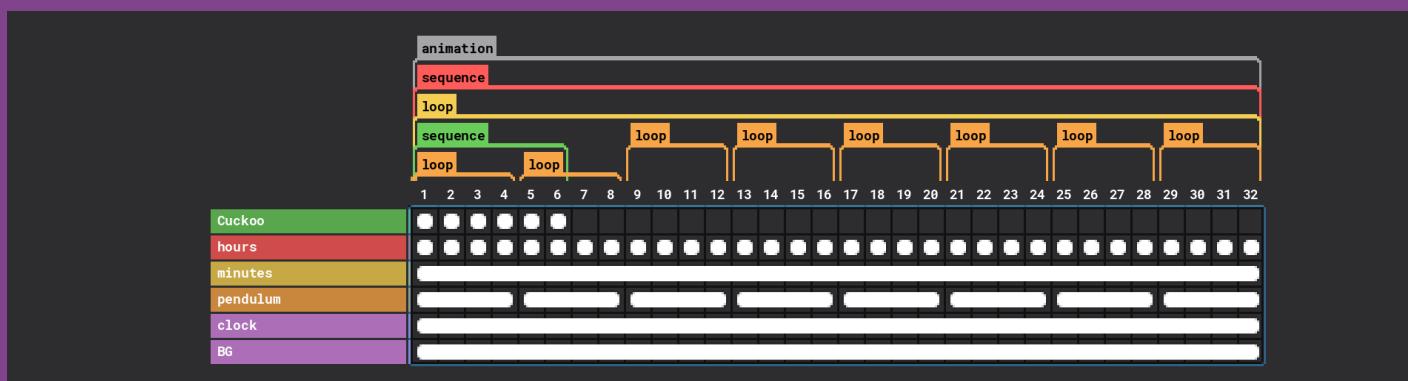
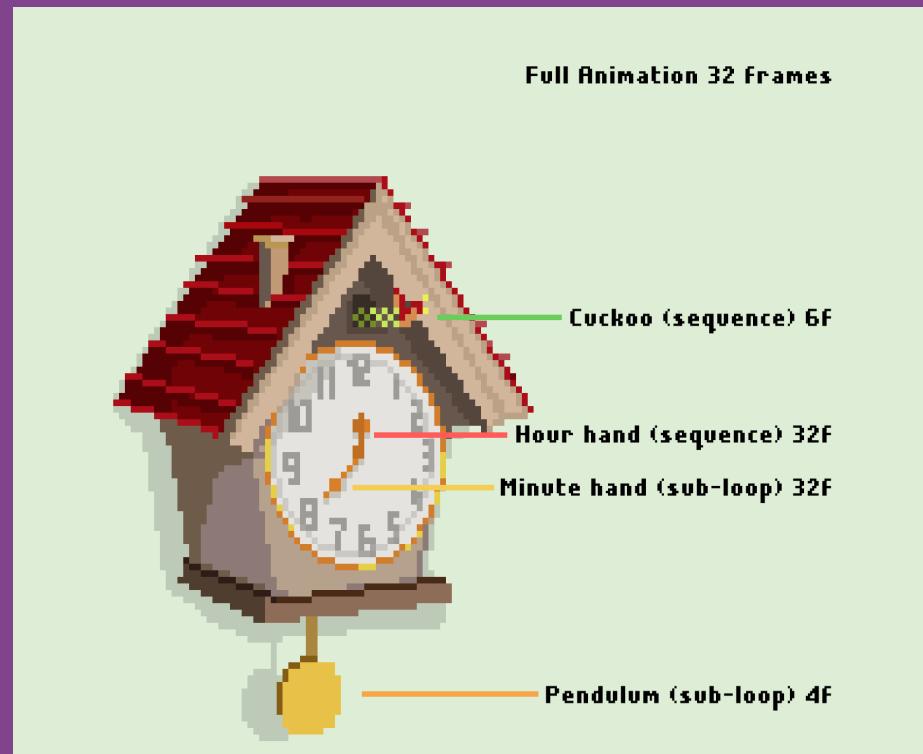
Duration: 32 frames.

The clock's animation is composed of:

- Continuous movement of the pendulum:
Sub-loop 4 frames.
- Minute hand going through a whole hour:
Sub-loop 32 frames.
- Hour hand trying to move forward and backward at the last moment:
Sequence 32 frames.
- Cuckoo bird coming out every time the hour hand strikes 12 o'clock:
Sub-loop 6 frames.



Scan for
"Clock"
Animation



Sequence loops: Where part of a story narrates, the only restriction is that the scene ends in the same state where it begins. The loop doesn't have much importance as a resource, but it's a creative way to restart an animation that has clearly ended.

Scene loops: Giving life and movement to a design that could remain a static image. Common to landscape scenes, where there is no primary action, each animated element focuses on its own sub-loop, creating something harmonious together.

Disguising the moment when the animation restarts always brings extra flourish to the final finish. There are ways to achieve this feeling that this lesson covers in detail.

A GIRL COMPOSING MUSIC IN HER ROOM

Here is a 120-frame animation that includes:

- **Static elements (purple):** The room and most elements remain unchanged throughout the animation.
- **Regular sub-loops (green):** Repeating constantly, although each element can have its own duration. The condition is that at the end of the animation, each element has finished its loop. In this case, most of the girl's body moves at a constant rhythm, suggesting she follows the rhythm of a melody. Here we also find elements such as a blinking display, a walkman...
- **Irregular sub-loops (yellow):** These are sub-loops (or animation sequences) launching at irregular intervals, without following a concrete pattern, that helps break the feeling of total and constant repetition. A random pencil's movement or a slight change in the ukulele's position.



A “LOOP” CONSISTS OF AN ANIMATION WHERE THE LAST FRAME OF ACTION LINKS PERFECTLY WITH THE FIRST, CREATING AN EFFECT OF CONTINUOUS REPETITION.



Loops of Asset: The most common in the immense majority of pixel art games, and they usually are the pieces that construct the behavior of the elements of the game. Typically, they're very limited in duration, size, and type of action... often these limitations are given by the game's technical requirements.

Within these loops are the actions of the characters (idle, walk, run...), the elements of the scenery (a waving flag, a torch, a chest that shines slightly), and even the user interface (a coin icon that rotates continuously). As they are the most common, let's focus on developing examples of these loops.

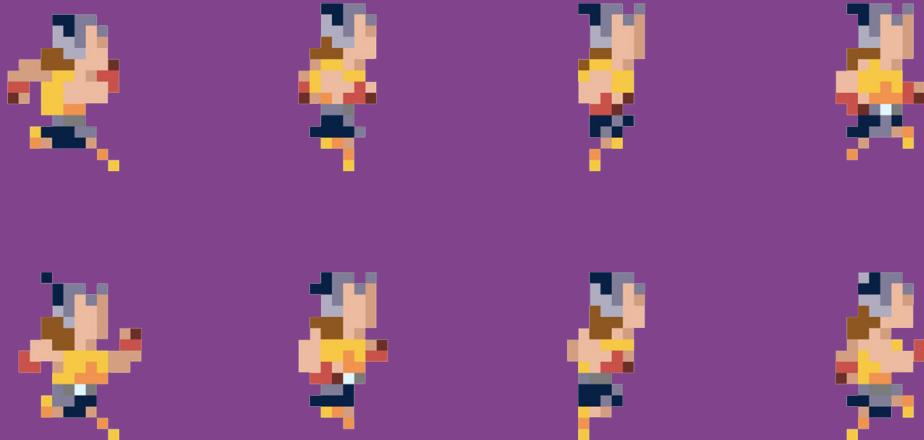
Precisely because of these limitations, it is essential to correctly select factors, such as the frame rate or each animation's duration.

For the duration (as they are short loops, it is usual that all actions have a symmetrical duration in terms of frames), follow these tips to ensure correctness:

- Inhale (2 frames) + exhale (2 frames) = 4 frames.
- Running with right leg (4 frames) + Running with left leg (4 frames) = 8 frames.

So it is frequent that each loop contains an even number of frames.

In many cases, animations are composed of several groups of sub-loops. It is useful for planning which durations are most suitable for working when looping groups like these.



Examples:

A **4-frame loop** can contain 2 and 4 frames. It isn't recommended for many sub-loop elements as the repetition becomes too obvious.

A **10-frame loop** can contain cycles of 2, 5, and 10 frames. It isn't recommended due to its limitations – too long to contain only three cycles, of which two are combinations of odd factors (five frames or five repetitions).

A **12-frame loop** can contain cycles of 2, 3, 4, 6, and 12 frames. It's highly recommended, as artists can create complex loops and odd cycles – which makes it very easy to camouflage repetition.

The example likes to work with durations in the multiples of 6 (6, 12, 24, 48) and, the most classic, multiples of 8 (8, 16, 24, 32, 48). ↗

⌚	🔒	👀	⚡	▢		1	2	3	4
⌚	🔒	👀	⚡	▢	4				
⌚	🔒	👀	⚡	▢	2				

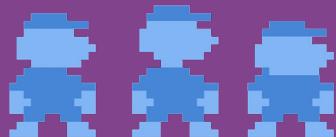
⌚	🔒	👀	⚡	▢		1	2	3	4	5	6	7	8	9	10
⌚	🔒	👀	⚡	▢	8										
⌚	🔒	👀	⚡	▢	5										
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⌚	🔒	👀	⚡	▢		1	2	3	4	5	6	7	8	9	10	11	12
⌚	🔒	👀	⚡	▢	12												
⌚	🔒	👀	⚡	▢	6												
⌚	🔒	👀	⚡	▢	4												
⌚	🔒	👀	⚡	▢	3												
⌚	🔒	👀	⚡	▢	2												

ANIMATION OF ASSET LOOPS

One of the most basic loops is the character's idle or resting state.

Remember: The chosen design perhaps doesn't include any animation in its idle. Think of Mario from *Super Mario Bros*. The character is 16 px in height, so to animate the idle by moving 1 px means modifying its size by 7%. Not much of an idle; instead it appears he's looking for something in the distance, or having a hiccup attack.



Here are some tips to gently animate idles that are more complex than the previous example.

THE LEADER, THE FOLLOWERS, AND THE +1

Any action has a point of origin (leader) that drags the rest of the surrounding elements (followers) in the direction it moves. A punch is a hand dragging an arm, an elbow, a torso... until the action's force finishes.

An idle animation is usually an action with little force: it can be a breath or a wiggle.

How to create this sequence? It's very easy. One of the advantages of pixel art animation is that it is very modular. Each frame represents a specific point in time, and each pixel represents a specific point in space.

One formula that helps create smooth animations is to drag the followers to the space where the leader resides in the previous frame – acting as if the followers are delayed in the movement of +1 to respect the leader.

For a breath, an artist usually places “the leader” on the chest and the mouth. See how this method works in the below, simple example based on the Pokemon style.



Scan
for “Idle
Pokemon”
Animation

Here are two characters – for this example's minimalist design, ‘the leader’ should be the mouth, the movement of the hair, and the knotted shirt that moves with the torso of the character on the right.

“The followers” would correspond to the hair and torso movement through their chests and arms. These followers generate their own followers: the left character's ponytail depends on the second hair movement. >



With the leader and followers defined, it's time to start creating the movement. “An idle” is a slight back-and-forth movement, such as moving the character's head 1 px down. The followers don't move yet because they have a +1 delay before following the leader... >



Meaning that they will move in that direction in the next frame. The follower's followers have a +2 delay from the leader. >



And so on, depending on the number of follower's followers that generate afterwards the original leader. >



Let the sprites have a moment of rest. >



Then move the leader up 1 px to recover to the initial position, and the rest of the followers repeat a similar sequence. >



WHAT HAPPENS WHEN INCREASING THE ASSET SIZE

Higher resolution designs imply a larger network of leader and follower movements. However, it's still a low-power action, so the followers further away barely need an additional pixel to remain within the action.

Follow the lines to visualize the movement between elements in the timeline.



WHAT HAPPENS WHEN INCREASING THE STRENGTH OF THE ACTION?

Increasing the force and moving from an idle to an energetic loop, inertia occurs (moments of stillness), which causes the rules to change, especially regarding the displacement of the last followers.

In this example, the hips are “the leader,” and the hands represent the followers of a +3 delay. Fascinatingly, due to the force of the action, the accumulated drag generates a greater movement in the hands (8 px of displacement in total) than that of the hips themselves (4 px of displacement).

Although this method creates a good movement structure, the final result depends on the artist's ability to interpret inertia, material, and pixel weights to translate them into the final animation.



Scan for
“Frog”
Animation



PARALLAX

“The parallax” is a technique that consists of moving different planes or layers of a scene at different speeds, depending on their position with respect to the camera.

A way to create a feeling for the viewer of natural displacement and three-dimensionality. It's simpler than it sounds.

Parallax usually occurs in scenes with continuous and constant movement, such as a character flying through a forest.

The first step is defining which layer serves as the base for the camera. (When referencing “the camera,” it’s referencing the frame or layout designing the scene.) This element usually remains static, as the camera supposedly moves at the same speed as the main character. In the example’s case, it is the character mounted on an Articuno. ➤



The rest of the elements on their layers must move depending on how close or far they are from the camera. To be able to move layers, an artist must design them with a size much larger than the layout in the example.

Number the different layers to visualize this. The closer an element is to the camera – the faster it moves. The further an element is to the camera – the slower it moves. It is common for extremely distant elements, such as clouds or mountains, not to move at all. ➤



As the character flies to the right, the elements will move from right to left past them. If taking the numbering as a reference to create a natural parallax, this movement guide is perfect to follow:

- 0: 20 frames/second
- 1: Static
- 2: 10 frames/second
- 3: 6 frames/second
- 4: 3 frames/second
- 5: 1 frame/second
- 6: 0.3 frames/second



Depending on how long the scene is and the length of our layers, bear in mind that some of the layers will be repeated over and over again (usually the closest to the camera since they move faster).

An artist must duplicate a few layers so the scroll animation starts at another point. For items such as mushrooms (layers

2 or 4), there is no problem. Being a layer formed by independent elements, displacement can simply start and end with the elements out of the camera shot.

But for elements such as bushes (layers 3 or 5), artists need to be more careful since the cut may be more evident. When working with a width similar to the camera's, copy the

beginning and end of the layer. So there is an exact reference of where to place the new layer in the new timeline. ↗

Extra Tip: Revist the Loop Creation Animation lesson on creating scene loops again, as the same technique can apply to parallax animations.





PARTICLES

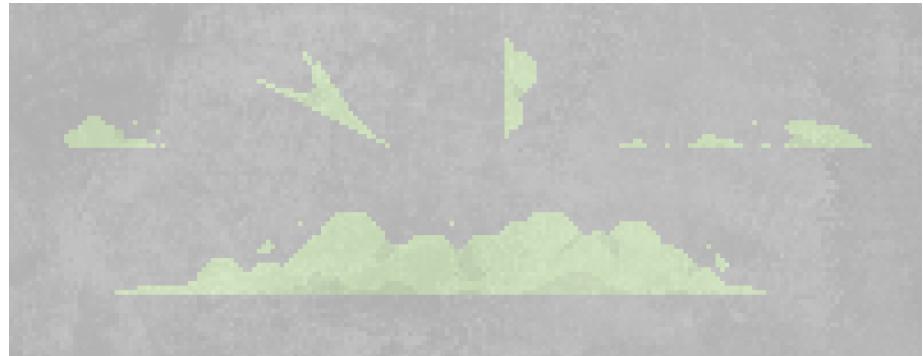
(FX, Smoke, Dust, and Explosions)

What are particles? In the pixel world, particles are called many different titles, such as effects, FX, VFX, and dust. Natural elements, specifically fires and electricity, fall into this category.

First, focus on the subtle particles a game developer would create that sometimes go unnoticed but brings “weight” to a character or animation. These particles may appear when a character first takes off while running or when a character breathes in a cold environment.

Here are various particle clusters (smoke or dust). Landing, sliding on a slope, sliding at a 90° angle, dash particles, and even a larger cluster created by a boss entering a room. ↗

Here's a breakdown of the frames found in a simple particle effect. The trick is to focus on one cluster at a time, so follow the highlighted green cluster. ↗

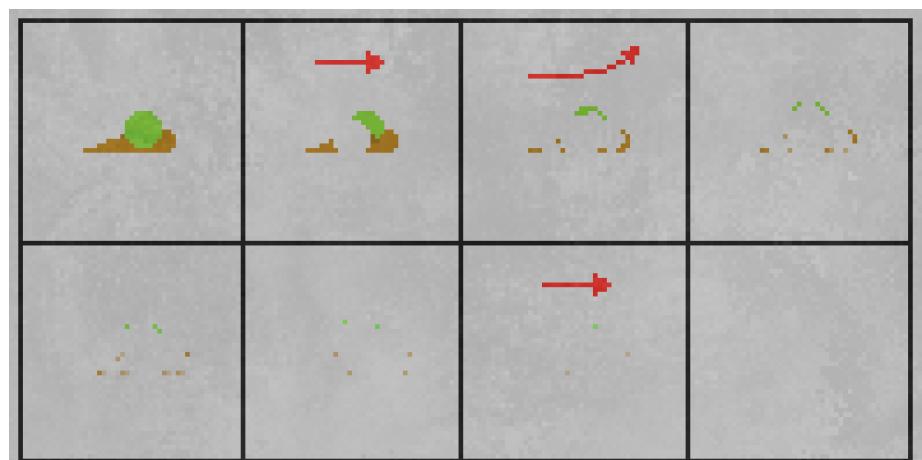


Frame 1
100% Cluster Size

Frame 2
45% Cluster Size,
Shifting Right

Frame 3
15% Cluster Size, Spinning
and Shifting Right

Frame 4
Less than 10% Cluster
Size, Particle Breaks



Frame 5
Less than 5%, Fading
(Lower Opacity)

Frame 6
A couple Pixels –
Still Fading

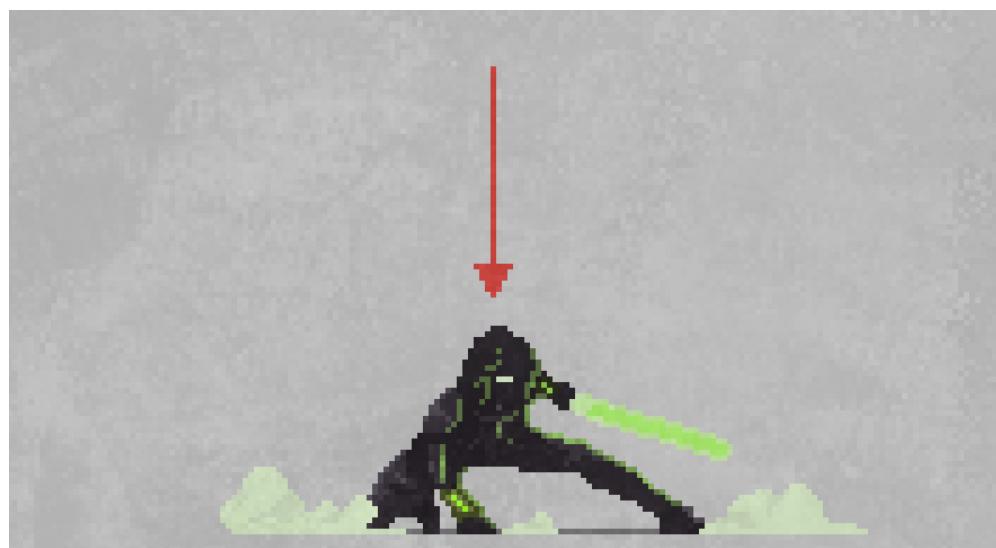
Frame 7
Single Pixel –
Still Fading

Frame 8
Empty



Scan
for bonus
“Magic Poof”
Animation

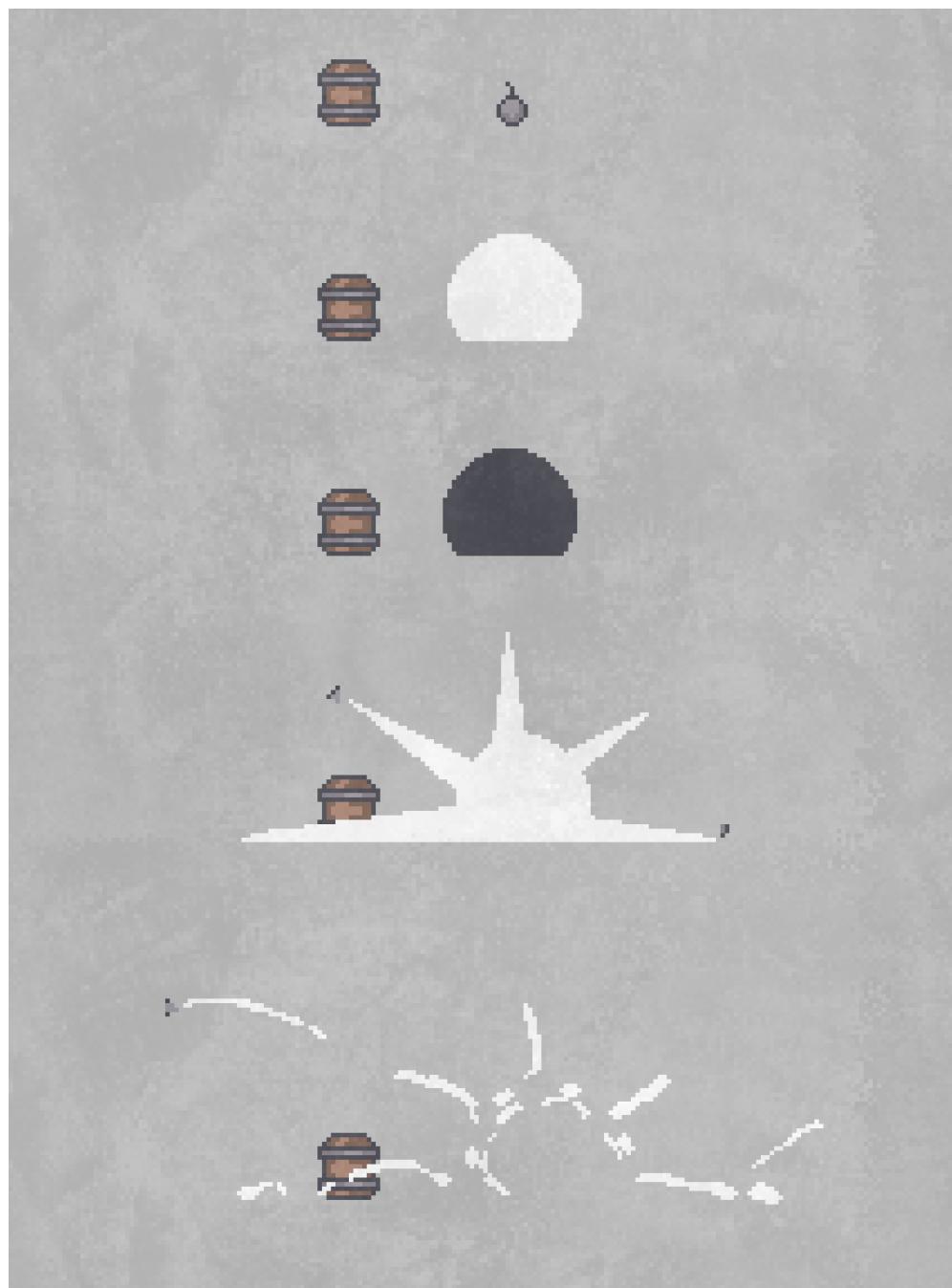
This image exemplifies a character landing with multiple particle clusters. How many to count? It may be tedious to animate, but tackling one cluster at a time will yield the smoothest and most consistent results. ➤



This image demonstrates how a small explosion can change the look and feel of a particle cluster. Clusters don't always need to be circular.

In the first three frames, there is a circular shape form, but the impact of the explosion sends sharp triangular shapes in each direction.

Each triangular particle cluster follows the direction it's pointing while slowing down drastically in each frame (following the guide laid out in page 76's bottom image). ➤

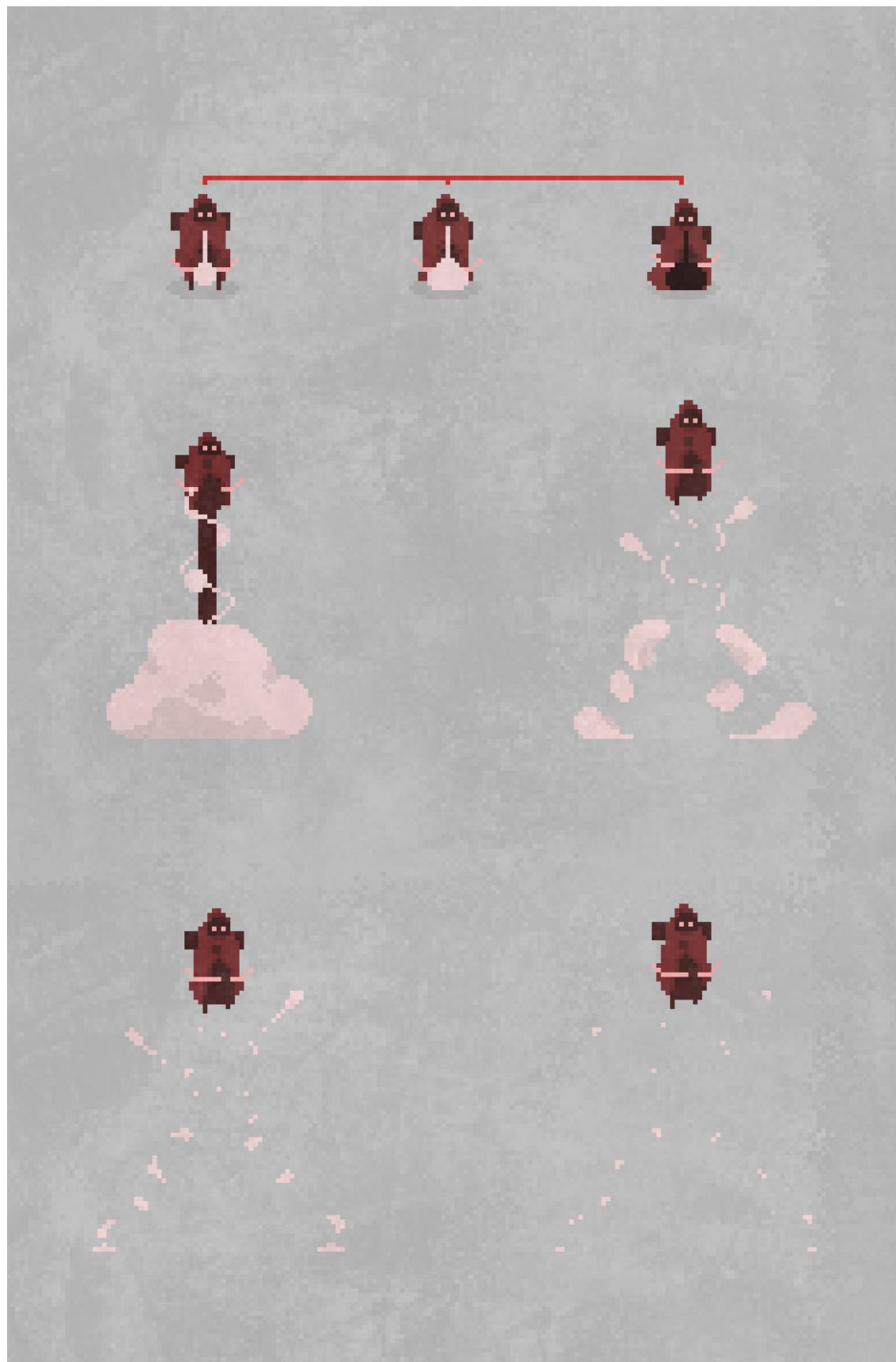


Scan
for bonus
“Ugly Bomb
Explosion”
Animation

TACKLING ONE CLUSTER AT A TIME WILL YIELD THE SMOOTHEST AND MOST CONSISTENT RESULTS.

Cluster shapes and sizes combine to create unique and exciting animations.

See how oddly circular shapes combine with stringy lines to follow a set direction. ➔



LESSON 22



SUB-PIXEL

Sub-pixel animation is an advanced technique within pixel art and creates a sense of movement without hardly modifying an element's shape... What?
(Yes, that was said correctly.)

It's time to reiterate that one of pixel art's characteristics is that an artist leaves nothing to chance. A larger pixel or a smaller pixel choice significantly modifies a design.

Similarly, the same animation result with a different frame rate changes how the viewer interprets the represented action.

Think of an idle animation representing the four states of taking a breath: inhale, holding breath pause, exhale, and resting pause.

This animation should not go from one state to another at the same pace, but the "pause" states should consume several repeated frames to simulate a slow breath (of a character who hasn't finished a marathon), which is why it's common to duplicate frames in an animation to control the pace of the action.

Changing a pixel of color for several frames and returning to the original color creates an effect of dynamism. The effect increases if changing several pixels at once and at different times on the timeline. ↴

At this point, the sub-pixel technique comes into play since it allows the artist to create the sensation of movement in the duplicate frames without hardly changing their shape. How? Playing with adjacent pixels of different colors (often applied between lights and shadows).

Let's look at different examples and techniques to apply the sub-pixel technique: ↴



CONTEXT SUB-PIXEL

Returning to the breathing animation example, when the character is in the state of “holding breath pause,” he isn’t really still but is slowly filling his chest with air. This movement isn’t significant enough to change the sprite’s shape, but it can be represented by moving the colors in the chest’s direction. In this case, when the chest expands, light colors appear on top of the dark colors, moving away with the “resting pause.” This technique also works superbly for shadows. ↗

Find magnificent examples of context sub-pixel in the mythical game *Metal Slug* and several other 2D fighting games. It’s also a good technique to use in the lead-up to powerful movements, like blows and jumps.



TRANSITION SUB-PIXEL

If creating smooth animations, take advantage of every opportunity, such as changing the state frames. In this change of position, an artist can “lengthen” pixels to soften the change of position. ↗



INNER SUB-PIXEL

Another powerful sub-pixel possibility is allowing artists to animate static objects, from small details to entire backgrounds. So any element achieves an environmental effect to integrate within a scene fully.

The difference from the previous techniques is that the inner sub-pixel uses no context because distributing color changes occurs randomly. If desiring to take this a little further, artists can take the element or material they’re applying. The sub-pixel sequences will be long and slow for solid materials (such as rocks or buildings), and the sequences will be short and fast for organic materials (such as fabrics or plants). Resulting in a more expressive finish in compositions.

These three versions of the sub-pixel can combine in many ways, even all three simultaneously. As a last tip, there are “shiny” elements (such as ice, glass, and metals) to intersperse a bright animation. ↗



LESSON 23



WALK CYCLES ANIMATION

Let's cover the basics of walk cycles with a simplified creating method and then varying the results to make each walk cycle expressive in its own way!

Walks are one of the most difficult types of animation as so many factors affect a walk's appearance due to the character's weight, mood, or action. Learning a basic breakdown gives artists a better understanding when planning out each character walk!



Scan for
bonus
“Walk Cycle”
Animation

1. CONTACT POSITION

A more “neutral” start for each step. The character’s weight is usually equal at this stage – remember while building that this is both the starting and ending position.

3. PASSING POSITION

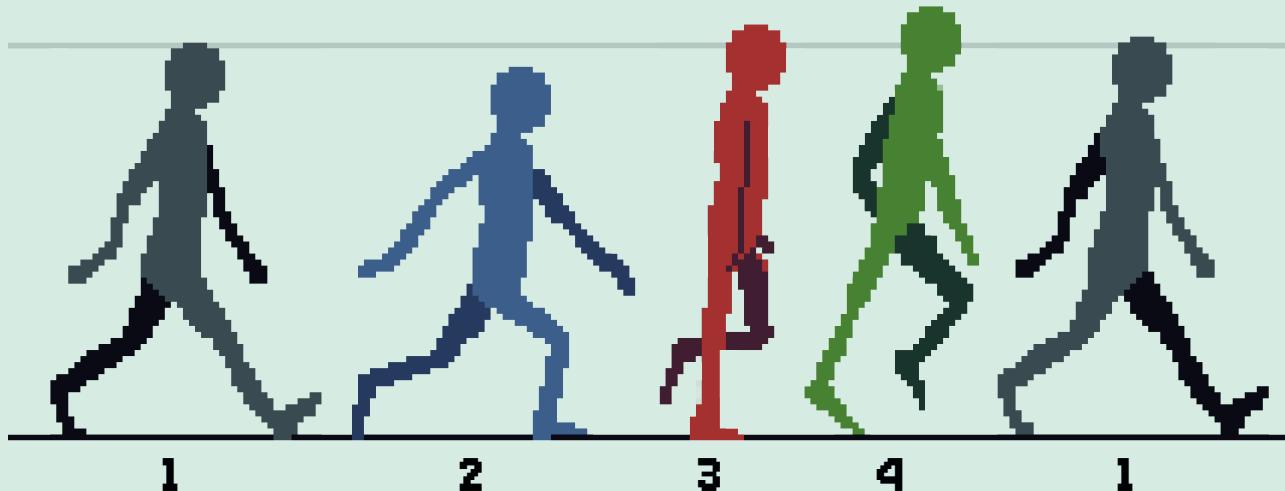
The middle position is when the legs are crossing. This is the character’s straightest moment, their body appears to be more raised than a standing position.

2. DOWN POSITION

The moment that the character’s front leg takes all of their weight. The arms are at their widest distance in this position.

4. UP POSITION

Known as the “push-off” state, when the character begins falling downwards again to be caught by its next contact step. The body and head are at their highest point.

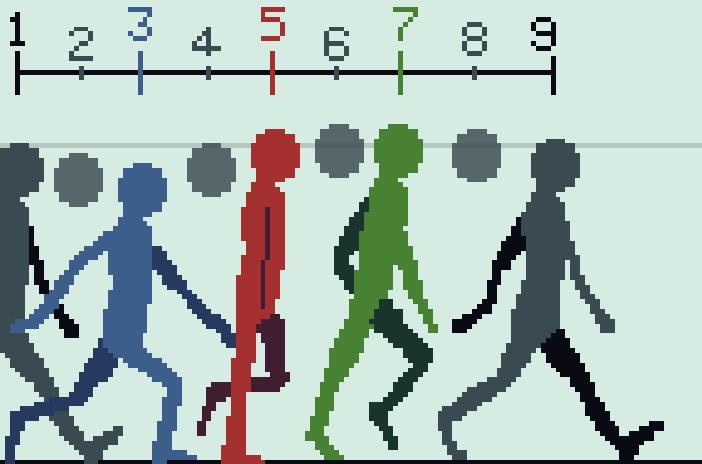


WALKING TEMPO

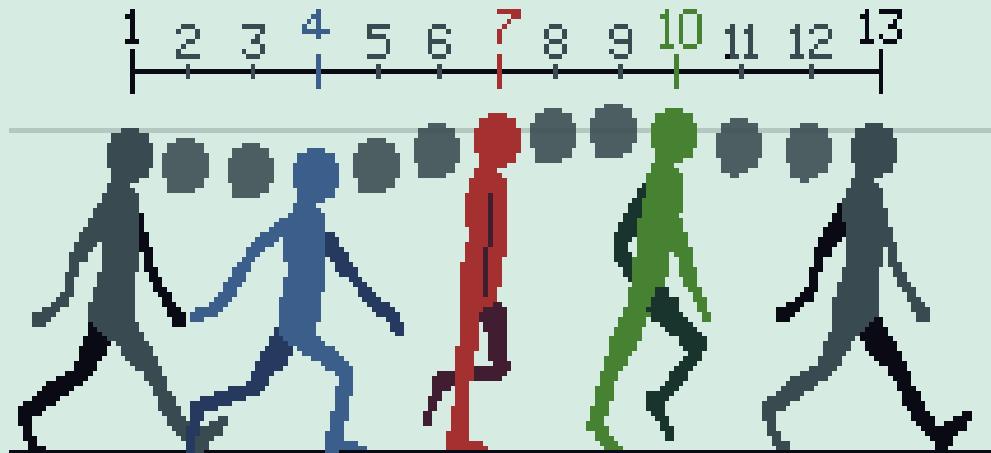
Before animating, set a walk's beat, which will help work out the walk's speed, whether fast or slow. Act out a character's walk and count how many steps they take in a second.

Film a human subject; use a stopwatch or metronome to time it! A second is roughly 24 frames per second (FPS), so animating in "ones" means animating for every frame. Shorten to 12 FPS if animating in "twos," animating every other frame!

The beside example's have walks are on 8 and 12 frames to show how many need drawings. Notice the comparison that more drawings results in a slower walk. The numbers and scale show the frame numbers! Each has been color-coded to show down, passing, and up walking positions! ➤



8 - Frames: This frame rate is easier to animate but makes the walk appear as a slow run or more "cartoon-ish," with three steps happening a second.



12 - Frames: This frame rate provides a more natural walk, where the character takes two steps a second.

STEP 1

Place Contact Postions

Ensure that the toes are primarily aligned and that the legs and arms swap! Notice how the black leg is behind the other and switches to go in front for the next pose! ➤



STEP 2

Add Passing Postion

Add the middle position – providing a guide for where the up and down positions will go. ➤



STEP 3

Down and Up Postion

First, add the down position; normally the weight goes down after the contact step and back up after the passing position. Try in a mirror, get into a contact pose, and take a step forward! ➤

MAKING A WALK EXPRESSIVE

With the character's basic walk built, an artist can experiment by adding personality. Below are two examples demonstrating the best ways to change a walk!

Main Tips:

1. Use the middle passing position (red) to determine a walk's mood, but keep the two contact positions the same (at the beginning and end). Now there's endless potential to create whatever desired walks.
2. When animating arms, one major tip is to always move in arcs from the character's shoulders and wrists. >



"HAPPY" WALK

The middle passing position (red) exaggerates to show a more open line of action (previously explained in the Sprite Posing lesson) – breaking the rule that the body must be straight, creating a very different walk.

The other main change is to the up position (green), with the front leg extending up much more than usual and the body leaning more forward. Add a few more frames to the walk to accommodate the exaggerated position, which makes this walking section slower. ✓



"SAD" WALK

Only the contact positions are raised high, all the other poses resemble a downwards arc shape. The down position (blue) pulls the leg in quicker to accommodate for the low middle passing position (red).

The same occurs in the up position (green), where the character lifts their leg a bit higher to return back to the same contact position. ✓



ANIMATE A CUSTOM SPRITE

Using the tips from the lesson, an artist can make their own custom walk cycle by starting with a basic stick figure sketch, and using the contact position method!

Once its planned out, design a sprite around a skeleton, do a rough pass, basic block pass, and a detail pass. The sprite will be walking in no time!

Here's an exemplified rundown for a sprite:

- Create rough passes on the five contact poses and set the tempo.
- Work out the rough inbetween poses.
- Color with a basic block pass.
- Once happy, finalize with a full detail pass on all the poses to polish off the animation!



LESSON 24



RUN ANIMATION

Perfecting “the run” animation is essential because of how often it occurs. In most video games, the character is nearly always running, usually over half the time! It must make logical sense and be pleasant to the viewer.

There are 12 principles of animation, but this lesson focuses on the “appeal” principle. Frequently “the run” animation occurs, so it’s essential to make it appealing – not just the animation itself but also the character design. The secondary action and animation bring extra life to the already-established character.

Look at elements that bring life to run animation.

One of the most common tricks is the hair, whether long and flowy, short and bouncy, or messy and chaotic. All will catch the viewer’s eyes pleasantly. Another common trick is adding a back accessory, such as a bag, weapon, cape, etc., to delay one frame behind and give the character extra life and separation. Another uncommon trick is using particles near the character’s feet and shading their back limbs to add depth! ↗



RUN ANIMATION PROCESS

Here's a good process to follow: ➤

STEP 1

Start with the head (red) – create a subtle movement bounce.

STEP 2

Add the front leg (yellow) – as the leg contacts the ground, the head is at its lowest point.

STEP 3

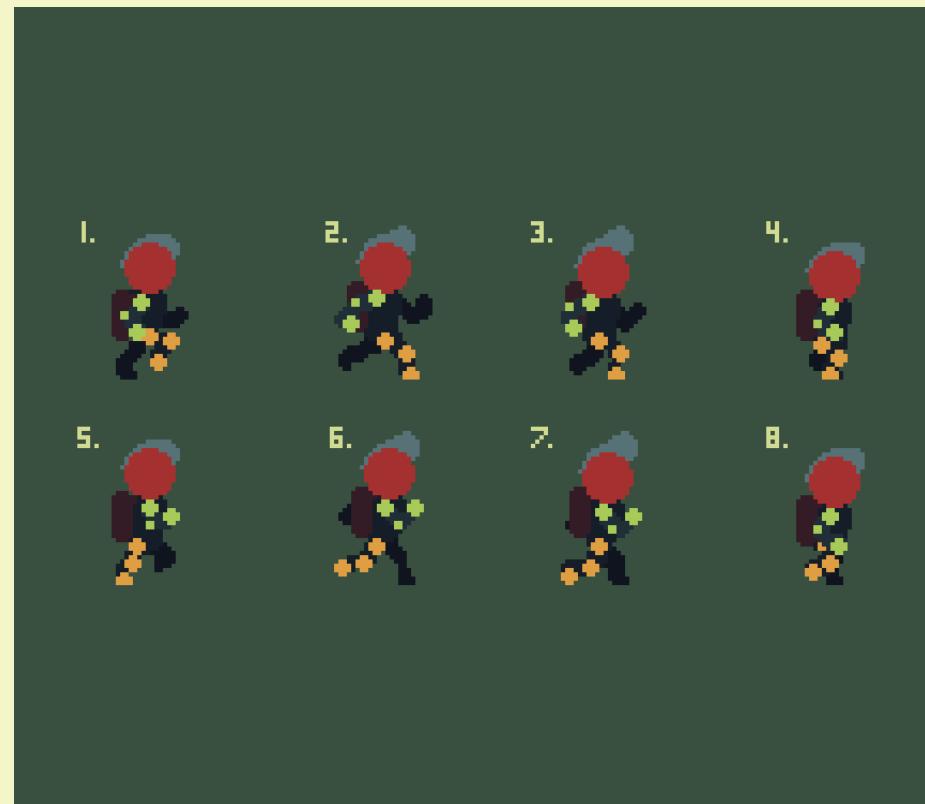
Add in the front arm (green) – it should be opposite to the front leg.

STEP 4

Copy and paste the front leg and arm layers and add them as a back layer, changing to a darker tone. Offset the frames and adjust any that may feel off.

STEP 5

Add secondary actions like bouncy hair, bags, etc. These should bounce with the head but one frame behind to give a delayed feeling.

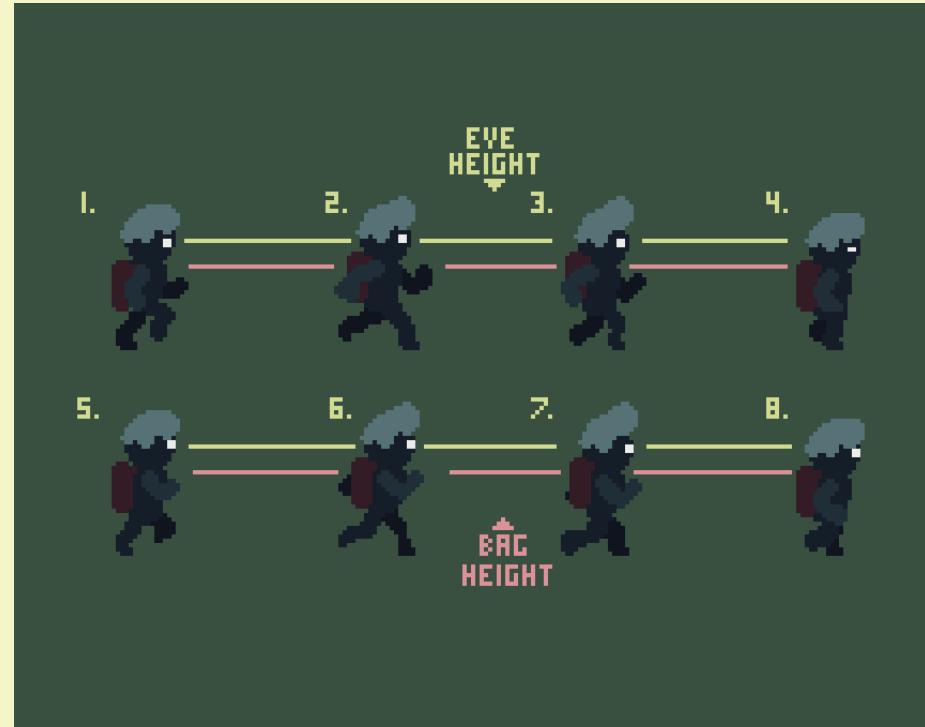


THE AMOUNT OF FRAMES AND A FRAME-BY-FRAME BREAKDOWN

How many frames to use? It depends on a game's style. In most animations, more frames results in smoother animation. Often using 12, 10, 8, 6, 4, and the occasional 2-frame run cycles (in retro-stylized games). 12-frames aren't common but are used occasionally for detailed games.

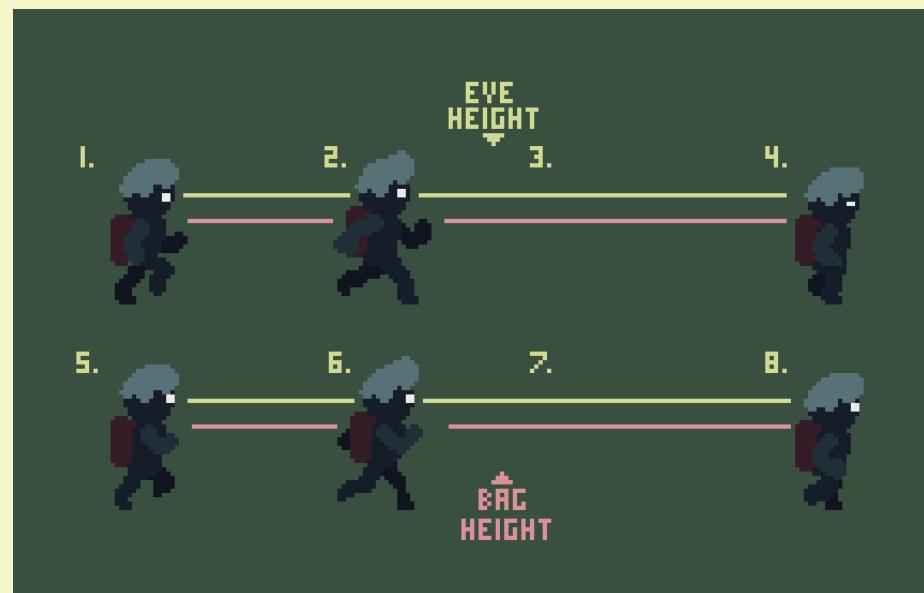
Let's look at the keyframes for 8, 6, and 4 run-cycles.

8 Frames – The most common amount of frames to balance a smooth run cycle and keep a retro pixel feeling. ➤



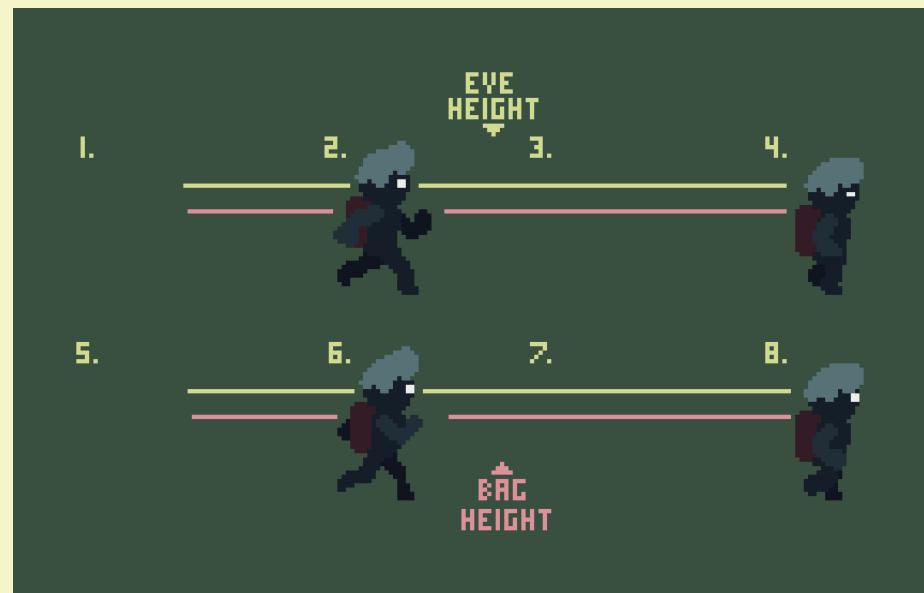
IT'S ESSENTIAL TO MAKE "THE RUN" APPEALING — THE SECONDARY ACTION AND ANIMATION BRING EXTRA LIFE TO THE ALREADY-ESTABLISHED CHARACTER.

6 frames — Remove the 3rd and 7th frames to go down to a 6-frame run cycle. This is a common amount that gives a retro feeling with a hint of smoothness. ↗



4 Frames — Remove the 1st and 5th frames (high knee frames) to go down to a 4-frame run cycle. ↗

Remember: When removing frames focused on a character's head, legs, and arms, secondary animations — such as a bag or hair — may also need to be adjusted.



RUN TUTORIAL

8 FRAMES



BOUNCY BACK
PIECES LIKE
BAGS, WEAPONS,
AND CAPES

PARTICLES

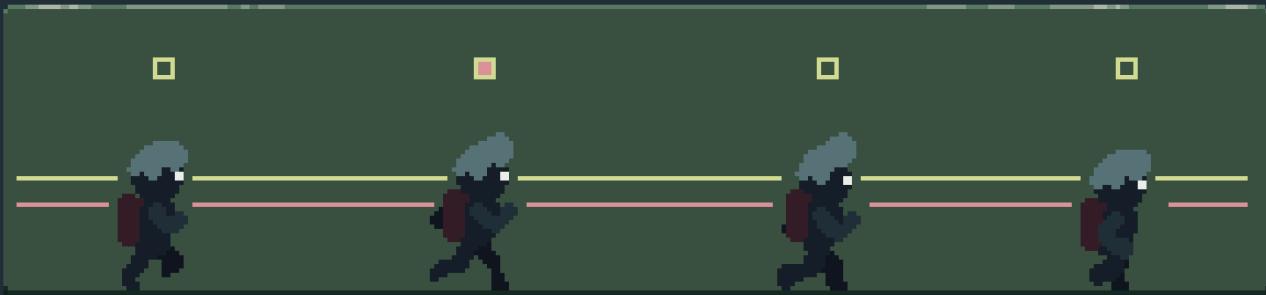
BOUNCY HAIR

DARKER BACK
LIMBS

FRAME BY FRAME BREAKDOWN

EYE
HEIGHT

BAG
HEIGHT



Scan
for "Run"
Tutorial

LESSON 25



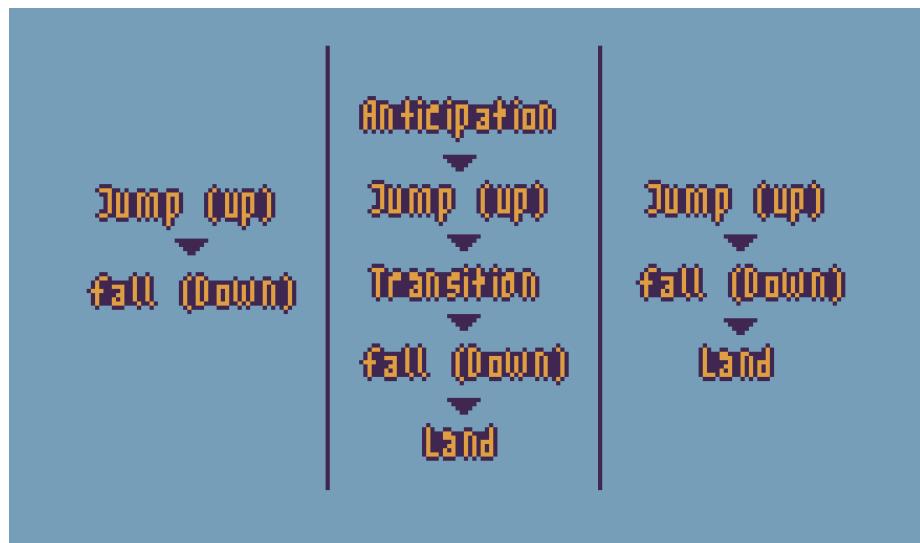
JUMP ANIMATION

Jump animations? Sounds simple... but they're a little more than they initially appear. Compared to other animations in the game development world – such as “the run” animation – it isn’t simply a looping animation that incorporates easily.

Artists can break down “the jump” animation into steps: Anticipation, Jump (upwards), Transition, Fall (downwards), and Land. These five separate animations create a “jump sequence,” but not all are necessary, depending on the type of game or feeling an artist aims towards.

See the examples that incorporate jump animation types.➤

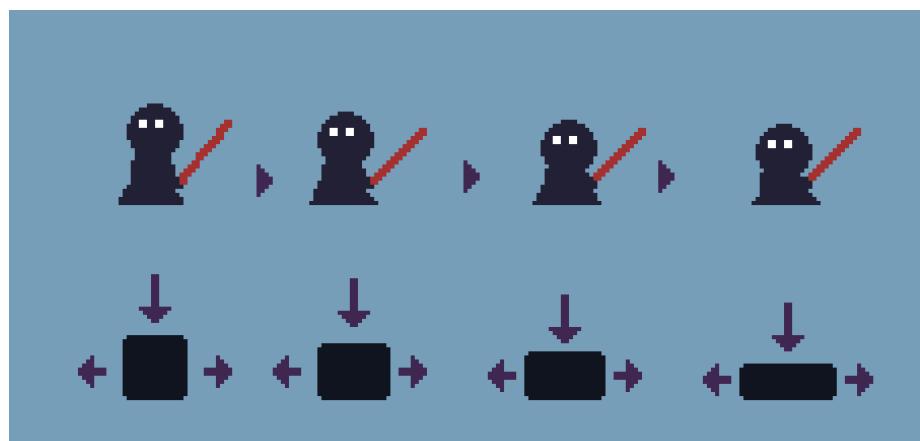
- Extremely responsive quick gameplay = Jump + Fall animations.
- Smooth animations with slower, sluggish gameplay = All five animations.
- Most Common In-between gameplay = Jump + Fall + Land.



Let's dive into a frame-by-frame breakdown of these animations – starting with Anticipation.

Anticipation – These build-up frames aren't looping. The “Squash” principle (1 of the 12 principles of animation) comes in handy as the player or enemy is “squashed” into the ground. Very similar to the Land animation, but the key difference is the quickness of the “squashed” frames.

*The Anticipation frames are more common for enemies; most games prefer the quickness and skip the anticipation frames for the main character.➤



Jump – One of the most important and always-used animations in the jump sequence. Loop this animation while the character travels upward. Characters' hands are lower (down), eyes look up, hair waves, and clothing flaps from the force or wind. If the character or game style is stiff (less animation), an artist can create this animation in 1 frame, but if desiring some more life (hair or clothing movements), it will likely be 3-4 frames. ➤



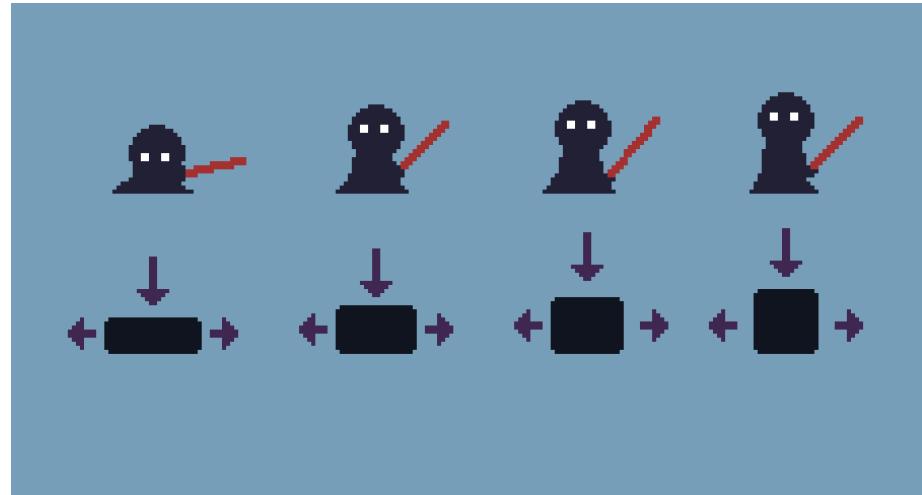
Transition – Happening between the Jump and Fall animations. Switching between those vital animations can sometimes look flat-out bad, so adding a Transition animation makes all the difference. In just 2-3 frames, bring the hands, eyes, and other objects from the Jump position to the Fall position. This animation doesn't loop and happens very quickly but adds a lot of depth. ➤



Fall – The second most important animation, looping while the character travels downward. Hands are up, eyes look down, hair waves, and clothing flaps from the force or wind. Like the Jump animation, an artist can create in 1 frame, but if desiring some more life (hair or clothing movements), 3-4 frames are perfect. *Notice the scarf flapping from side to side. ➤



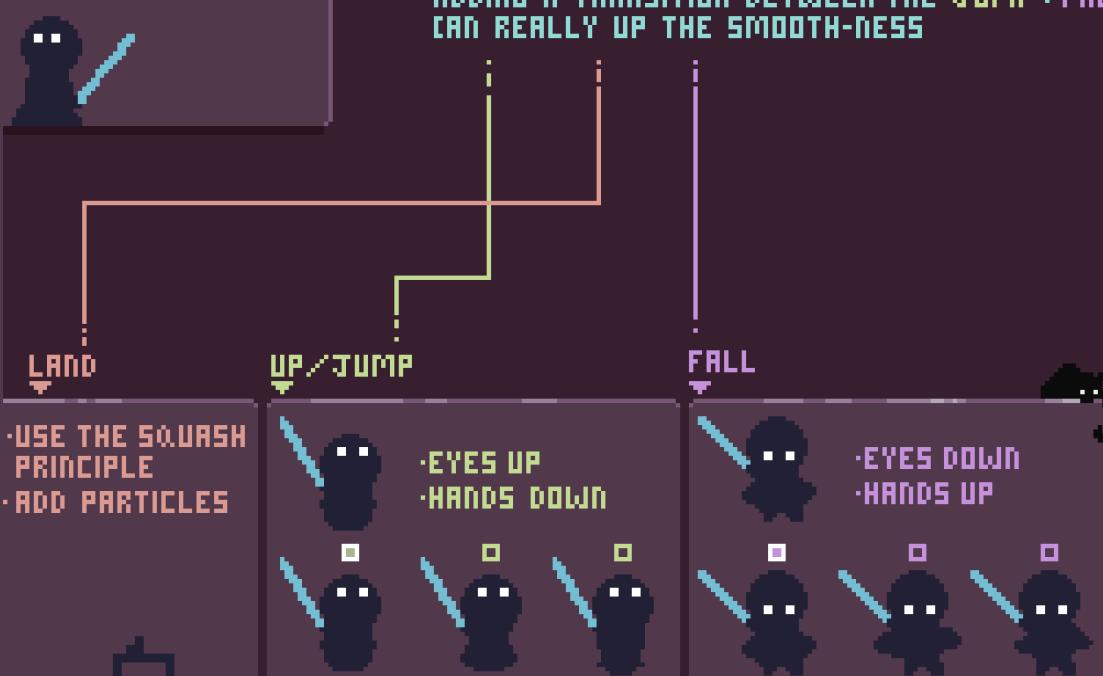
Land – Happening when the player or enemy contacts the ground. Almost the exact opposite of the Anticipation animation but follows the same “squash” technique. The player “squashes” the ground on impact and rises to the idle position. Play around with the length of this animation to get a feeling for what's preferred. Adding particles can add a forceful sense! ➤



JUMP/FALL TUTORIAL

A SIMPLE JUMP ANIMATION CAN BE BROKEN INTO SEPARATE ANIMATIONS

- JUMP + FALL CAN JUST BE USED FOR QUICK GAMEPLAY
- IN MOST CASES A LAND ANIMATION IS NEEDED ADDS WEIGHT
- ADDING A TRANSITION BETWEEN THE JUMP + FALL CAN REALLY UP THE SMOOTH-NESS



Scan for
"Jump/Fall"
Animation



HEAVY ATTACK ANIMATION

Let's cover heavy attack animations, how and when they are helpful, and break down the process of creating a powerful, heavy attack.

Most often used for bigger, slower, and powerful enemies – nearly always bosses.

But what makes a heavy attack different from a basic attack?

Well, a heavy attack is very slow and predictable, and it should be readable to the player – giving enough time to escape because the impact can be lethal.

Let's break down the heavy attack process ▾

- Staging (Keyframes)**
- ▼
- Sub Pixel Animation**
- ▼
- Special Effects**
- ▼
- Details/Appeal**
- ▼
- Finishing Touches**

STEP 1

Staging (Keyframes)

Plan to make the poses look appealing (best done in silhouette or creating a less-detailed character).

STEP 2

Sub-Pixel Animation

Add very subtle animation for each keyframe to show a build-up, anticipation, and follow-through within the animation.

STEP 3

Special Effects

Start by adding unique embellishments, such as a weapon smudge with fire, electricity, or magical particles – bringing the animation together to make it feel like an explosion! Add dust particles at contact and impact points, as well.

STEP 4

Details and Appeal

Finish by adding details to the character, which range depending on the level of detail in the game!

STEP 5

Finishing Touches

Watch the animation over and over, and let others inspect and smooth out areas. Get rid of stray pixels.



STAGING (KEYFRAMES)

Staging and planning the keyframes can be broken down into further sections. Here are three keyframes (the amount varies depending on the animation).

1st Keyframe

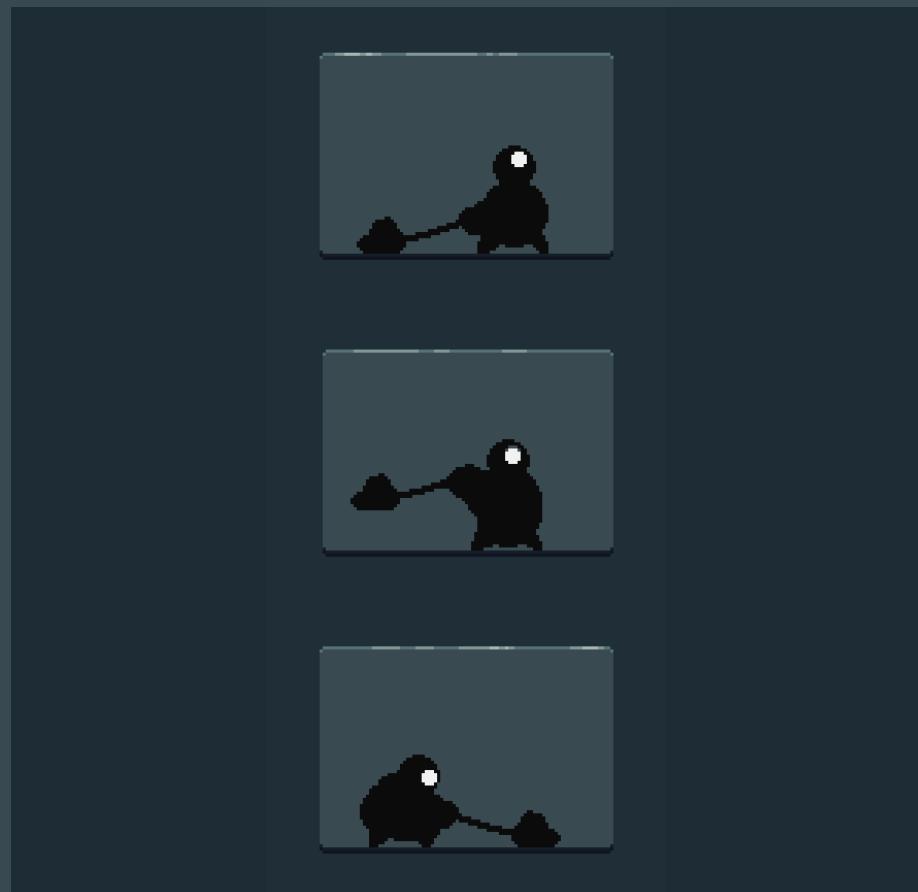
Like an idle pose, the enemy or player starts to crouch and tighten their body. The start of the anticipation and build-up. The viewer should be thinking, "okay, something is happening."

2nd Keyframe

The "calm before the storm" pose, the enemy or player moves into an attack position, and their weapon is prepped and ready to strike. The viewer should be thinking, "okay, something is coming."

3rd Keyframe

The aftermath pose that the character falls into after an attack. Make it appealing and powerful to hold for a while. ➤



SUB-PIXEL ANIMATION

Also known as connecting the keyframes, here is the process of slightly moving pixels to give a slow-moving effect. However, this example uses a silhouette, which technically is not sub-pixel animation but follows the same principles.

Three frames connect the 1st keyframe to the 2nd in this exemplified image. They all look very similar – which they are – just slightly different, with subtle pixel movements to build up the overall animation. In the second frame, the hand tightens by bringing it over 1 px, the head lowering by 1 px. Easy, right? Lower the entire body in the last frame and the eye by 1 px. Doing this might not look like much, but the final animation begins to come together once the special effects are inputted.

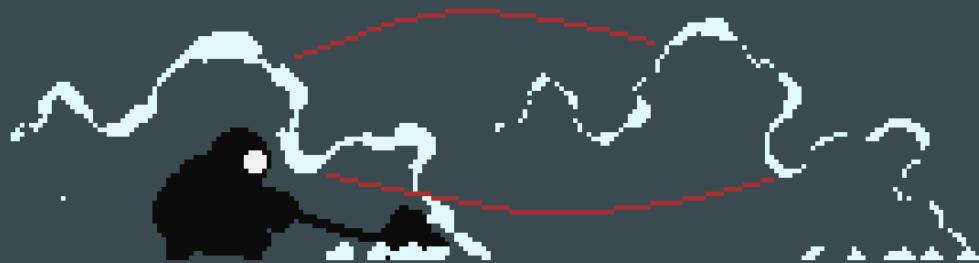
Repeat with the 2nd and 3rd keyframes! ➤



SPECIAL EFFECTS

The technique varies depending on what effect type an artist chooses, for example, the process of electricity compared to fire will be very different. However, the core principle is to follow the pose-to-pose principle for each section or particle. This process can be tedious, but the outcome is rewarding.

This example shows how the special effects apply to a couple frames. Most slowly dissipate and break apart frame-by-frame. Slowly lowering the opacity to each frame can also really sell the result. ▶



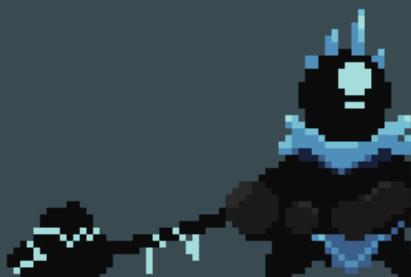
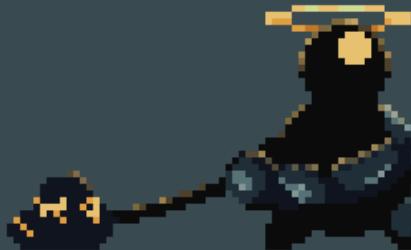
DETAILS AND APPEAL

The details and appeal of the character depend on the game's style. Many pixel games have a low-resolution retro-style feeling where silhouettes are perfectly fine, but some games have more detail, so it depends. It's important to get the animation smooth and final before this step.

This image addresses three different ways of character detailing and explores adding additional animations when required.

Halo and Light Beast

This concept idea doesn't impact the overall animation too much, and no secondary animations are needed. The special effects base is the lighting – adding a glowing feel to anywhere light brings life to the theme.



Ice Beast

More complex, an artist would need to add secondary animations to the rope and clothing. The special effects are ice-based.



Molten Beast

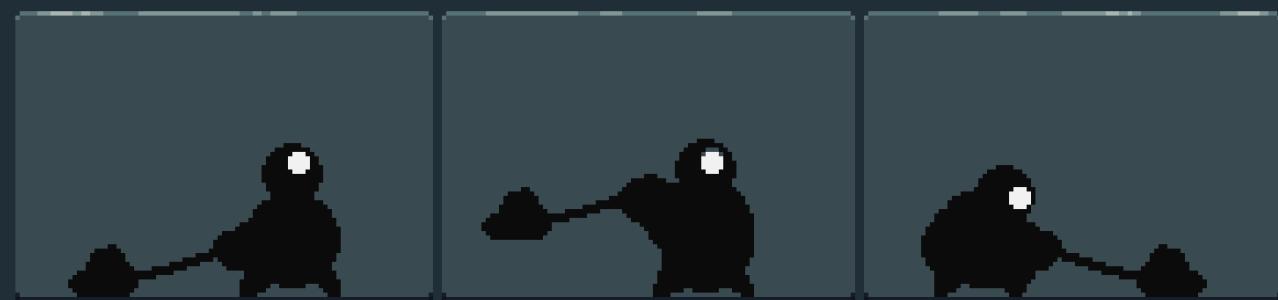
Similar to the Halo and Light Beast, no extra major animations are needed. The special effects would be fiery sparks and lava. ▶

HEAVY ATTACK TUTORIAL

FOR TANKS + BOSSSES

THE AMOUNT OF FRAMES

- ADDING SPECIAL EFFECTS CAN REALLY BRING LIFE TO AN ANIMATION
- ENVIRONMENT OBJECTS HELP CREATE A SENSE OF FORCE



ANTICIPATION

- PLAYER CAN READ THE ATTACK
- THE HARDER TO READ, THE HARDER THE BOSS

BUILD UP

- THE LONGER THE BUILD UP, THE MORE FORCE

FOLLOW THROUGH

- THE FINAL TOUCHES
- SUBTLE MOVEMENT
- PARTICLES FADE

FINISHING TOUCHES

Review, review, review! Dissect the frames and find any stray pixels that don't make sense and may appear randomly. Flip the animation around and watch. While rewatching, occasionally, an artist catches something quite obvious. Get opinions from others!



Scan for
“Heavy
Attack”
Animation

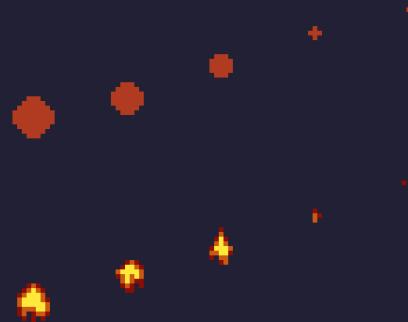


FIRE ANIMATION

Fire is one of the most often used elements in games and comes in many forms, such as a tiny candle or a huge forest fire. Regardless of size, all fire types follow the rules of physics.

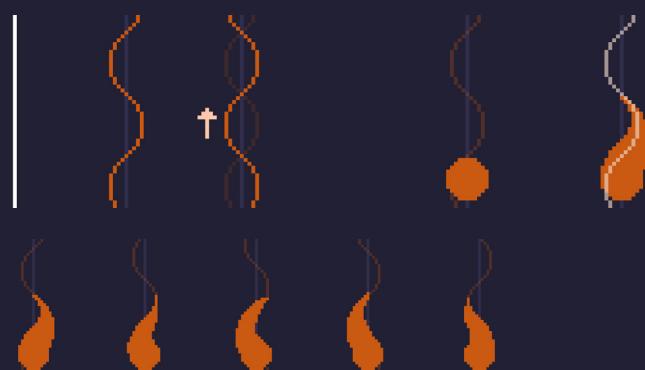
UPWARD MOTION

It is key to remember that fire travels upwards (away from the initial source) and becomes smaller over time. See how this works with a tiny, dying flame. Every frame moves the flames up as each shrinks in size. Simplify the fire into a basic shape of one color. Refining the shape and adding more colors comes afterward. Fire is hotter in temperature in the middle, so use a brighter color for the middle (e.g., yellow) and a darker color on the edges (e.g., orange and red).>

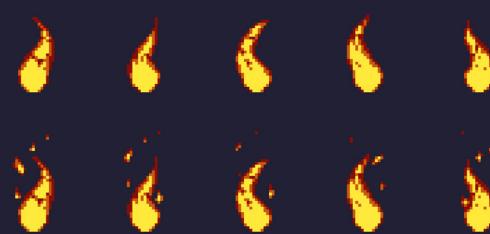


FOLLOW THE WAVE

But what about a lasting fire? Let's first set up the sprite with a few simple steps: (1) Make a straight line down the canvas' center. (2) Create a 1 px wide wave. (3) Move this wave upwards every frame until it overlaps with the position on 1st frame. (4) Create a filled circle – the base of the flame. Now we are ready to animate!



On every frame, draw a tail above the fire sphere base. That tail should follow the path of the wave previously set up. Now there should be a nice looping animation, and an artist can start refining the fire. First, add color (yellow, orange, and red are most common); the example uses mostly yellow. Lastly, add tiny flames in different places as the final touch.>



Scan
for "Fire"
Animation

LESSON 28



FLAG ANIMATION

Creating a waving flag is quite easy, when following the step-by-step process!

STEP 1

Design the flag and leave a one-pixel depth on the flag part that touches the pole static.

STEP 2

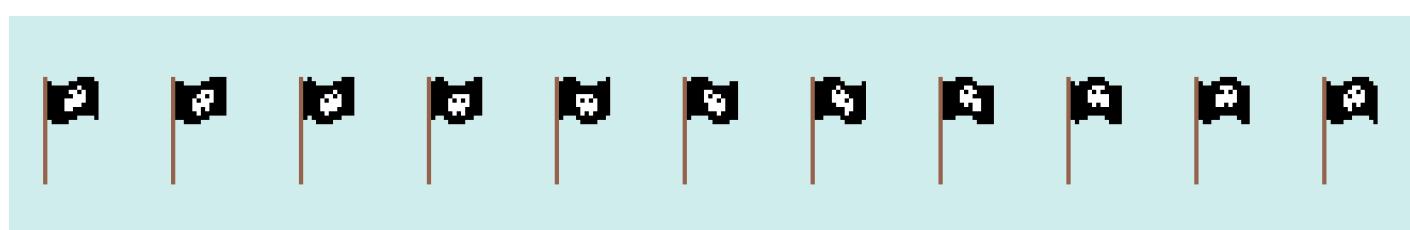
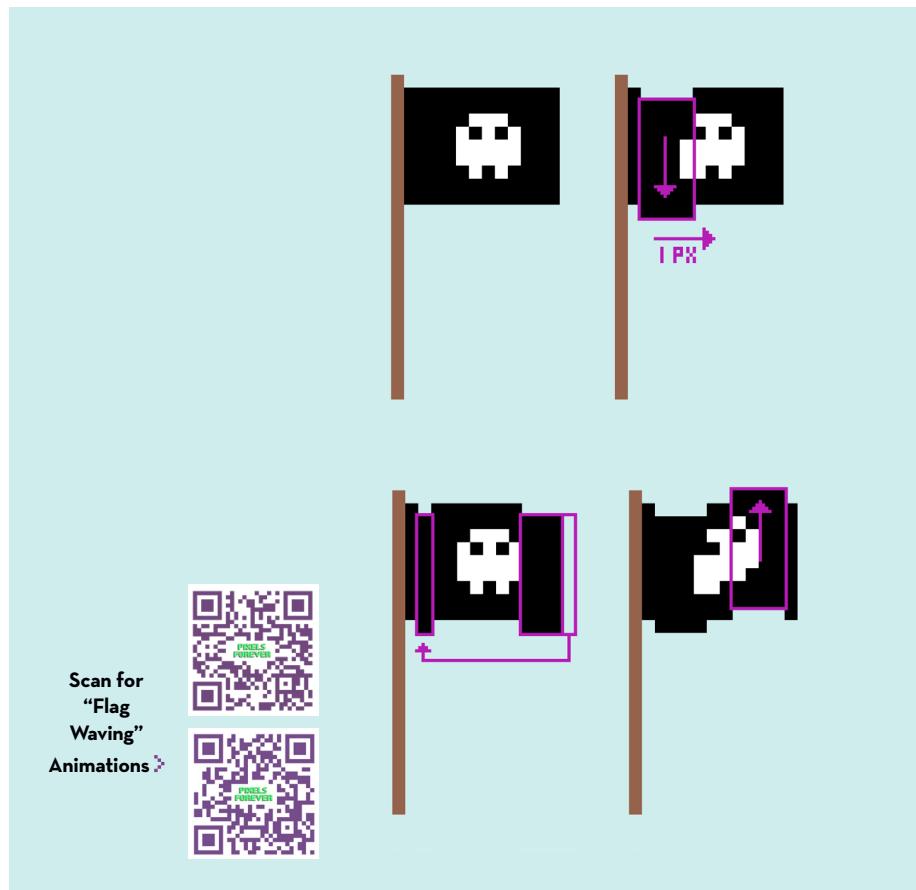
Take a small section of the flag and move down by 1 px. Remember the surface area it occupies. Take that same surface area on every other frame but offset by 1 px. In this example, the surface area is 4 px wide. Call this the DOWN area.

STEP 3

Once reaching the end of the flag, start replicating the effect on the beginning of the flag (remember to skip the one-pixel depth closest to the pole).

STEP 4

Take into account where the DOWN area is, skip a pixel or two, and create the UP area. It should have the same surface area as DOWN (in this case, 4 px). Apply to the UP area (move 1 px to the right of every frame). Enjoy the end result!





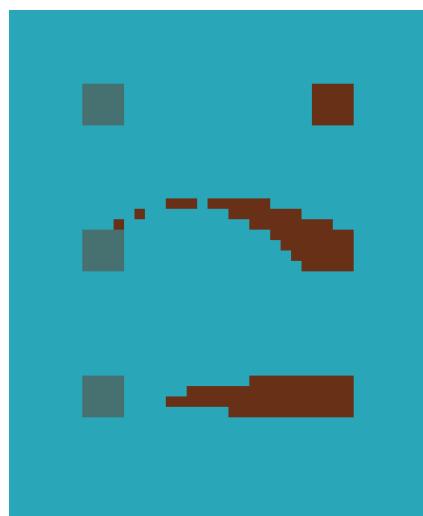
BLUR ANIMATION

A blur happens when an object is moving too fast for the viewer's eye to see the details.

WHY USE?

Blur conveys extra information for extremely fast-moving objects. When a fast car rushes by in real life, there's an experience where it's all blurred. Or when hands are waving quickly, one cannot distinguish the details but rather sees a blur. The below example displays a simple, brown box. Try to move this box from left to right. The top row doesn't use any extra effect, so the box simply teleports in this case – confusing the viewer and exhibiting bad pixel practices. To avoid that mistake, use a blur to provide extra information.

In the second and third rows, there are two different blur examples. Notice how each shows a different path that the box takes? ↴



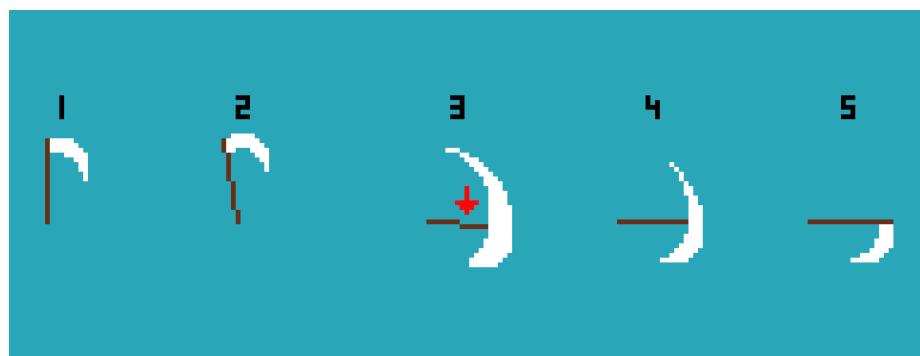
WHEN TO USE?

A common practice is to use blur on attacks, especially ones with a weapon. Let's break down this example. Frame 1 displays a simple scythe, while the anticipation frame is in Frame 2 – informing the viewer that an action will happen. Anticipation should be used on enemy units in games as it provides extra time for the player to react to the attack. However, in real-time combat, an artist shouldn't use anticipation for the player character as it feels unresponsive, creating a delay between the button press and the attack's end.

Frame 3 has the scythe arrive at the target area but overshooting a bit to convey extra energy. This frame creates a blur effect in a tail-like form, connecting the previous position to the current one. Frame 4 settles the scythe (bringing the handle back to a neutral position), and the blur effect dissipates a little bit. Frame 5 is the scythe's final position. ↴



Scan
for "Blur"
Animation



LESSON 30



LIGHT MAGIC ANIMATION

In games, “light magic” usually represents good alignment and is often used for healing spells or harmful spells to evil characters, such as the undead.



Scan for
“Light Magic”
Animation

There are many ways to animate light magic, and this tutorial focuses on a simple buff spell. Imagine a priest casting a spell to regenerate health and invigorate the target! This priest worships The Sun, so the magic uses bright, warm colors.

1. PREPARATION

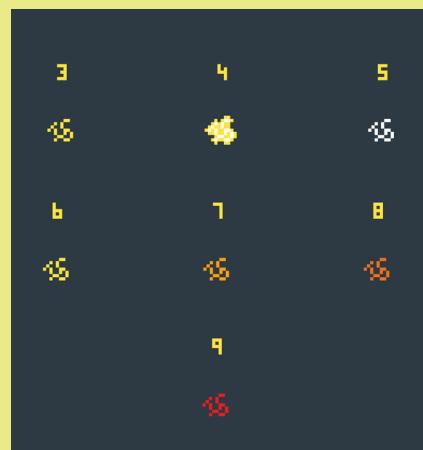
Divide spell effects into three layers. The first layer is the spell preparation for the first two frames. Drawing a few simple, white lines surrounded by yellow light indicates a descending light. Straight lines moving in one direction imitate how the light moves – it doesn’t hesitate or fear but moves fast and straight. ↴



2. A GLOWING SIGN

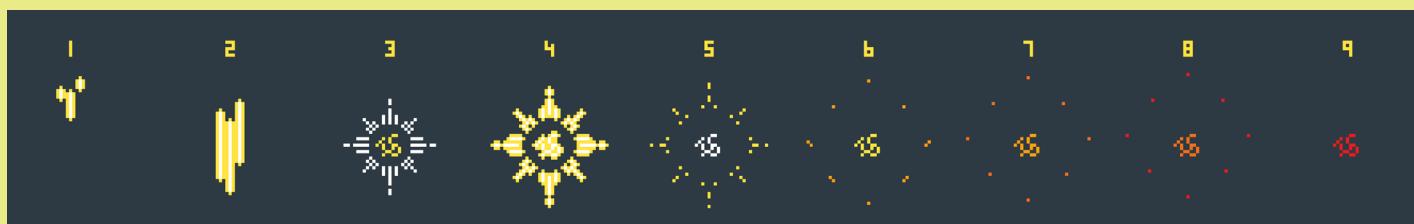
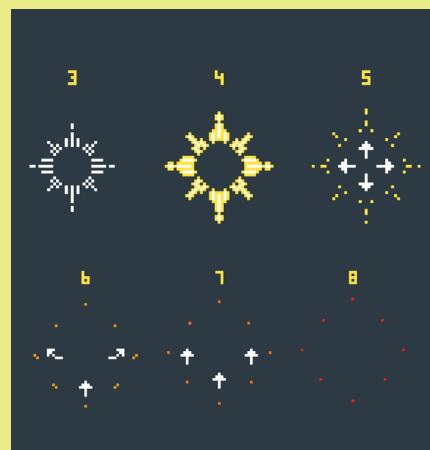
The second layer will be The Sun’s sign found in the fantasy world and is the spell’s center point. Frame 3 is where the sign appears yellow and then glows in Frame 4. Drawing the sign in white achieves a glowing effect (Frame 5 exemplifies), and another yellow surrounds it.

Frames 5-9 show the sign becoming darker – starting as white and ending in red, creating a light dissipating effect. ↴



3. GLOW EXPLOSION

The third layer surrounds the sign with white lines – imitating The Sun glowing. Frame 4 surrounds these lines with yellow, creating the glow effect. Frame 5 extends these lines away from the middle and erases them a bit, again imitating light and warmth emitting from The Sun. Frame 6 pushes the particles upwards, implicating a tiny element of fire and bringing the target’s spirit and will upwards. Frames 7 and 8 push the particles upwards. Notice the colors change from yellow to red (Frame 5-8 exemplifies), creating the dissipating effect. ↴





MASTER LESSON

For this last lesson, the exemplified tutorial demonstrates the ultimate mash-up of pixel art skills. Raise, design, and animate a complete piece – applying a few of the methods and tips already covered and some new bonus ones.

There is plenty of different pixel elements to incorporate when starting a new art piece. The following example creates an animated action sequence, including aspects from the previous lessons on workflow, backgrounds, looping, sub-pixel rendering, idle animations, movements, and particle effects. A menu of pixel art techniques awaits!

THE IDEA

Start with the conceptual elements; what does the artist wish to create? What is inspirational? What skill would the artist like to improve? Perhaps the artist loves to create crossovers between characters and elements of different games, movies, or book series... and tries to give a comical or surprising mood.

Use the “looking for inspiration” excuse to look at media (that contains a little action) to apply the lesson’s content easily. ➤



This walk-through pixel art piece's idea settles on creating a samurai fight between Sekiro and Quirrel, *Hollow Knight*'s mysterious swordsman.

THE BLANK SHEET

This book has already discussed the magic of pixel art: very limited rules result in endless combinations and visual styles. View this guide's collaborators/featured artists to get an idea of the versatility of the pixel. (See Page 105.) From the colorful and defined designs of Watt Designs; the impossible creatures of Richard Townsend; the narrative of Octavi Navarro; the adventures of Mucho Pixels; the minimalism of Apoonto; the crazy detailing of Nerkin; the use of dithering and outlines of Rodrigo Tejero; the colors of Luigi Salas; or the extreme designs of Mike Oakley.

These example's shouldn't make beginner artists feel they must find their unique style. The good thing about pixel art is that it allows experimentation easily.



However, an artist should always prioritize their efforts into perfecting aspects they enjoy — having a clear focus helps move pieces quickly from the blank page to action. Remember that experience points are earned at the end of a battle, not at the very beginning.

Perhaps our exemplified artist is passionate about minimalism and abstraction, so they prioritize creating fluid and organic animations, especially if animating small details and particles is their favorite part. On the other hand, perhaps an artist doesn't like creating backgrounds and isn't skilled with color palettes. From these contributing factors, what should be the initial sketch?

COMPOSITION AND DESIGN

If an artist is looking for a solid and clear process to create pixel art, there is good and bad news: there is none (at least not from a technical point of view). There is total freedom to make mistakes, masterpieces, and everything inbetween.

It all depends on the decided concept an artist works on. If creating a landscape, the composition of the elements and the colors is the starting point. However, shapes and modularity are the starting point of creating character concept art. Let's start the fight scene.

In this case, the character's animation will be the piece's common thread — so that's the best place to begin.

Important: A commentary video supports this lesson found on page 110, exclusive to *Pixels Forever*, accessible with this guide. This written component summarizes the most important aspects the video deals with.



Start creating silhouettes and sketches of the characters, and retouch to find the sweet spot between beautiful and practical. This piece is independent, meaning it doesn't belong to a series of animations or part of a game. It has no prerequisites (or pressures), so try not to invest too much time in finding the perfect balance. The best attitude an artist has is to work with the first design they like and see its possibilities. ➤

During this creative process, the work can turn into the unexpected – refining the sketch can make the work even more unclear and complicated. Occasionally the solution is to make the work smaller... now it's perfect! Refine, this design is the base of the whole piece. ➤

This piece has animation, so take that factor into account since that affects a significant part of the composition: the frame rate.

"The Frame Rate" is the number of frames that make up a second of the animation. Most audiovisual content consumed is displayed at 24-25 frames per second (FPS). But animating that frame rate in pixel art is difficult because, at that speed, the resolution doesn't give room to represent appreciable changes. For a coherent rhythm animation, an artist needs to practically duplicate all the frames in a piece. On the other hand, a too-low frame rate makes an animation look sloppy and unnatural.

Some frame rate ideas:

- The higher the frame rate, the more fluid the animation, but the cost is investing more time and effort.
- A good frame rate for pixel art ranges between 8-12.5 frames per second (between 80-120 milliseconds between frames).
- The sooner an artist clarifies the frame rate to use, the better. They can adjust the frame rate slightly, but sudden changes can spoil the piece. For example, a walking animation doesn't become a running animation when the frame rate increases. Or a bouncing ball may lose its standard gravity sensation when reduced.



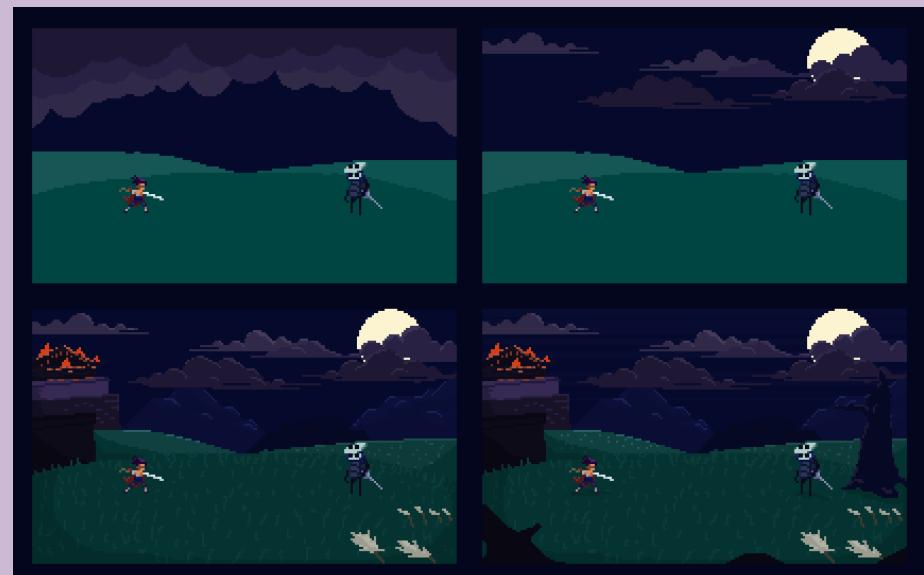
Some programs, like **Aseprite**, allow an artist to apply a variable frame rate, which is useful for emphasizing actions.

DRESSING THE SCENE

With the style already defined, complete the rest of the scene. In this case, there appears to be a lack of creative freedom since it references an environment of

Sekiro ➤, but even so, each artist values different parts. As the scene's protagonist is its characters, leave the central area liberated because surely the action will focus there. The rest of the scene will try to be balanced so that it doesn't attract too much attention.

Perhaps an artist would wonder... "if you have set a temple on fire, how can that not attract attention?" Surely it will – but only once. The viewer will become a secondary

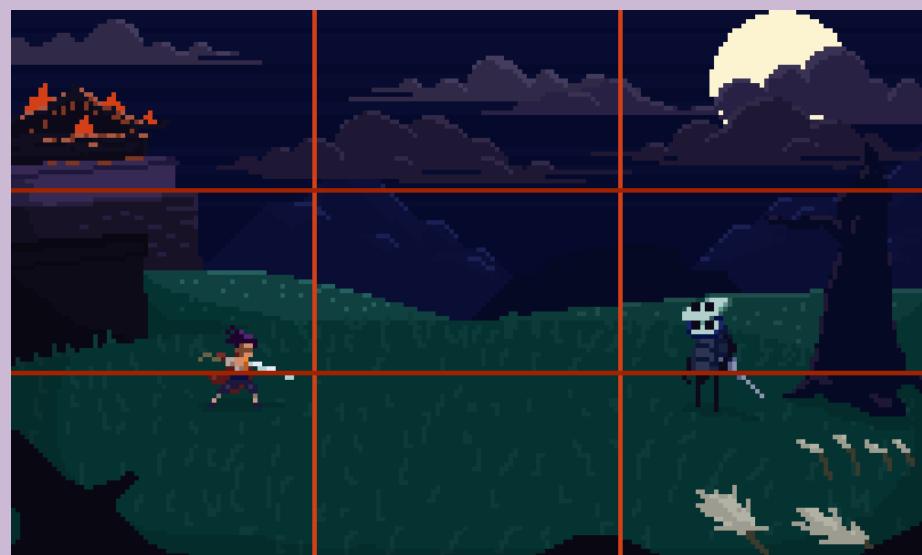


element, assuming the animated loop constantly repeats. Suppose an artist is worried about achieving a balanced scene. In that case, many visual composition techniques can help, such as the golden ratio, the golden triangles, or the use of main lines. However, when creating animations, play with one of the most basic: **the rule of thirds.**

An artist refines with the composition already defined. Don't obsess about total perfection. Pixel art is so modular that adding, moving, or deleting elements is easily modified at any time desired.

DEFINING THE BASIS

All design elements are now here, so it's time to think about how to show it. It's time to play with minimalist designs, high frame rates, and animation types.



HOW TO VALUE THIS?

Low resolution. An artist relies on abstraction over definition with a "Sekiro" of around 16 px in height. The ability to hint at information is key, so perhaps add elements to help give context to each element and its movement, such as hair, a scarf, a long coat, etc.

A clearer resolution is not better or worse; it's just different. *Shovel Knight* is a great game, just like *Owlboy*. It all depends on the readability offered to the audience, based on the purpose of each artist. ↴



High frame rate. A world in itself, as the higher the frame rate, the more required effort. It's affordable for quick projects (like this piece), but for a video game or music video, it becomes too demanding of an aspect. One of the industry's favorite frame rates is 12.5 FPS (or 80 milliseconds per frame).

Lots of animation. A combination of two factors offers different opportunities. On one hand, the artist doesn't have to be exhaustive with the final design of each frame because the playback speed camouflages many details (or defects). However, on the other hand, each pixel carries a lot of weight, so the artist must take continuity care between frames so viewers don't see flickers or forced transitions.

What a mess, huh? Don't worry; the preview window helps and alerts an artist what's wrong.

HERE WE GO. TAKE A BREATH

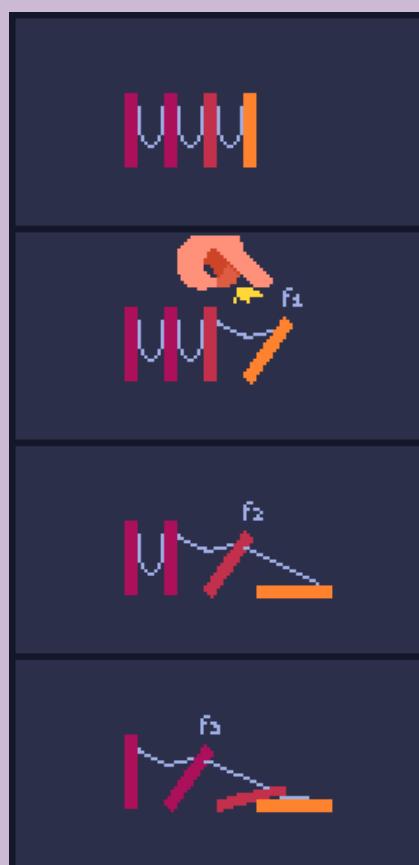
With an okay-ish design, begin to give life to the image.

There are two main elements to animate: the characters and the environment.

Start with the characters, creating the most classic pixel art animation: the idle. "The Idle" is the state where a character finds themselves when not performing any action, and often represents the character taking a breath.

In pixel art, character design shrinks or stretches a few pixels to simulate this action. Adding this animation isn't always necessary in small characters, like the exemplified one. The hero of *Hyper Light Drifter* has no idle; the one of *Fez* just blinks. But why not tackle a challenge? Time to try to make a nice and fluid idle.

The most common element in an idle is two keyframes: taking-in air (raised character) and releasing air (lowered character). An artist usually does this variation of pixels at chest height ➤ – determining which state the character acts during the appropriate frames.

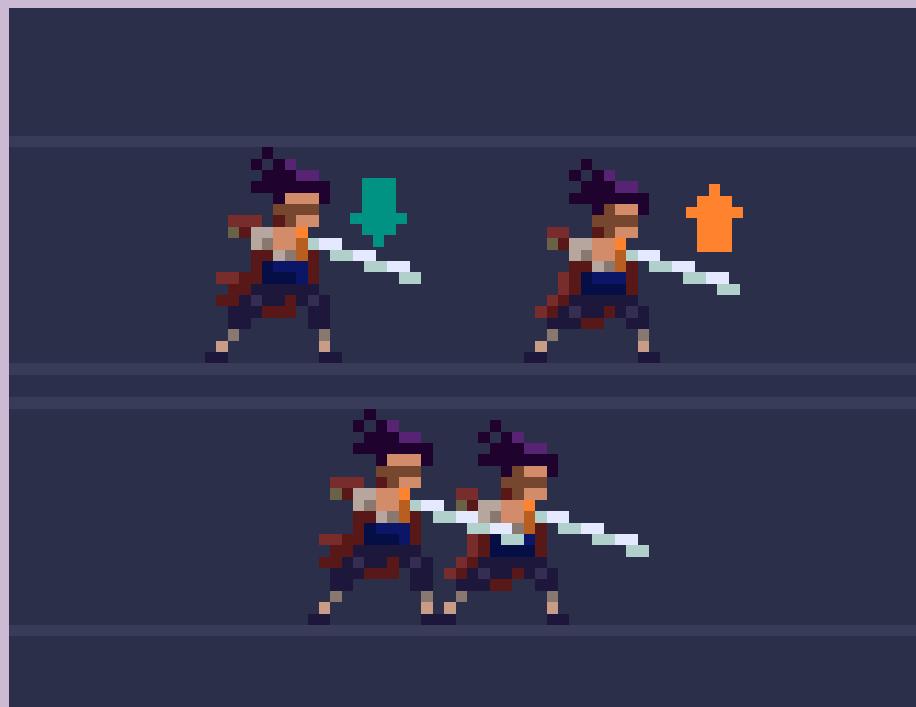


To achieve greater fluidity in this animation, include as many frames as possible between the transitions of these two states. This guide covers two methods to accomplish that: leader and followers, and sub-pixel.

The "Leader and Followers" method generates a movement that drags the rest of the connected elements with a delay of one frame. These elements drag others at the same time in the same way. ↵

Here's a clearer example: imagine a row of dominoes joined by a rope. By pushing the first tile (the leader), the rope begins to tense up, and after a few moments, it's tense enough to drag the next piece. So the second piece takes a moment (one frame) to perform the same movement as the first piece. And so on consecutively with all the pieces. Keep in mind that one piece can be attached to several at once.

When animating characters, the main piece is the head (the leader), let it guide the animation. Firstly, making the head lower, then the chest and hair (followers), and then the character lowers their arms (followers). In this case, a group of "second pieces" will suffice: the head pulls the shoulders and hair. But doing so doubles the number of character states for the animation. So, in theory, the animation should look twice as fluid.

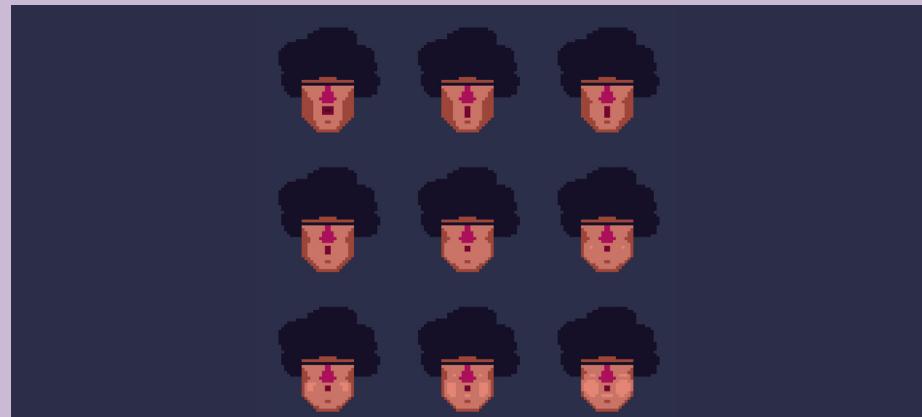




Let's give another boost of fluidity with the "Sub-pixel" method, which generates a movement sensation of each element without explicitly modifying its shape.

It is more difficult to explain than to show. Here's a common example, when facing a mirror, a closed mouth gradually fills with air so that the cheeks swell, and the lights and shadows on the face change subtly (unless a shadow isn't present, so change locations and try again). ➤

Due to its modularity, pixel art is an ideal art style for transferring this technique. To do this, play with the adjacent interior pixels in which the color changes (usually the pixels the lighting hits), and move one towards the other, depending on those that interest the artist. When an object swells, the central pixels "invade" those around them. An object that lands on the ground will have the upper pixels invade the lower ones to show the impact of the fall. ➤



When applying, think of lighting as the last follower, such as these steps: lower the head, lower the chest, lower the chest lighting... doubling or tripling the number of different frames in a simple animation. ➤



Almost done – just one last trick! Think of the sub-pixel as “dragging colors,” to find the application on the edges of the figure. By changing the state, instead of moving a pixel from “A” to “B,” stretch so the frame occupies “A” and “B” simultaneously. This technique is another resource that helps remove rigid movements from the animation and works great at a high frame rate. ➤

The sub-pixel is an advanced technique that is not easy to master. It is not enough to apply these tips everywhere; the goal is to make the animation more readable, so practice and test until acquiring artistic sensitivity about where and when to use it.

To give more context, let’s include two more elements that wave in the wind, such as a scarf and the end of the coat.

Undulating animations are always complicated; no method unifies them well. An artist should combine the “leader and followers” method with inertia. In this case, the followers will move more strongly as they separate from the leader. ➤

A LIVING ENVIRONMENT

Now it’s time to liven up the environment. How many objects are susceptible to animation in this scene?

The flames, the flowers, perhaps the clouds... in fact, light itself is a living entity that interacts with all other elements – making the whole scene susceptible to animation. That is, any static element also have slight movement.

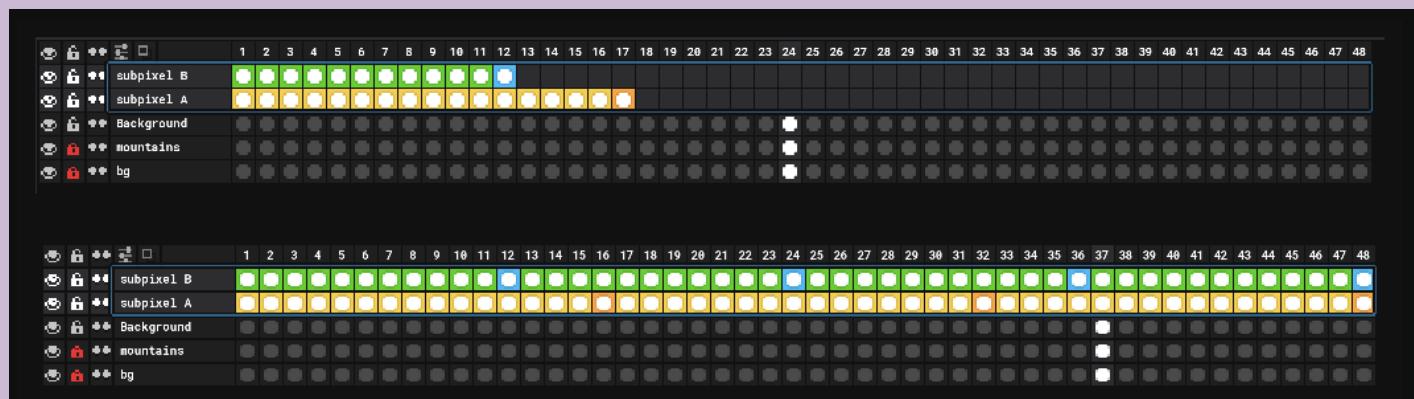
Obviously, the castle’s stones don’t breathe, but they don’t have to be photographic still either.

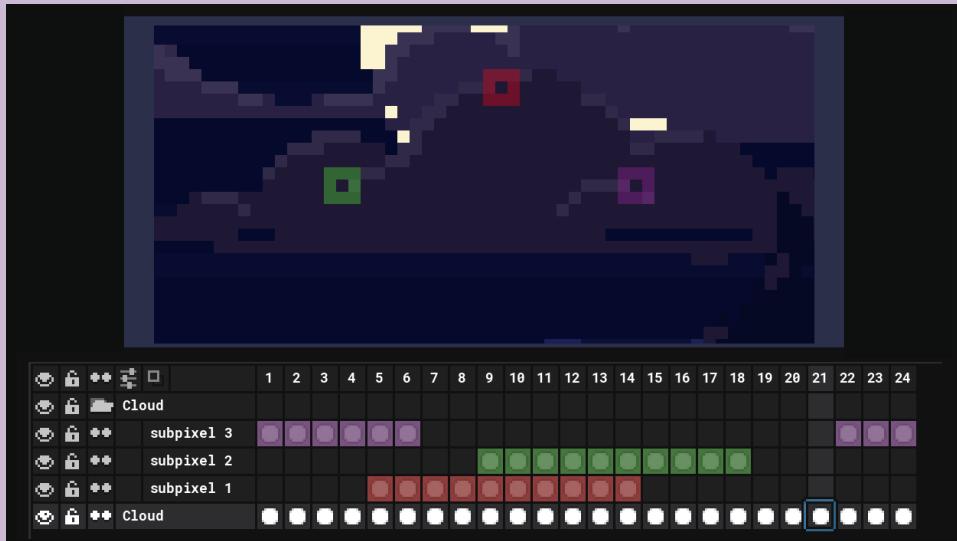


What’s the right way to animate all these static elements?

Exactly, sub-pixel. In this case, there is no obvious need, such as a chest filling with air, but if looking for a generic effect to create an atmosphere, notice the pixels where lighting changes, and manipulate them with these tips:

- Adding a sub-pixel is valid for any pair of pixels where the color changes. Remember, this is one of the colors invading the other for a short time.
- If a sequence lasts 400 frames, that doesn’t mean analyzing those 400 frames to add each sub-pixel point. It’s more practical to group into smaller loops and duplicate them to fill the entire sequence. Create a loop for each element, such as one for the temple and one for each cloud. They don’t need to have the same duration! ✅



- These loops cannot be small – the invasions carry out as blocks of several frames in a row. If an artist creates a loop of four frames, the repetition will be noticeable and uncomfortable as the blinks occur. It is better to create a loop of 16 frames (the smaller, the better) and make invasion blocks with about half the frames.
- An artist must pose each invading pixel sequence independently. If there are five chosen points to apply sub-pixel, and they all invade and return simultaneously, the result is an ugly intermittent effect. It's best to distribute the different invasions amongst all the loop frames – if overlapping, all the better. 
- For small resolutions, invasions are usually made of only one pixel (but they can be more!). Make blocks of “sub-invasions” within the underway invasion, creating an accordion effect. 

These explanations have been technical, but the sub-pixel, in reality, is a very mechanical process that doesn't require an artist's full attention:

- Choose an item, such as a cloud.
- Create a layer/loop with 24 frames.
- Go to frame 4 of that loop.
- Look to apply a sub-pixel at a color change; the machine gun begins invading the pixel for eight frames (as an example): Paint the pixel – next frame (repeat eight times).
- See that frame 12 already has the sub-pixel applied.
- Now, focus on frame 7 (as an example), and look to apply a sub-pixel at a color change to invade again.
- An artist does this as often as they desire, in as many elements as they desire.

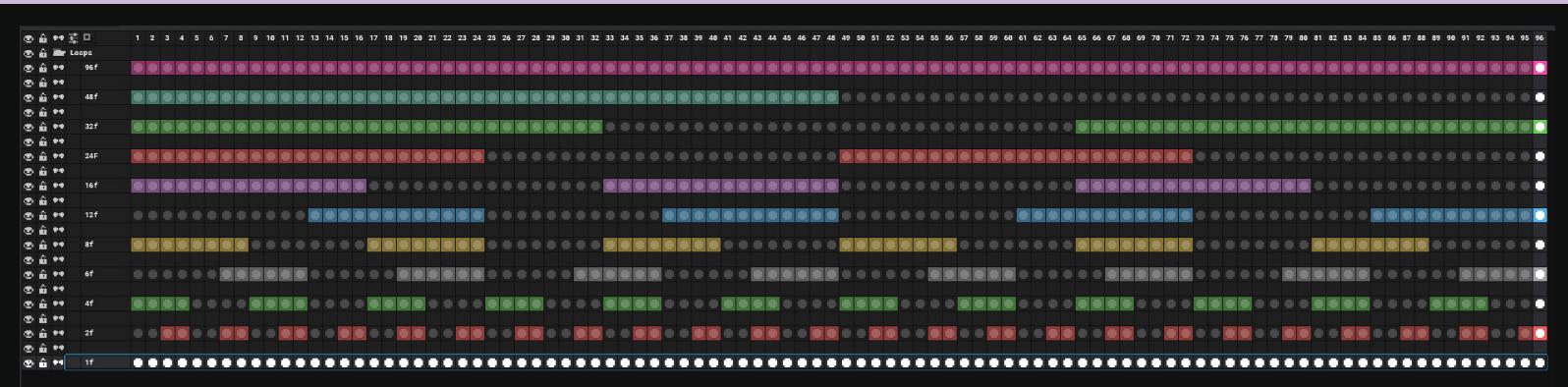
Feel free to visit the previous images since this demonstration might've made the process more understandable.

Artists often obsess over camouflaging the

repetition as much as possible. When the repetition is obvious, the magic of animation suffers. This guide has already demonstrated a few tips for avoiding this, but here are a few specifically for this piece.

Make the size of the animation (in the frames) work in the piece's favor, usually when the whole animation is a loop by itself. However, creating animations with

this idea perception gives an artist control and clarity as they create.

In long animations, the magic number is 96. In 96 frames, an artist can duplicate many varying lengths of different loops to all end simultaneously. Loops of 1 - 2 - 4 - 6 - 8 - 12 - 16 - 24 - 32 - 48 and 96 frames fit all. 

Not bad, right? Take advantage of this flexibility when deciding on the sub-pixel's loops or for sets within the same element (such as a character). For example, if mixing loops of 6, 8, and 12 frames, the sequence will not restart until frame 48.

At this point in the lesson, there should be a base standard to assign each loop's duration of each loop, especially when creating environment sub-pixels.

The more organic the material, the shorter the loop and invasion block duration. For example, elements such as clouds, clothes, vegetation, ice, etc. should use loops much shorter than stone, wood, etc., since the more ethereal a material is, the more likely it will experience variations in its appearance.

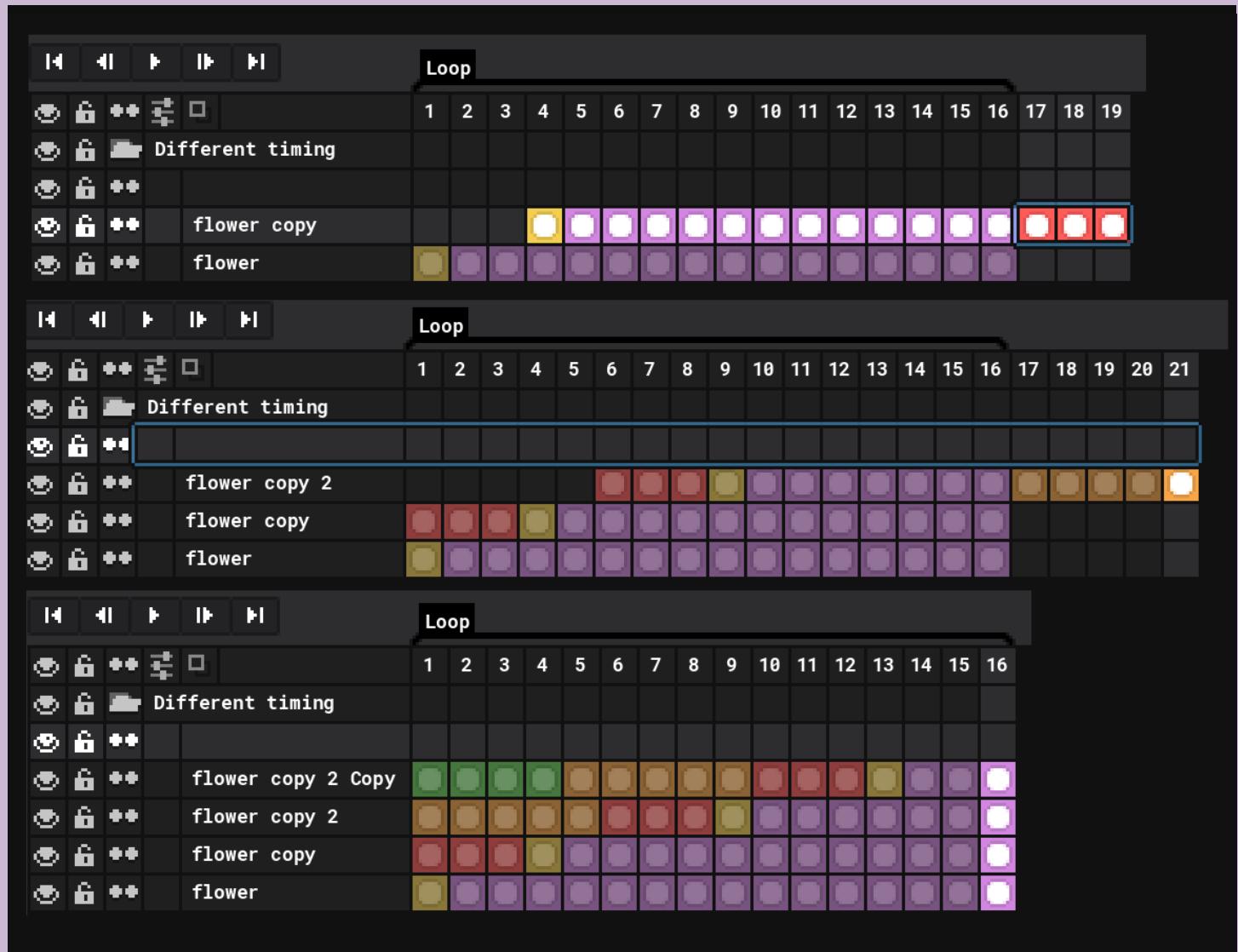
Now there are only two elements left to animate, the flames of the temple (since they are so small, there isn't a technique or secret to animating), and the flowers to have a slight swaying motion. If wondering, "why are there so few flowers in the scene?" – the intention is to animate them once then duplicate them.

When multiplying an element with an obvious loop but not wanting the repetition to be too obvious, do these steps:

- Clone that loop and position wherever desired.
- Move several of the initial frames to the loop's end.
- Adjust the layer on the timeline.
- Repeat.
- And voila! There are already as many animation sequences as needed, place wherever for the desired outcome. ✅

This simple process gives variety to any scene, from the exemplified field of flowers, a battalion of warriors, a sky furrowed with shooting stars, or a camp full of torches. ➤

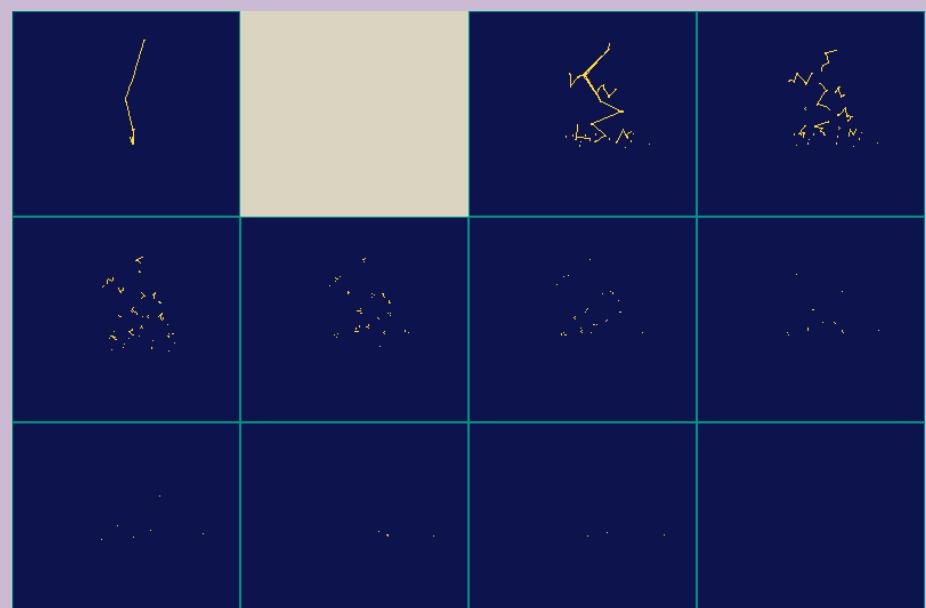
One last note: within a combination of loops (especially if they are as long as the example suggests), include animation sequences to adorn and break the repetition. As mentioned, this scenario is a direct reinterpretation of an existing level in Sekiro, in which lightning strikes incessantly, so let's add that element to this scene.





Animating Lightning Steps:

- The Guideline – a frame of lightning, which is a fairly straight line.
- The Flash – takes over the entire screen or can only illuminate the elements closest to where it falls.
- The Classic Lightning – recreates “the guideline” with extra sparks.
- Fragmentation – the lightning quickly decomposes and drags to the edges until disappearing.
- Blinking – to accompany the fragmentation, some of the disappearing lightning parts blink, nuancing an electrical component.
- Screen shake – if one of the lightning bolts is very close to the action, make the screen vibrate for 2 – 3 frames giving the action more intensity. ➤



LIGHTS, IDLE, ACTION!

Animating the battle between the characters is – believe it or not – the easiest part of the tutorial. With a low resolution and a high frame rate, fast sequences work well because the focus is on the narrative rather than the designs. Therefore, the artist doesn't have to be as exhaustive with each frame, saving time to invest in other reinforcements for the action, such as FX.

Any action with a certain intensity that generates a character, such as a jump, sword swing, or baseball throw, is divided into three moments:

THE_END.GIF



Scan for
“Master
Lesson”
Content



ANTICIPATION ("LOOK! I'M GOING TO DO SOMETHING!")

It begins the movement and notifies the observer that an action will happen. It is the impulse that comes before a jump or an arm backing away before throwing a punch.

There is no basic rule to follow with anticipation, as it depends on what the artist hopes to convey. Anticipation can be non-existent (to indicate the ultra-speed of the character), or it can contain a dozen frames to show how a powerful attack is loaded little by little. Usually, anticipating an action with 2 or 4 frames is enough.

IMPACT ("I'M DOING IT!")

It is the action itself, but this example refers to it as “impact” to not mix terms. The artist usually represents impact with a single expressive frame, which transmits all the strength of the action through illuminations, trails, etc.

When the action isn't generated but is received unexpectedly (such as a punch hitting a character's face), there is no anticipation, so the character goes directly to the impact frame.

CONTINUED ("WHAT DO I DO NOW?")

The classic step is transforming the pose to show the effect on the character after the action. However, there's the freedom to do whatever an artist desires, which can be the initial pose, another different pose, or even a new anticipation.

Remember, the character comes from a moment full of strength, so surely they need a few frames to correct their pose before recovering.

The first sequence is quite fun to break down, as it contains three impacts, generating transitions between states of all kinds.

Many artists like drawing keyframes at the beginning (usually of the impacts) and then adapting the rest of the animation according to these frames. Creating video game animations this way is very useful since the restrictions are typically stricter, and it is necessary to establish how the impact works and appears perfectly. However, there is much more freedom in this example's animation type, so work sequentially and duplicate (or delete) the necessary frames by each sequence.

Leave the reinforcement details for the end (such as the protagonist's scarf) because they will likely deconfigure during the sequence's refinement.

Finally, apply any reinforcing elements to the action, such as dust when the character begins to run or brakes, sparks and shines to a character's feet, grass flattening, or flowers moving through the shock wave of attacks... this specific example adds a few dust animations.

The first frame of the powder animation will depend on the action that causes it:

- A jump generates a cloud of "sharp" dust in the direction of the jump itself.
- An element that lands on the outside generates "sharp" dust in the opposite direction to its cause.
- A walking character generates "round" dust after each step.
- Once there is a first frame, the process is similar in all cases.
- The dust cloud rounds up and moves in the same direction that the action began. Depending on the force of the start, it will move more or less quickly, but always with decreasing speed until it disappears. ✅



Sparks are even easier. Draw some reference trajectories from the point of impact and add a pixel through them until it disappears. The challenge is calculating the speed at which each pixel/spark moves since a spark that rises, descends, and bounces against the ground differs from one that shoots out and is parallel to the ground. But playing with colors is always a good idea; for example, the spark begins with white or light yellow and degrades to dark red or brown. ✅

This tutorial completes here as an artist following the step-by-step has included all components. It's difficult to talk about animation without seeing it move, but fun to create strange examples and invent terms to best show pixel art techniques. Whether making video games, designing music videos, or simply using pixel art as a tool for artistic expression, be encouraged to practice and experiment as much as possible. Look for what is exciting and inspiring because surely there is a gap within all the possibilities of the pixel.

Never miss the opportunity to teach someone what they can achieve by playing with small colored squares; that's how all the artists who collaborated in *Pixels Forever* began their pixel careers and have had their lives changed.



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PIXELS

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GEMS TUTORIAL

Every game needs beautiful and valuable gems.

A round gem is easy and quick to draw. This tutorial has nine steps in total.
Let's dive into each!

STEP 1

Decide the size of the gem, create a circle, and fill it with one color.

STEP 2

Draw a bright reflection. The light source is on the top left side, so the reflection's placement will mainly be on the top left side of the gem. Extend to the right a bit to create a more interesting impact.

STEP 3

Draw highlights on top of the bright reflection to create more contrast.

Steps 4-7 add shadows within the shadows.

STEP 4

Add shadow on the entire sphere except for the top left portion

STEP 5

Draw an even darker shadow within the shadow created in the previous step.

STEP 6

Again, draw an even darker shadow within the previous shadow – except not on the edge. Leave space of 1 or 2 px near the outline within the brighter shadow, representing the reflected light as polished gems easily reflect.

STEP 7

Add the darkest shadow inside the previous shadow to create extra depth. Now let's increase the brightness of reflected light.

STEP 8

Emphasize the reflected light by coloring a 1 px line on the bottom right corner into a brighter color.

STEP 9

Brighten this line even more in the middle.

The same principles apply even to tiny resolutions. Here's an example of a gem on a 7x7 px canvas. It still has the same elements: outline, highlight, reflections, light, and shadow areas – skipping Step 2 because of limited space. The smaller the resolution, the fewer steps there are to complete. ↴



EMERALD

Gemstones are all sorts of strange shapes and sizes. A faceter will take the gemstone to cut, polish, and make beautiful. This tutorial simplifies and replicates the same process.

The image to the right (in the first row) displays an unrefined gemstone. Its outer edge is uneven, and it would be difficult to socket it into jewelry. Decide the gem's outer shape first, and then cut the excess away. The red part indicates the areas to cut away.

Even though there's only one color (to keep it simple), keep in mind that this object has three dimensions. So the second row continues to cut the gemstone. The middle of this emerald will be a flat rectangle. Cut angled away from the middle to thin out the gemstone, resulting in the middle sprite in this row. Make another cut to make the gemstone even more fascinating. These cuts will be transitions between the middle rectangle and the sides. Now here is the final shape: a flat middle rectangle, with a shallow angle cut and a deep angle cut.

The third row demonstrates polishing the gemstone by drawing more details and imperfections to create interest.

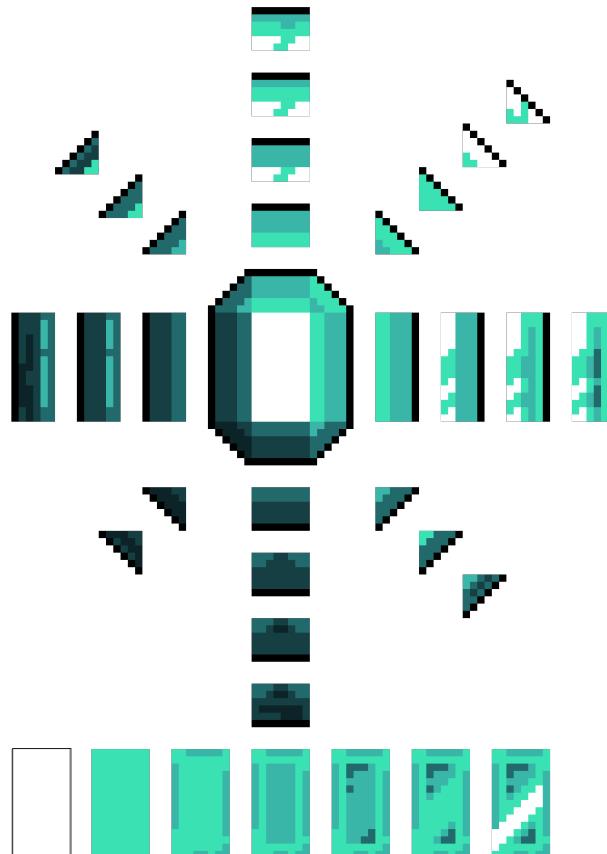
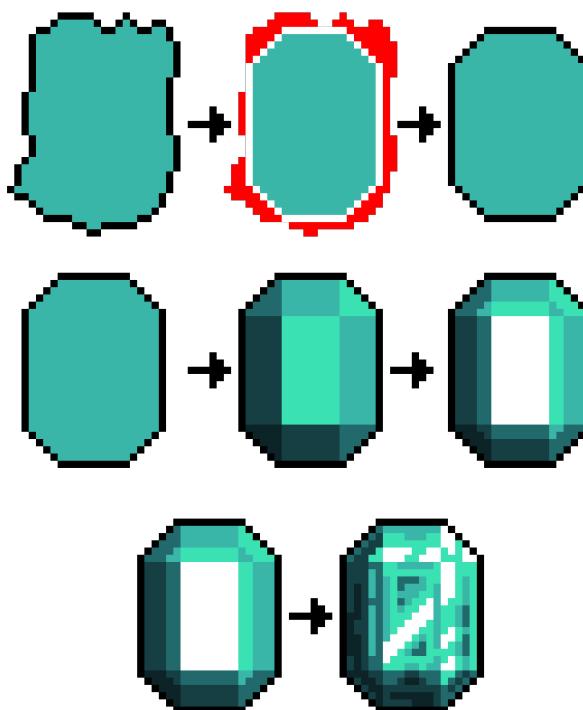
Since there's a massive leap in the third row, let's break it down step-by-step. Divide the emerald into sections, and the light source comes from the top right direction.

All side and corner sections have two clearly defined areas – shallow and deep cuts. First, focus on the shallow cuts (the area closer to the middle, rectangular area). They usually have highlights, while those in the shadow will appear brighter, and deep cuts will usually be darker than shallow cuts. Also, since there is more space, add more detail by drawing a few imperfection lines.

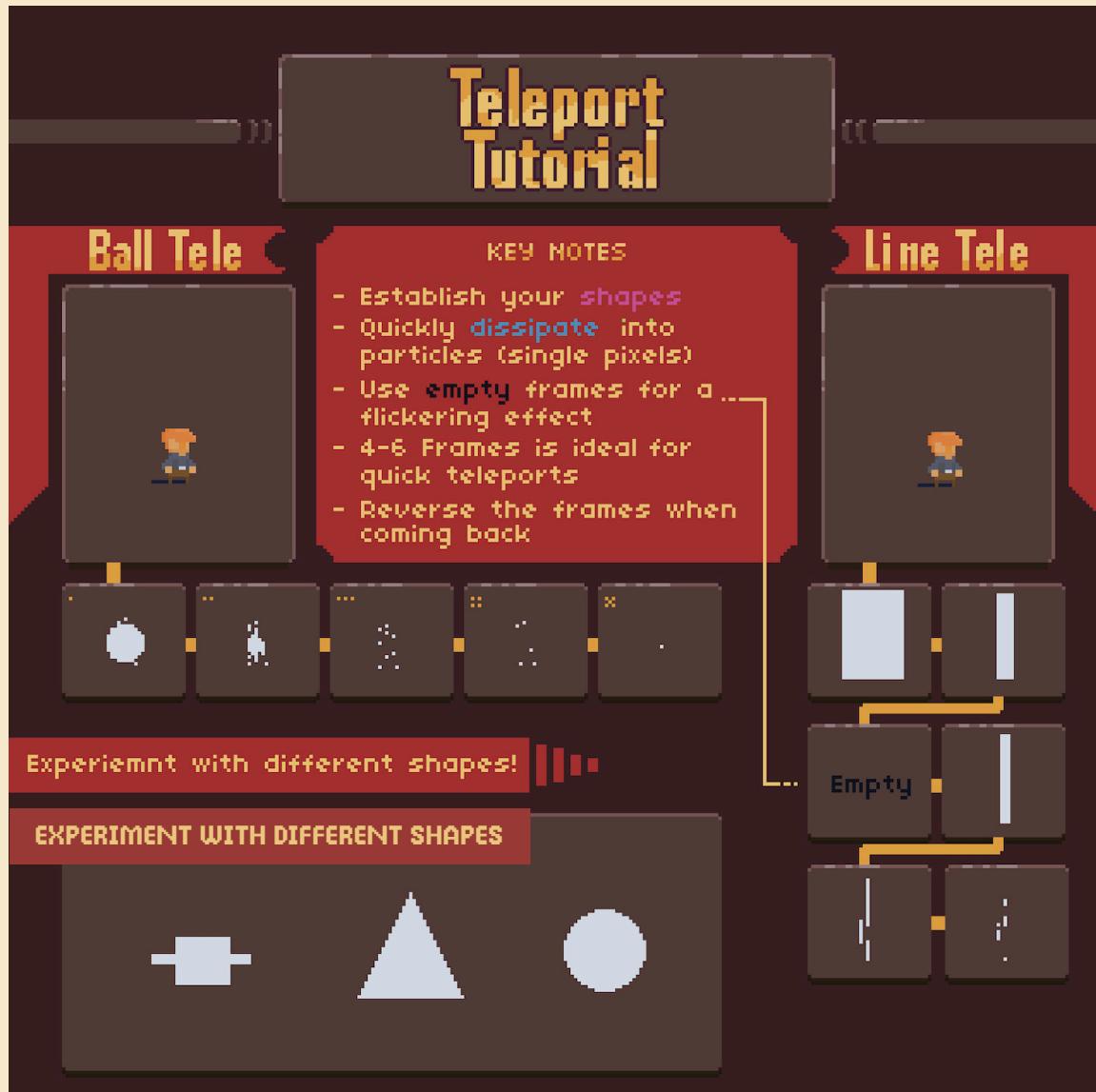
Notice there are more steps for the lighter area sections? It's good to have more details in the light and fewer in the shadows when creating focal points. Now let's talk about the most important area – the middle section.

The bottom diagram has steps for the middle section. Swap the white color (used previously for area definition) into the main light tone. Place a few lines in the shadow tone on the edges to define the edge.

To make it more interesting, draw another rectangle within and apply the same technique. Finally, erase a portion of this new rectangle to create space for more highlighting.



THREE SPRITE'S IN ACTION TUTORIAL



Scan for
“Teleport”
Animation

ROLL TUTORIAL

FINAL OUTCOME

STEPS

8 FRAMES TOTAL
• 1 ANTICIPATION
• 4 ROLL
• 3 RECOVERY

- FOCUS ON THE ROLL FIRST
- I LIKE TO START WITH THE HEAD + BODY
- ROTATE THEM 90 DEGREES
- 4 FRAMES TOTAL
- ADD WEAPON, SHIFT ANGLE SLIGHTLY
- ADD CAPE + BG WITH SOME BOUCY FLOW

FRAME BREAKDOWN

1

IDLE

2 3 4 5

THE ROLL

6 7 8

RECOVERY FRAMES

QUICK ANTICIPATION

- ALLOWS QUICKER, MORE RESPONSIVE GAMEPLAY
- SHIFT THE IDLE FRAME SLIGHTLY DOWN

THE ROLL

- FRAMES CAN BE ALMOST IDENTICAL JUST ROTATED
- REMOVE FEET IF THEY LOOK OFF

RECOVERY FRAMES

- 3 RECOVERY FRAMES ALLOWS BOUCY FLOW
- CAN DELETE SOME FOR QUICKER, MORE RESPONSIVE GAMEPLAY

Spin Attack Tutorial

Guide lines

Anticipation

Continuous Spins

- Use a Guideline to get a smooth spin

- Use Anticipation Frames for start and stops

- Loop the middle frames

FRAME BREAKDOWN

Tips!

- Practice with just a guideline & ball
- Try to Keep Pixels within the guideline circle
- Less frames equals quicker speed
- More frames equals slower speeds

1.

2.

3.

4.

Scan for
"Roll"
Animation



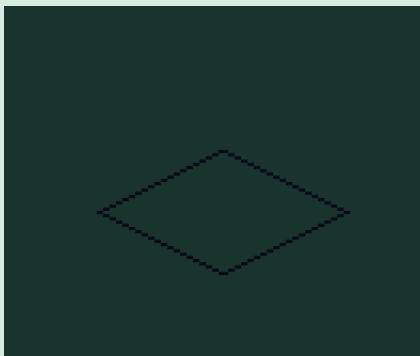
Scan for
"Spin Attack"
Animation



ISOMETRIC HOUSE TUTORIAL

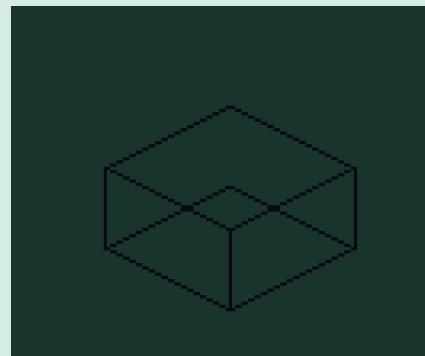
STEP 1

Start the process of making the clichéd 3D square. It's important to keep the number of pixels in the line consistent throughout the illustration. In this case, let's use 2 px that are side-by-side. Create a basic square. ▶



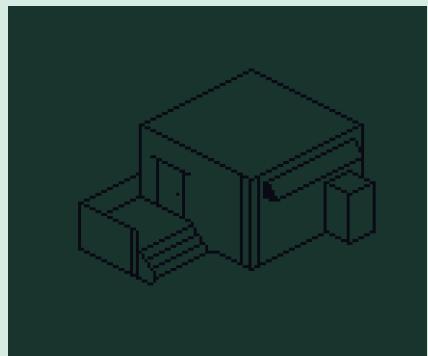
STEP 2

Copy-and-paste that basic square and connect the corners, creating a 3D square. ▶



STEP 3

Erase the lines that appear at the back side of the house. Use the same process in creating other shapes like windows, decks, and doors. ▶



STEP 4

Using the same 2 px method, create a triangle with the base the same length as the house. Copy-and-paste the triangle, connect the corners, and place it on top of the house. ▶



STEP 5

Step back to think of more basic shapes to add to the illustration to give it that extra edge. ▶



STEP 6

Establish where the light source is coming from and add shading. ▶



STEP 7

Add some basic colors. In this case, the house is made of wood primarily, so add some browns while factoring in the light source. Begin adding grass highlights. ▶



STEP 8

Start fleshing out the details, like the wood's rust, chips, and nicks. Add a bit more depth to the grass. ▶



STEP 9

Add some more grass highlights and some reflections in the windows! ➤

Tip: Constantly zoom in-and-out and flip the image to keep consistent details throughout the illustration.



STEP 10

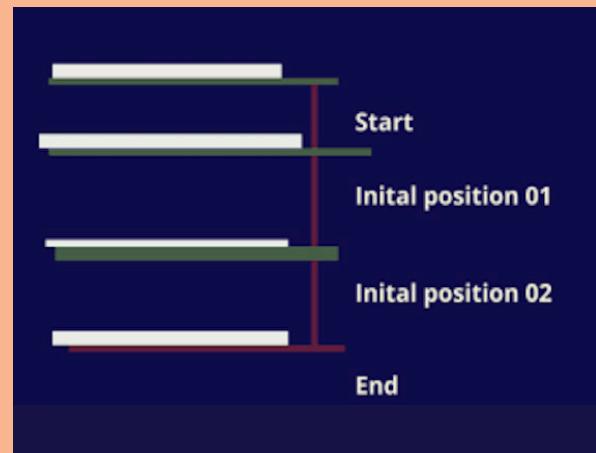
Continue fleshing out more details, such as adding a secondary light source from the windows, smoke from the chimney, and cute, little daisies! ➤



WATERFALL TUTORIAL

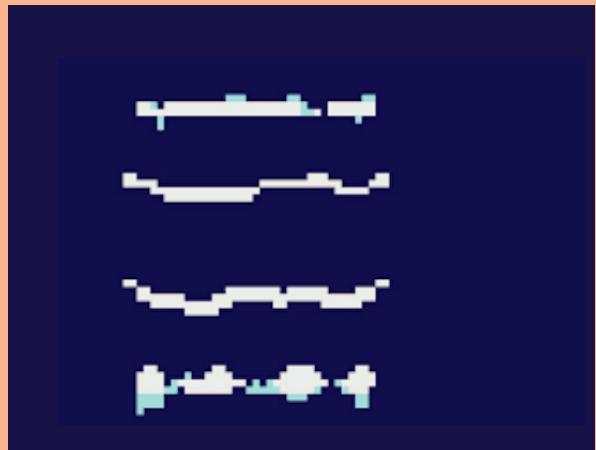
STEP 1

Set up a guide for the Start, Initial position 1, Initial position 2, and the End positions for the waterfall. Loop lines falling down, adjust the speed. ➤



STEP 2

Curve the falling lines and animate the top and bottom with four frames of random “bubbles.” ➤



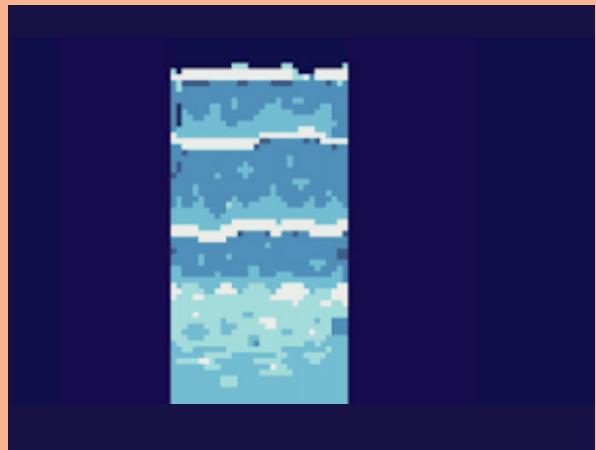
STEP 3

Animate the bottom by moving circles and lines, away from the waterfall. ➤



STEP 4

Finally, add a backdrop and some shading behind the curved lines for depth.. ➤



Scan for ➤
“Waterfall”
Video
Tutorial



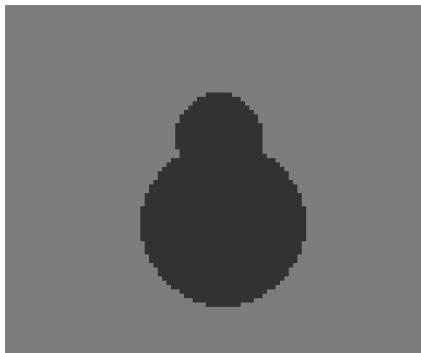
Scan for ➤
“Waterfall”
Animation



PANDA WARRIOR TUTORIAL

STEP 1

Add a couple of circles that resemble a snowman shape. ↴



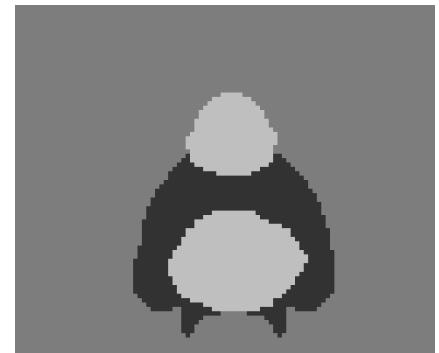
STEP 2

Add a layer underneath to draw some stubby legs and thick arms! ↴



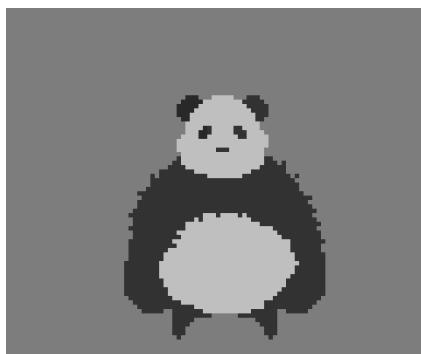
STEP 3

Color the stomach and head white. ↴



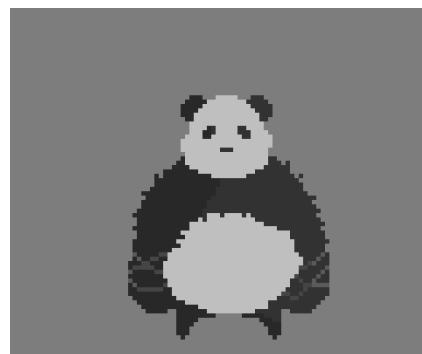
STEP 4

Add black eyes, ears, and a nose. Make the fur appear fluffy by adding a few stray pixels. ↴



STEP 5

Add shading to the left side where the light source isn't hitting and some small details – like ropes wrapped around his arms. ↴



STEP 6

Continue to add shading depth to his head and body. Add a shadow line that connects the character's two feet. Add more details, such as a headband and some straps! ↴



STEP 7

Create another layer underneath to add a weapon, like a bow! ↴

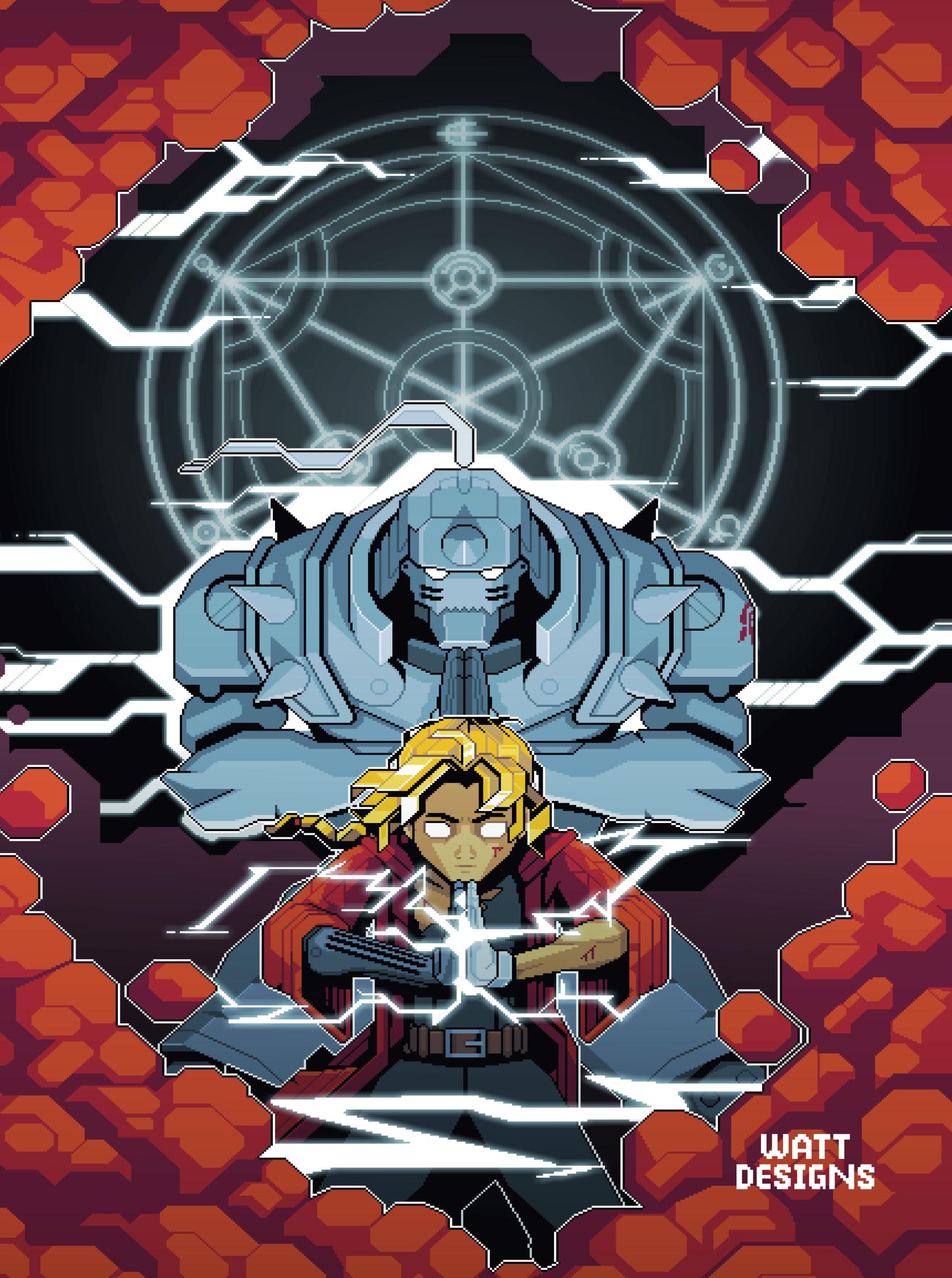


STEP 8

Finish by creating grass near the character's feet and the weapon's tip! ↴



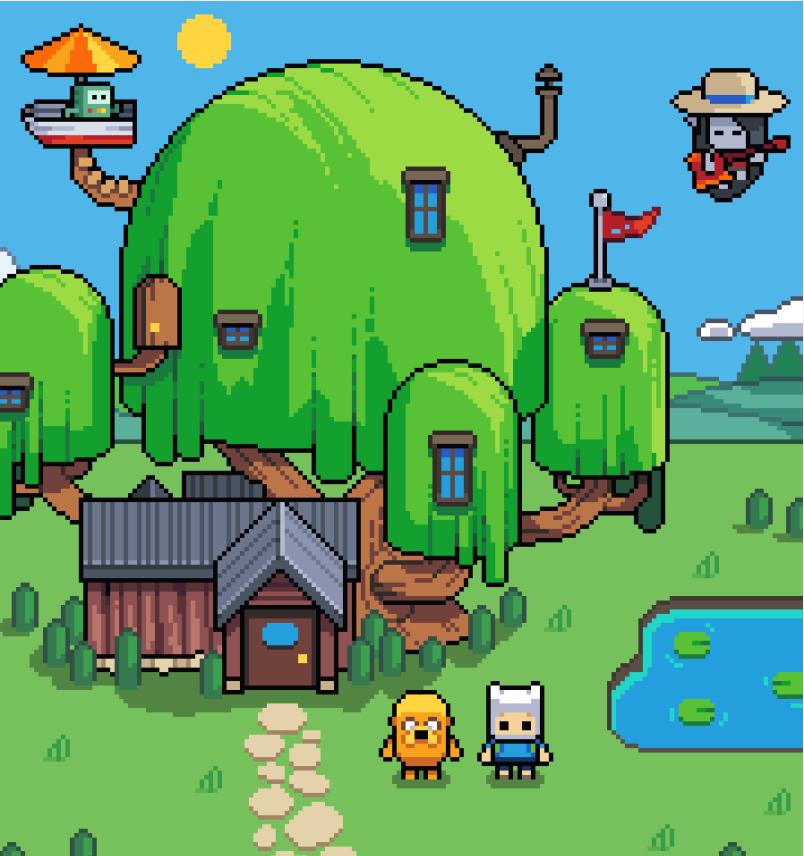
Scan for
“Panda
Warrior”
Animation



WATT
DESIGNS

FEATURED ARTISTS

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WATT DESIGNS

Matt Smith (aka Watt Designs) graduated with a Bachelor's Degree in Electrical Engineering from San Diego State University.

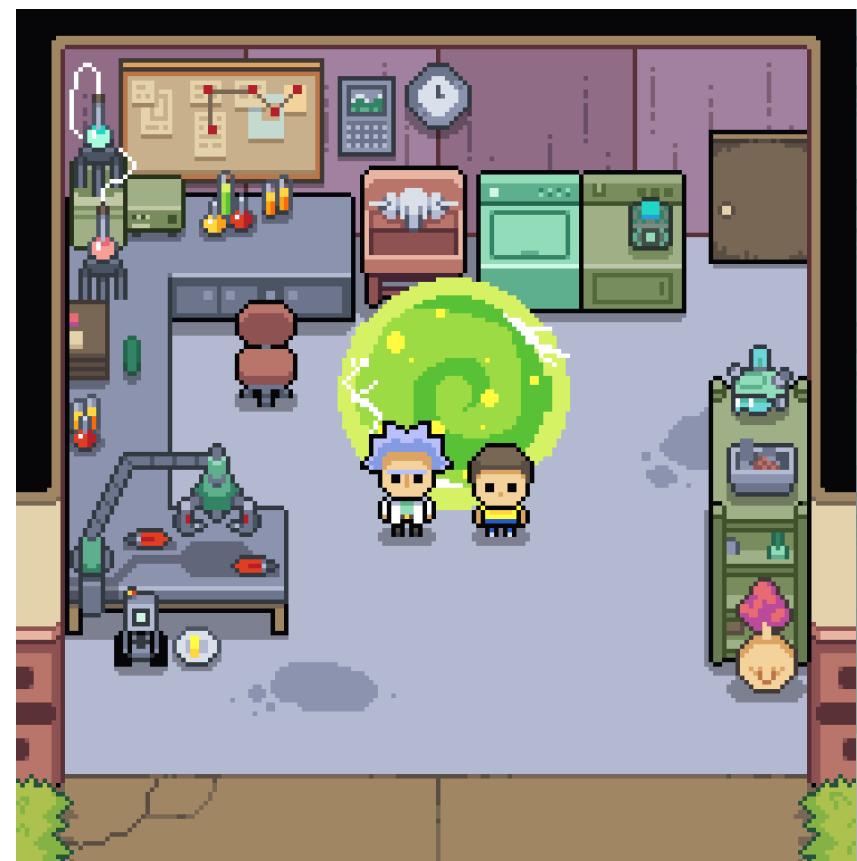
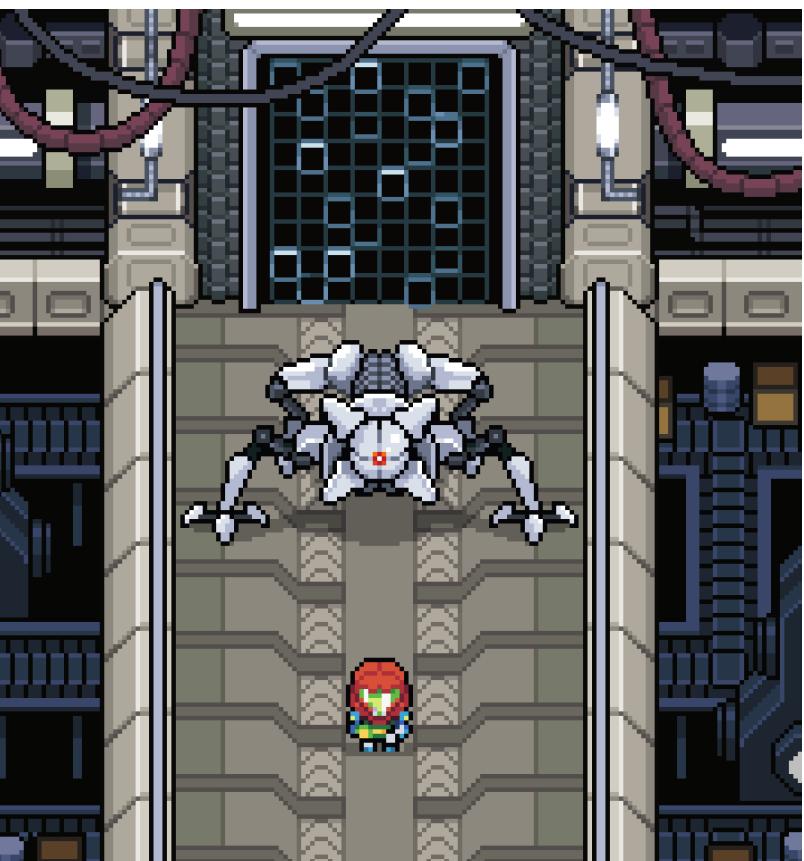
Matt Smith works as a full-time electrical engineer – on the side, creating art and developing video games. His love for pixel art began when he received a book with 500 drawing prompts as a gift, and he decided to draw a 100x100 px drawing every day using the prompts as practice so he could one day make a game.

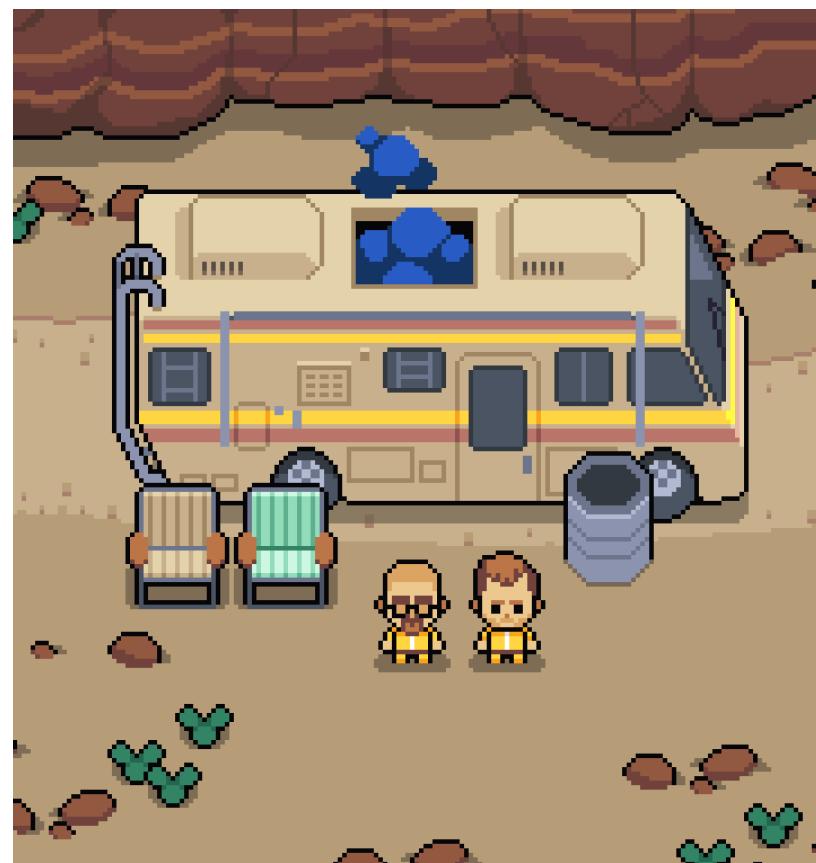
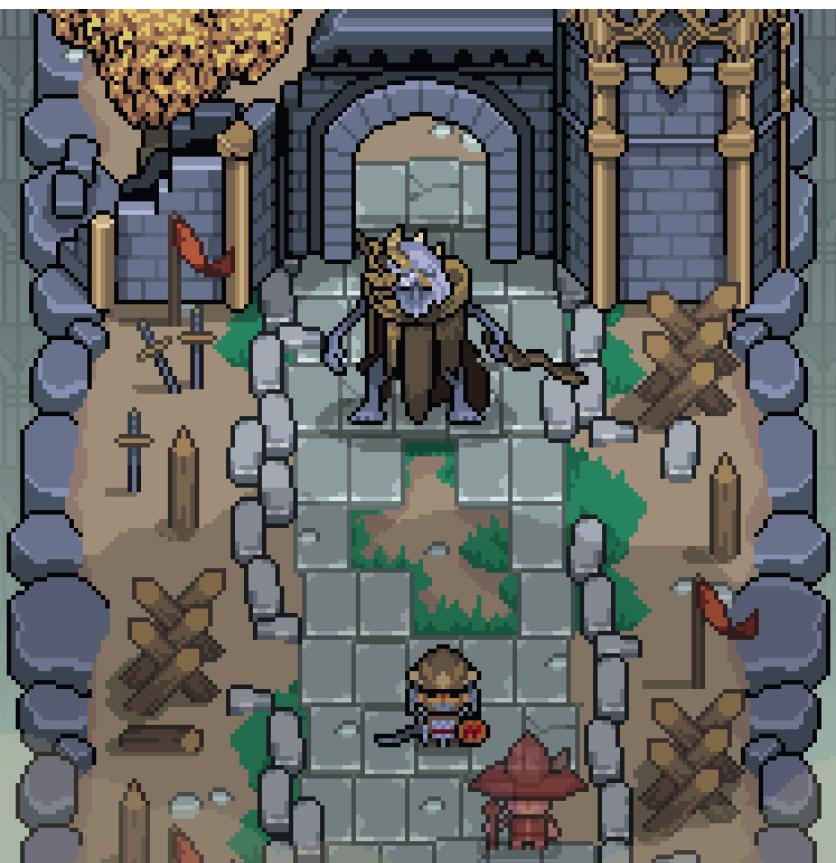
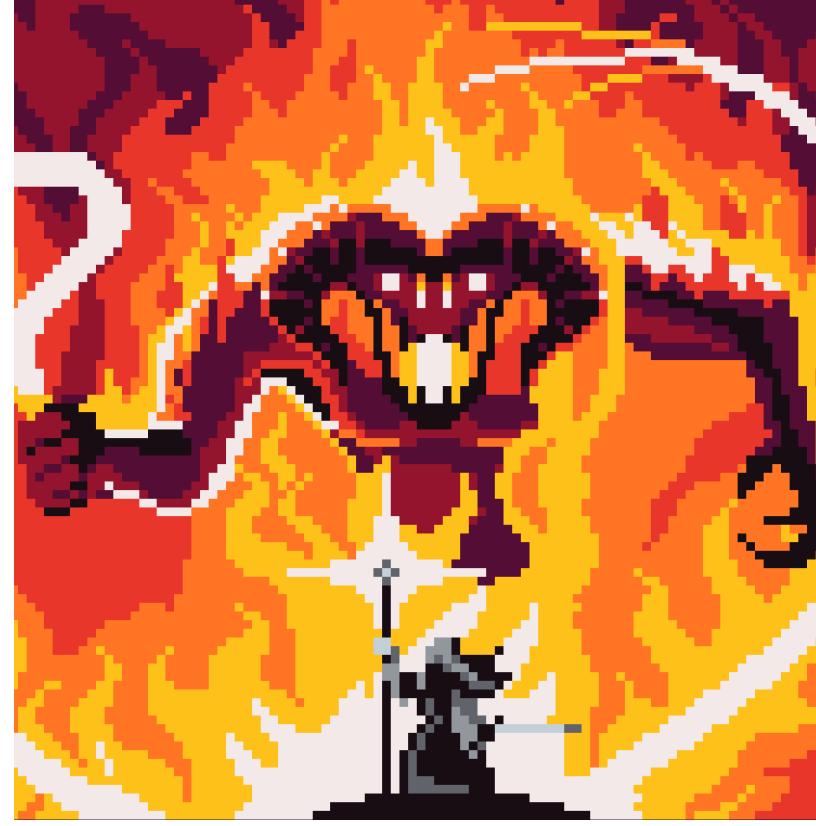
Finding the prompts somewhat boring, he would usually twist them to involve a game or movie reference and gathered a large following of viewers – each one anxious to see what artwork the next day held.

Upon finishing the prompt list, Matt began work on video game development and now spends most of his spare time creating game assets with the occasional fan-art piece sprinkled in for fun. He enjoys video games, tennis, and Brazilian jiu-jitsu when not placing pixels.

Matt's biggest advice for aspiring pixel artists is to learn the common subjects for a scene because they're super important, even though they might not be the most fun to create. The last thing an artist wants is to distract their character designs by placing them with half-assed backgrounds. The sooner artists learn the "basic" methods for creating common subjects, the sooner they can begin experimenting and adding their own personal aesthetic. Each artist paints one simple element the same way they approach painting everything, so start with a basic form – defining the shapes, distinguishing different parts with lighting, and refining with details and textures.







ROCK TUTORIAL

STEP 1

Start with a basic cylinder shape and make the top appear rounded. Make the top a lighter shade so the sun appears to hit the rock. ☀️



STEP 2

Add a few rock ledges to give more variety. Feel free to get creative and add as many or few as desired. 🌟



STEP 4

Add cracks by taking a darker color and drawing little loops. These loops will make that portion of rock appear that it's protruding. Don't use the absolute darkest color for all regions. ☀️



STEP 3

Add some darker and lighter regions, depending on the light's direction. Add a thin highlight along the edge and slight top shading to make a rounder appearance. ☀️



BUSH TUTORIAL

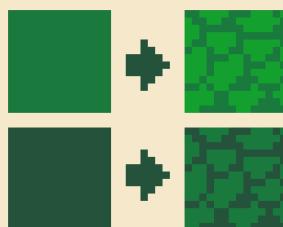
STEP 1

Start with the basic bush shape. Don't be afraid to add "ledges," like the rock tutorial – treat them as tiny additional bushes. ↴



STEP 2

Create a texture to draw leaves. Don't just randomly draw circles; try to make the leaves look like they're overlapping, like scales. Apply this texture to each solid region, using a lighter one for the top. ↴



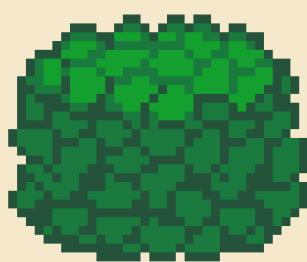
STEP 3

See that Step 2's example shows that the outline is thick and dark at the top. The intersection between the light top and dark sides looks a bit sloppy. Clean these issues up by performing the actions depicted in the below figure. Remove excess pixels and allow the darkness to "seep" in from the sides. ↴



STEP 4

Since the sides of the bush look a bit plain and flat, add some small highlights to make it appear more textured and rounded. ↴



WATER TUTORIAL

STEP 1

Figure out the shape of the water container, and fill it to the brim. This lighter blue on the edge represents a bit of foam. ↴



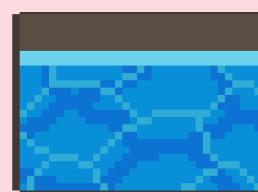
STEP 2

Add some thin ripple lines to the top of the water on a different layer. It's easiest to draw 6-sided shapes, like a sloppy honeycomb pattern. ↴



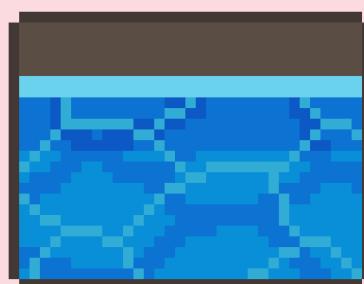
STEP 3

Decide how deep the pool is, and place little shadows for the ripple. These can be a bit thicker. Again, doing this step on a separate layer makes it very easy. ↴



STEP 4

Change the illustration so the viewer can see the side of the pool. Darken the lower shadows and the water to make it look like the pool wall is there. If an artist sets up layers correctly, this is fairly easy; just make sure the correct depth occurs. ↴







RODRIGO TEJERO

Rodrigo Tejero is a web developer (he's Mexican, so his full name is Rodrigo Antonio de la Torre Tejero, that's a mouthful, right?). He's 36 years old and owns a company called Chimp Web Studio, while, of course, being an aspiring pixel artist.

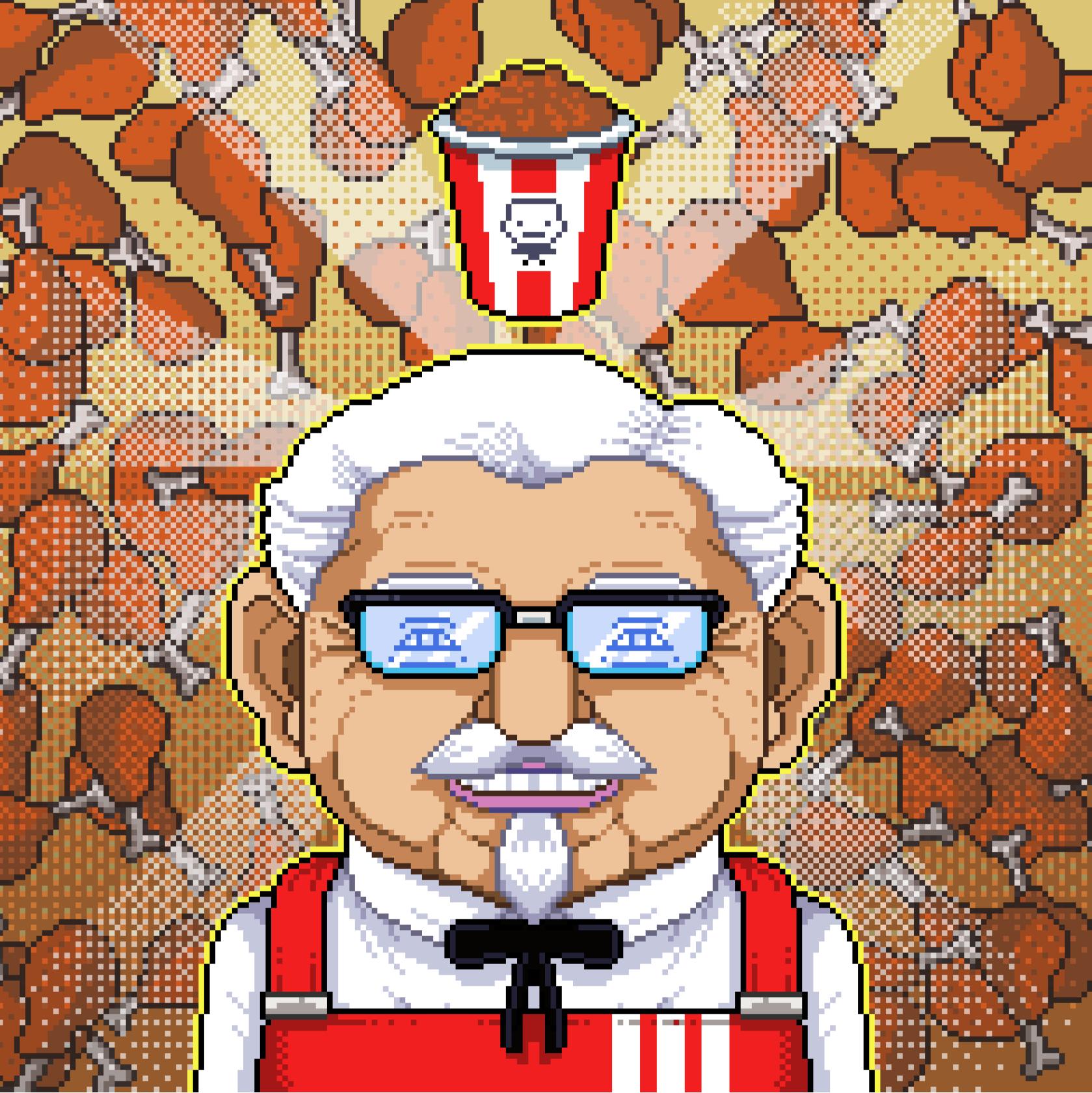
Rodrigo has been pixel-ing since childhood on MS Paint, and became obsessed with pixel art. At the time, not knowing it was called pixel art per se, but still loved it. Rodrigo also draws digitally and traditionally as a hobby, the kind of person who's always doodling.

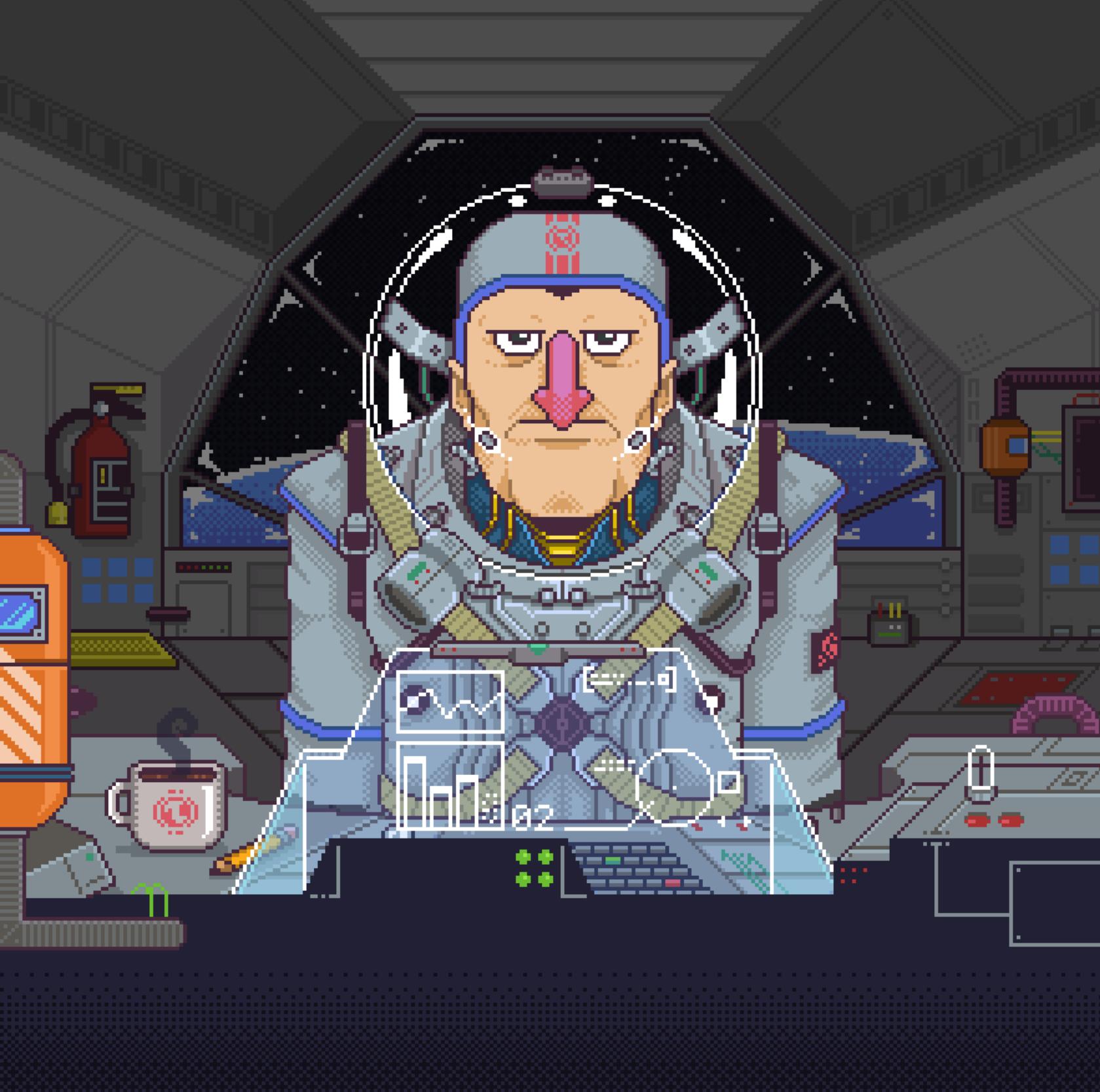
As a millennial, web developer, and overall geek, Rodrigo loves comic books, anime, manga, cartoons, and is very influenced by pop culture and 80's nostalgia. His pixel heroes are Eboy and Paul Robertson.









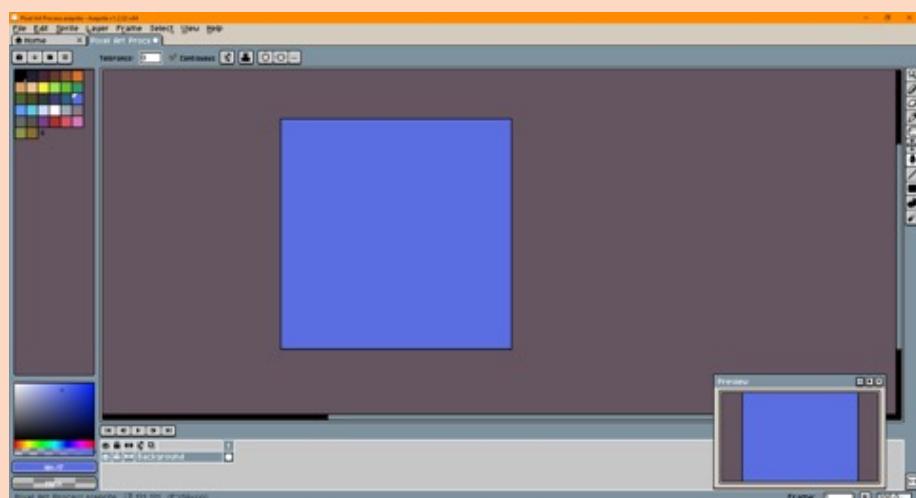


PIXEL ART PROCESS

Hello amigos, here's **ThePixelChimp** method.

STEP 1

This piece uses a canvas of 121x121 px (this tutorial uses Aseprite). **Aseprite** is great for pixel artists since it has many tools, like layers and animation frames. Create a "Background" layer with a color that allows the artist to see the pixel grid: ➤

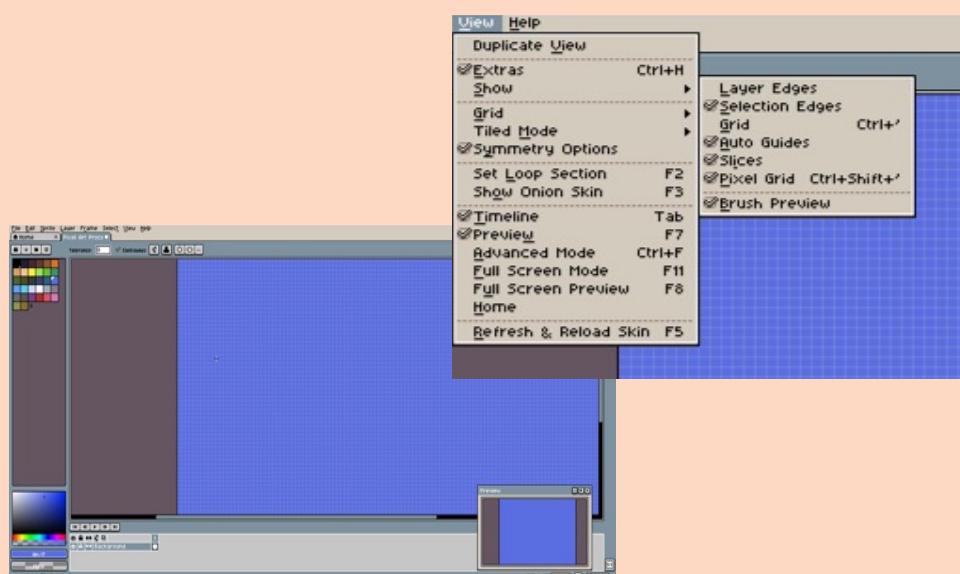


STEP 2

This blue allows the artist to see the pixel grid in the background.

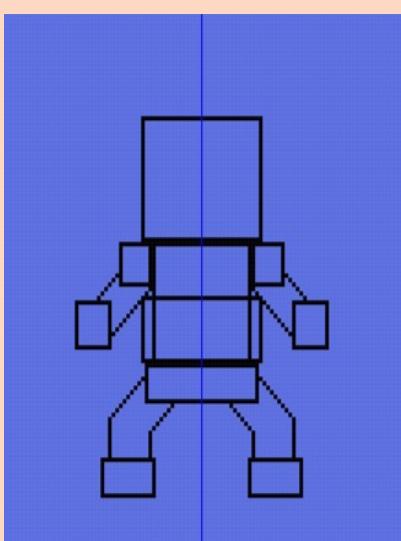
To toggle on the pixel grid, go to "View → Show → Pixel Grid"

For this piece, toggle the Horizontal Symmetry tool for drawing a perfectly symmetrical piece. That's why the canvas is 121 px in size – the extra pixel helps have a "center pixel." ➤



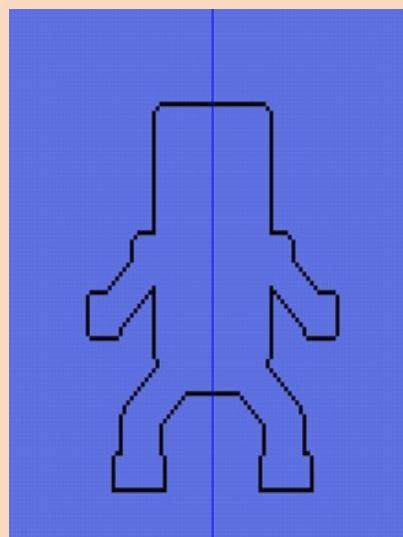
STEP 3

Let's draw a pirate; start with the base figure, and create a second layer on top of the "Background," called "Drawing." Start drawing shapes here. ➤



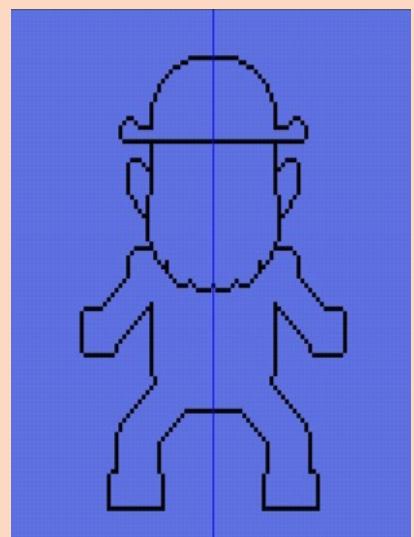
STEP 4

Set up the character's base wireframe. Remove the extra body lines so there's a clean outline. ➤



STEP 5

Round some of the rough edges, and begin to create the face. Start by drawing over the wireframe. The exemplified pirate has a big hat and a lot of facial red hair. Imagine the colors for the piece before adding any. ➤



STEP 6

Add the facial features and the rough body and clothes details. ➤

**STEP 7**

The pose is completely symmetrical, and that's not bad, but to give more personality and naturalness, let's change the pose slightly. For example, this guy has a treasure chest under one foot. ➤

**STEP 8**

Fix the extremities. Perhaps the two elements every pirate needs: a hook and a wooden peg leg. ➤

**STEP 9**

This is looking good! Add a fist to the right hand to give it more personality. Add more details, such as the coat looks like it disappears on the character's back, so it must appear behind. The treasure chest also needs some work, and how about making the clothes more detailed for a realistic touch? ➤

**STEP 10**

It's looking great! At this stage it's time to add color, the palette called, "AAP-Splendor128" gives a good range to work with.

Add the base colors. ➤

**STEP 11**

Start adding shadows and lights. It's very important to define where the light source comes from, which determines where to cast shadows and gives realism to the piece. Let's say that the light source comes from the top right: ➤



STEP 12

The pirate's left side will be under shadows, and their right side will be lit up.

Imagine and represent how the different elements in this piece would cast shadows over the others. ➤

**STEP 13**

Use darker tones to apply shadows of the same colors. Start to imagine how this piece would appear in 3D. Where are the bumps? Where are the small details, and how does light interact with them? Use the same technique for adding lighter tones to represent the shining light. ➤

**STEP 14**

Light gives a lot of detail and realism to this drawing.

Notice that the hard lines now look too "hard." The black outlines worked well to define the shapes, but the pirate now looks too heavy now that there's color. Fix this by adding softer colors to the lines inside the piece. ➤

**STEP 15**

Now all the outer lines remain black, while all the inner lines change to a color similar to the object it represents.

Add more detail – maybe a skull to the hat or more lighting features. ➤

**STEP 16**

Finally, add a background to give the character some atmosphere. Create a new "Scene" layer underneath the pirate character and illustrate a beach scene with water and a sky.

**STEP 17**

Lastly, add a small pixel gradient to the sky.

Here's the final piece! Remember, the most important thing to do is to practice, like, a lot. Thanks a lot, amigos. ➤







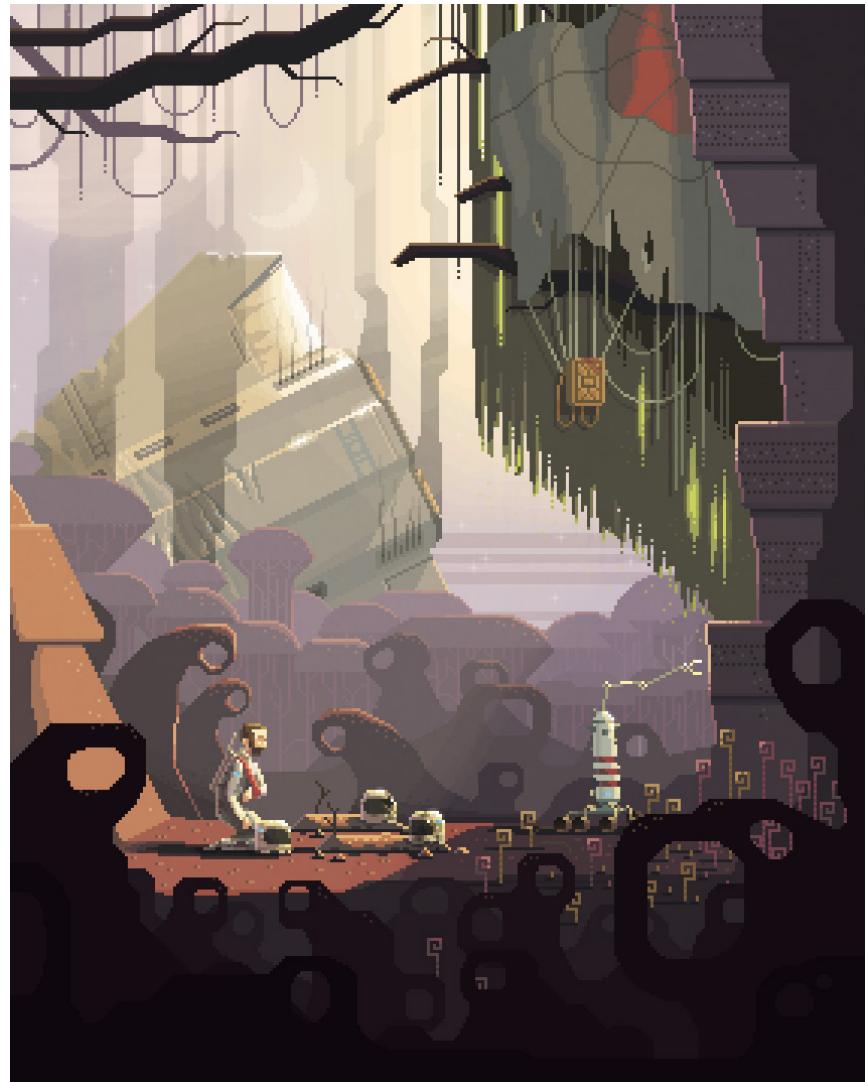
OCTAVI NAVARRO

Octavi Navarro is a self-taught pixel artist, a former children's books illustrator from Barcelona, and the creator of the Pixels Huh project – a love letter to pixel art and the classic video games that marked his childhood.

His work features in some of the world's greatest art and design publications, where he collaborates with extremely creative people that share his passion for pixel art and acknowledge it as a legitimate art form.

Working on video games like *Thimbleweed Park* and *Photographs*, Octavi has created his own game development label to combine his two biggest passions: art and video games.

Patreon: [octavinavarro](#)
Instagram: [octavi.navarro](#)
Twitter: [OctaviNavarro](#)
Website: [www.octavinavarro.com](#)
Redbubble: [people/pixelshuh](#)









THE FLOOD. VISUAL COMPOSITION

Scene #22: 'The Flood'

In this section, I'd like to discuss the visual composition of one of my pieces: 'The Flood,' one of the most challenging pieces I've done so far.

It's a tribute to those who can bring out the best, even in the most dire situations. I had the challenge of developing a suitable theme and visual composition that would reflect that feeling in the viewer.

Around the time I created this work, I read an article in a local newspaper about the sad reality of Brazilian slums. I decided that a fictional representation of their streets would be interesting scenery for this new piece. I found the colorful look of the buildings heartwarming in contrast with the harsh realities its inhabitants have to live.

After doing some pencil sketches based on the documentation I found, it was time to transform the idea into pixel art.

Pencil Sketch and First Layers of Color and Texture

The main protagonist of the scene is the water. It's one of the most difficult elements to depict visually, especially in pixel art.

Water looks quite different in floods from what we see in most natural environments: it stagnates after carrying tons of material, losing most of its transparency, and becoming a thick, dirty substance.

I used soft reflections and a very subtle transparency to make it look like a dirty mirror, especially in the foreground, where I could play with the details.

Let me point out some of the elements more in-depth on the following pages.

— Octavi Navarro



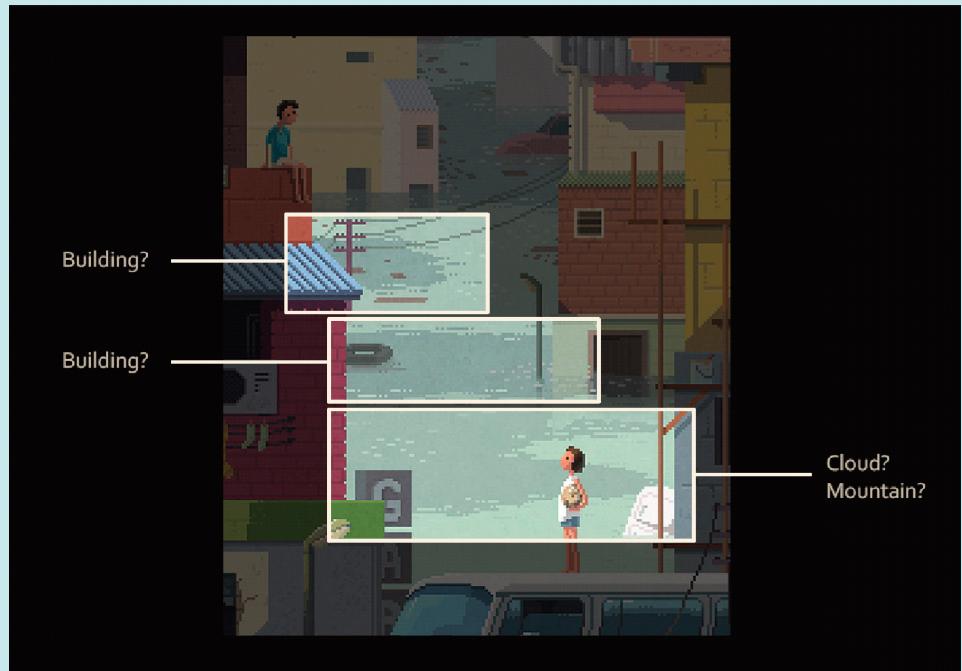
I wouldn't drink this water...

I painted the background much brighter than the foreground, so that I could focus the viewer's attention on the space between both children. Notice that the highlights create an imaginary diagonal line that follows the characters' line of sight. ➤



The viewer's eye will focus on this highlighted zone (between the kids).

This sunlit background allows me to show items, like buildings, that are hidden from the viewer, but the audience can feel their presence thanks to the light's shadows. ➤



The shadows hint at some elements.

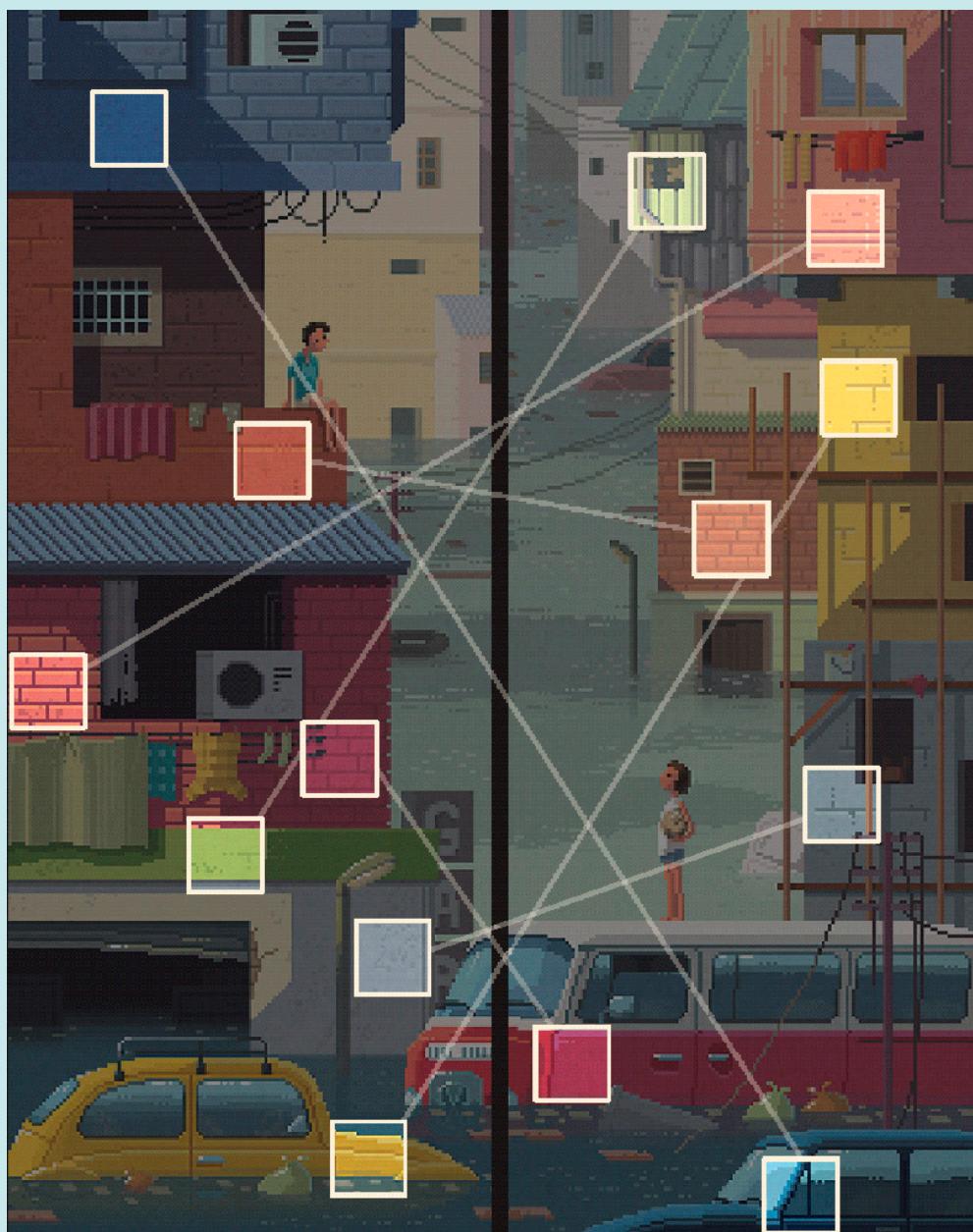
I love the effect of “hinting without showing.” It’s pretty fun and captures the viewer’s imagination.

With so many bright and lively colors, it was easy to make the scene feel messy and confusing.

To avoid this, I used a little trick: every color in the left half of the composition has a counterpart in the right half. That way, the whole piece feels balanced despite the apparent chaos:

A color-matching game!

I hope this little peek into the creation process of my pixel art pieces was enjoyable. ➤



WATER LOOKS QUITE DIFFERENT IN FLOODS FROM WHAT WE SEE IN MOST NATURAL ENVIRONMENTS: IT STAGNATES AFTER CARRYING TONS OF MATERIAL, LOSING MOST OF ITS TRANSPARENCY, AND BECOMING A THICK, DIRTY SUBSTANCE.





MUCHO PIXELS

With its penchant for bright, vibrant hues and timeless 8-bit artistry, entertainment brand Mucho Pixels is aiming to become a benchmark for pixel art products and content for new generations.

Created by Daniel Benítez and Jesús Garrido, the creative duo of Mucho Pixels combines Daniel's experience in developing video games with Jesús's digital effect creations. Both of them together bring a remarkably unique style to their productions.

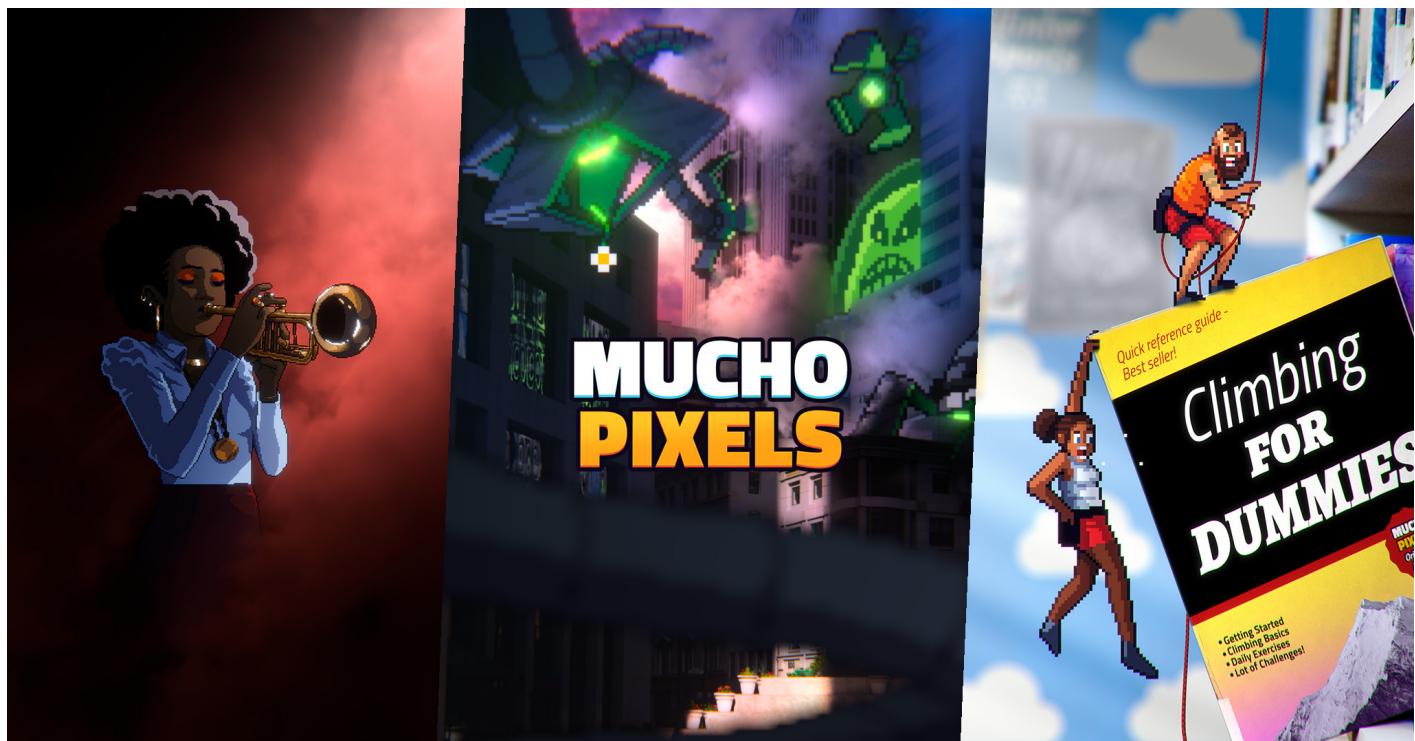
The studio started as a hobby in their free time, as a way to experiment with mixing

Pixel art over real images. After a few posts on Instagram, the response from the community was amazing, and it has managed, in just two years, to go from being a small profile on Networks to a brand with more than 40 thousand followers.

The development of independent video games is an essential part of the brand, and their contact with developer communities

are crucial to understanding entertainment in their own special way.

Mucho Pixels produces not only games, but the assets for creating them, making them a direct connection with the gaming industry.





However, the spearhead of the brand is purely audiovisual. For the first time, a pixel art profile turns to producing audiovisual clips. By using advanced digital compositing techniques, the viewers will be surprised by a myriad of pixelated elements that co-exist with reality.

Mucho Pixel's latest projects have been for companies like Netflix or WhatsApp, and they're also releasing other kinds of content, especially posters and short videos.

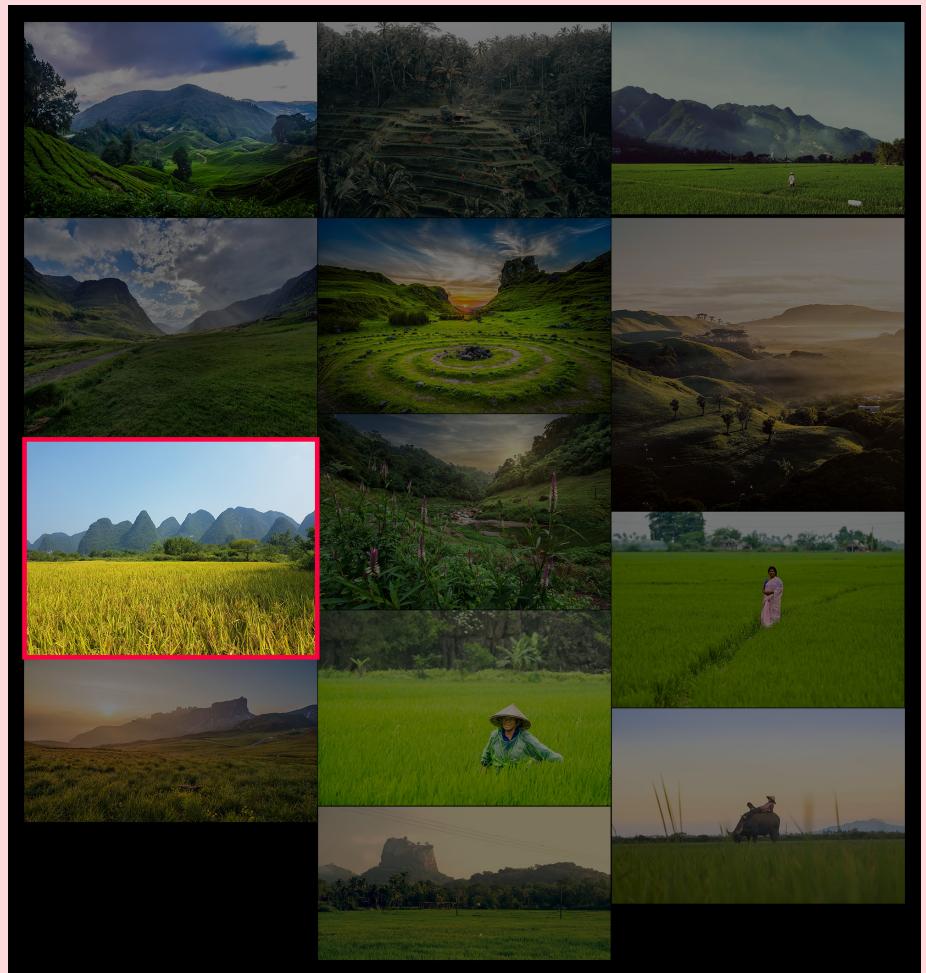
It's just the beginning!

BUNS & BOMBS

STEP 1

Start creating the shot by first choosing the genre and theme. We (as Mucho Pixels) often have many genres in mind: Western, Musical, Sci-fi, etc. Most of the time, we follow our instincts, but on other occasions, we browse through the Unsplash website, saving environments where we easily imagine a story happening.

We try to conceptualize the overall idea of the shot, planning the camera movements, the characters involved, the storytelling, etc. We started looking for references and pictures that we could use for our background. ➤



STEP 2

At that point, we work simultaneously, sharing progress to ensure the work is going in the same direction:

Jesús Garrido using **NukeX** for the VFX and compositing.

Daniel Benitez using **PixelEdit** for the pixel art components. ➤



STEP 3

“Block the acting”: it’s time to draw characters’ poses to communicate the message. Render a rough version of the shot to ensure the storytelling is clear. Once happy, move to the main characters’ animation. ➤

**STEP 4**

Use the same character dimensions to optimize the development from one video to another. We also try to make the characters expressive enough. In pixel art, that means exaggerating the gestures and poses. ➤

**STEP 5**

For the secondary characters, try to change elements (such as a character’s skin tone) to save time and make the piece dynamic. ➤



Scan for
“Characters”
Animation



STEP 6

The helicopters only need animation on the blades. The tank only needs animation on the wheels, so we created sprites in **PyxelEdit** and moved them directly to **NukeX**.>

**STEP 7**

The beginning of building the 3D set-up, take the original photo and separate the different elements, like the sky, background mountains, and trees. Once the camera moves, we achieve a 3D effect by projecting these onto basic geometries, like cards. We apply a soil texture for the ground and then use particles to generate all the grass. A few different kinds of grass are randomly emitted from plane geometry to fill the ground.

**STEP 8**

It was really important to have a soil texture underneath, so once the explosions finish or the tank passes, the soil is revealed, giving a better feeling for the aftermath. At this point, we add shadows so the characters and vehicles feel connected to the ground.>



STEP 9

Once we have all the characters' animation, we place into the 3D environment on cards that populate the fields. Add Motion Blur to the characters and vehicles so the movement doesn't look stuttery. ♡

**STEP 10**

Here, we decide to use 2D hand-painted elements from our asset library for the FX and explosions. Mixing a real image, pixel art, and these 2D elements works well. ♡

**STEP 11**

We add one last foreground layer of the burgers and drinks. By placing all the elements in a 3D environment, we can correctly apply a defocus to the image, based on the depth of each element. ♡



STEP 12

Once we have a final shot, we complete color correction and add lens distortion, chromatic aberration, optics, grain, and other integration adjustments since we're bringing together all these elements into the same world.

We used **Epidemic Sound** to find the perfect sound effects and music tracks. The sound editing occurs in **Adobe Audition**, with the final video integration in **Adobe Premiere**.>







APOONTO

Miky Arias (aka Aponto) is a Spanish pixel artist who quit his career as an advertising creative to look for opportunities in the video game sector, and finally found that pixel art held many more possibilities.

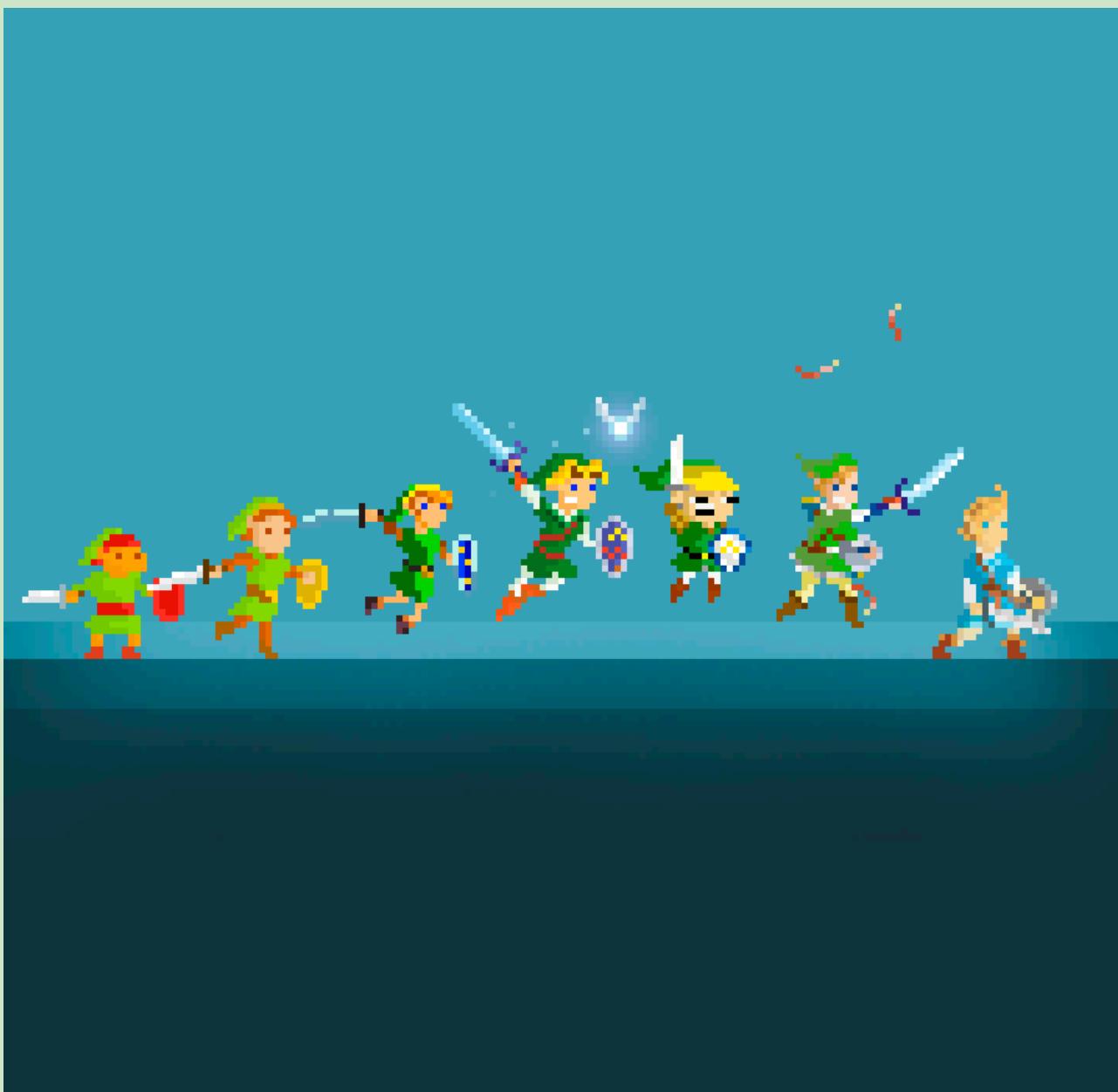
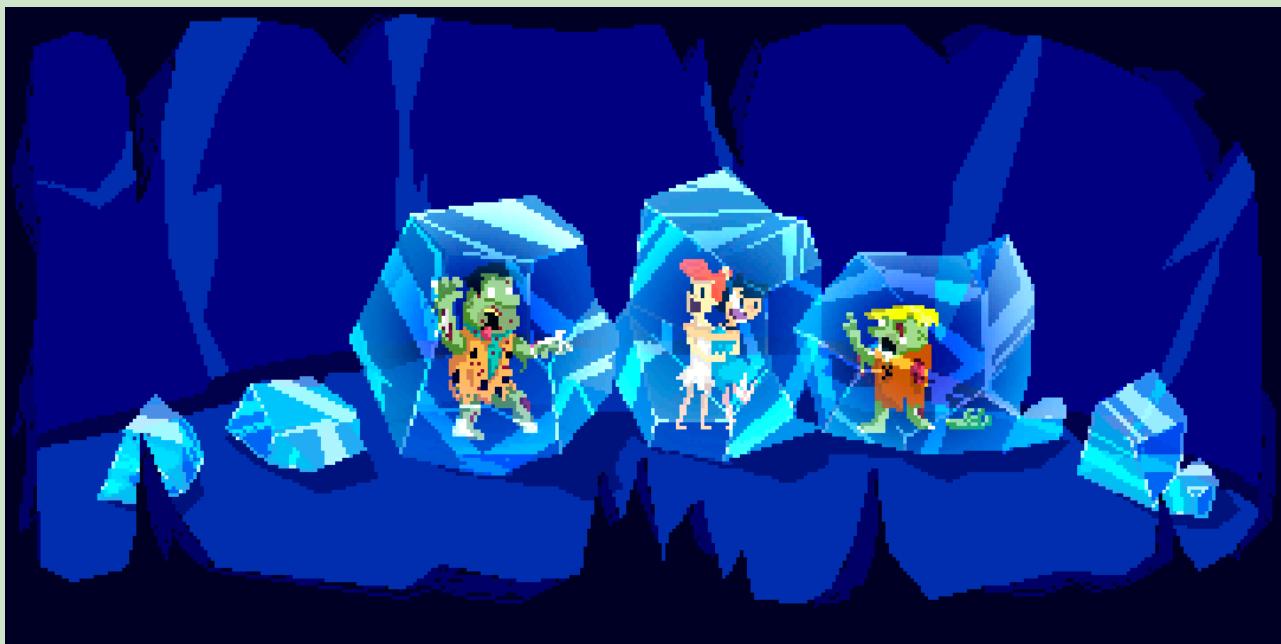
One of those pixel art possibilities was the ease for any piece to become “something alive,” but it was in animation that Aponto found his true passion. Despite being a total artisanal discipline, these animation types’ control and versatility are ideal for an artist focussing on content over form.

Unlike other artists, Miky Arias does not seek to achieve a unique and defined visual style. He develops his pixel art work as a vehicle to create and tell audiovisual stories, usually focused on humor and gags.

Although he’s collaborated in different video games, some of his best works are elsewhere. For example, Aponto has created over 50 intros for the Gamelab 2020 event and conceptualized (and designed) numerous music videos for groups around the world.















LUIGI SALAS

Luigi Salas is a self-taught, UK-based freelance pixel animator and motion designer, while creating educational pixel animation content on Instagram and YouTube!

Luigi has worked within the music, gaming, and advertising industries creating storyboards, concept art, animations, and stories for brands looking to bring their work to life. Recently, Luigi has shifted towards teaching online, intending to make pixel art and animation accessible to everyone – no matter their circumstances.

The pixel art displayed in the following pages is a collection of personal projects over the years and a few major clients works.

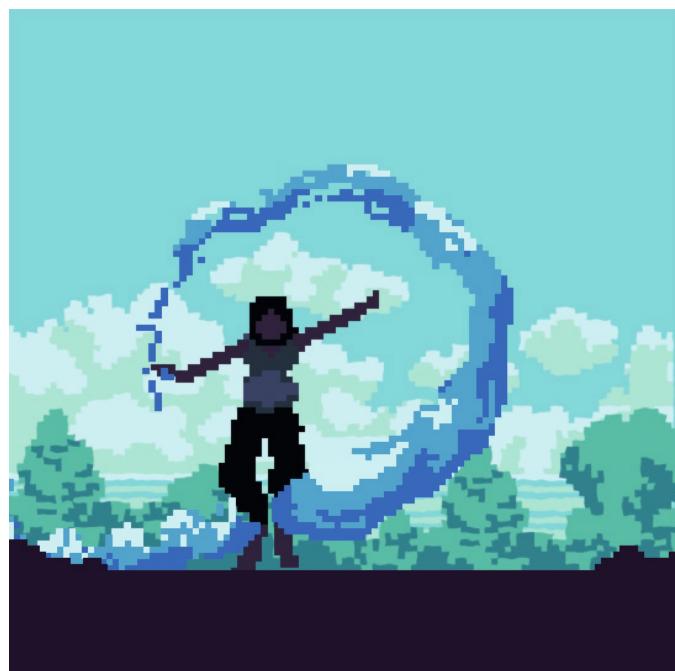
"I aim to test myself with every new piece, be it focusing on my environment designs, character animation, or even telling stories with limitations – such as limited color or detail."

Instagram: [luigisalas_](#)

YouTube: Luigi Pixel Art

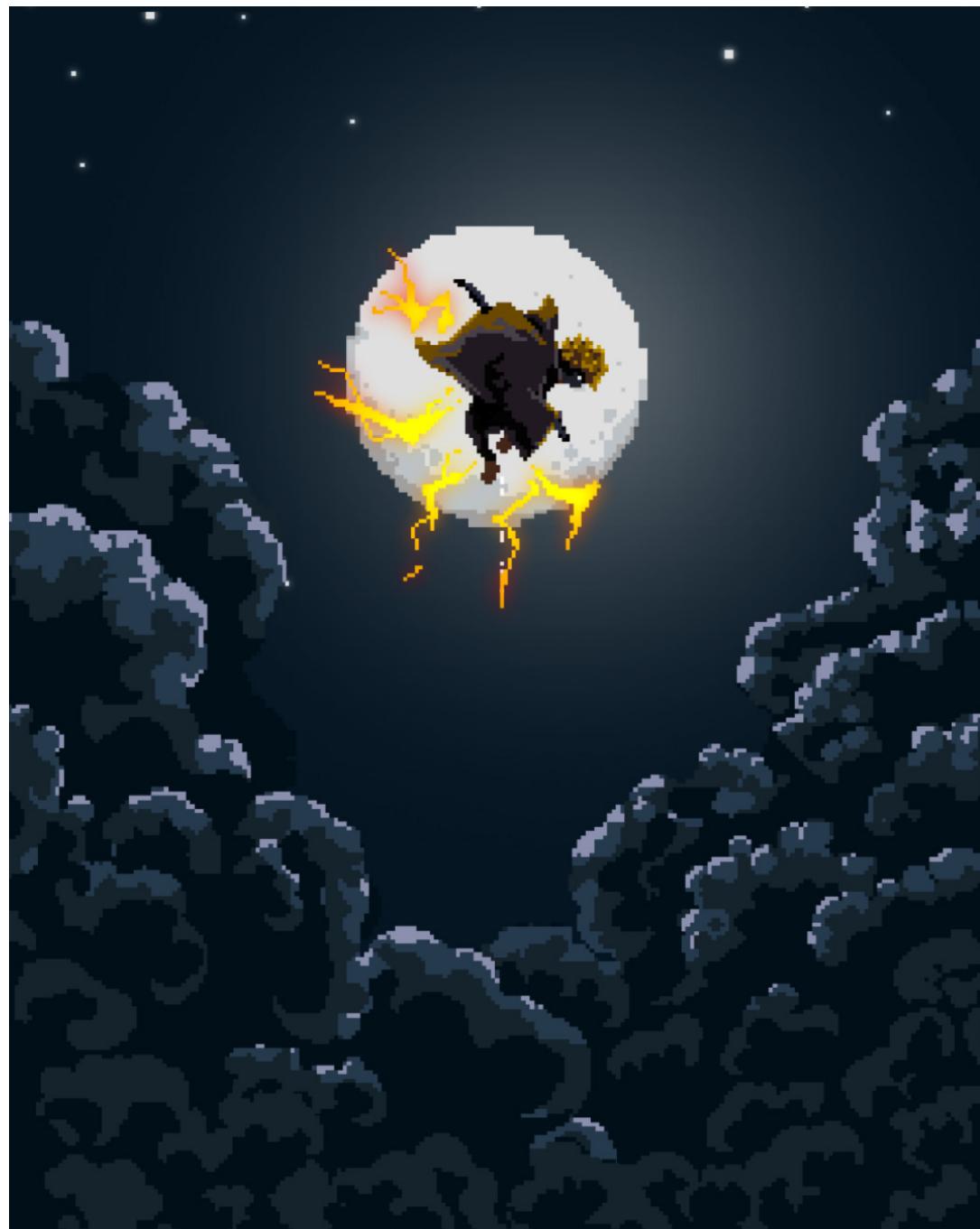
Showreel: [luigismotiondesign.myportfolio.com](#)













MD



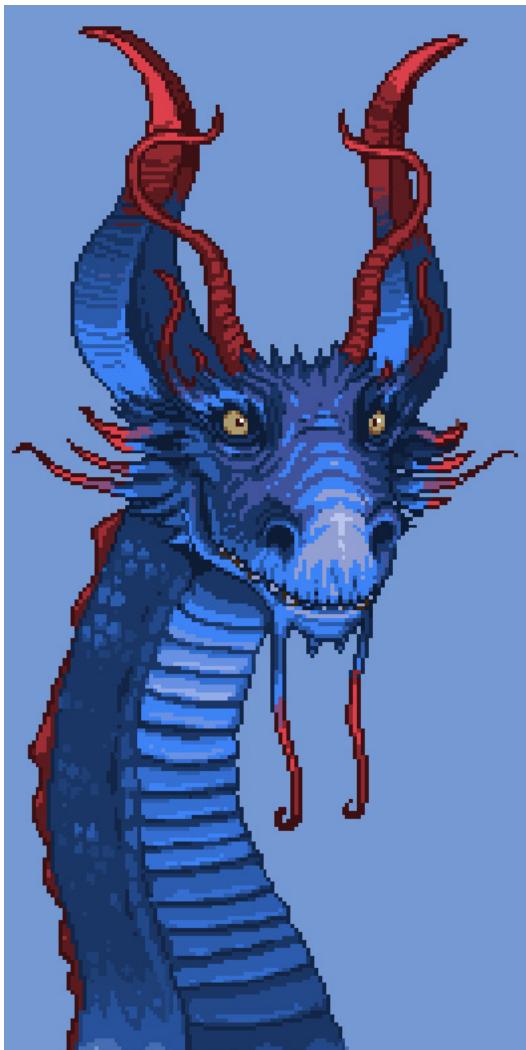
MIKE OAKLEY

A lean, mean, pixel art-making machine for over 30 years – starting as a teenager with a hobby working on an *Amiga* demo scene to becoming the principal artist for a UK-based award-winning game studio.

Mike's first-pixel art piece was an *Amiga* demo scene when he was just a teenager. The hobby soon became a profession as he found work as a pixel artist and was fortunate to work on some incredible games. When Mike's not doing pixel art (generally mostly for fun these days), he's a principal artist for an award-winning game studio in the UK. Besides art, Mike also loves watching 80s movies, listening to soundtracks, playing acoustic guitar, and writing novels.

Instagram: mickeypixelart









TREE TURTLE TUTORIAL

STEP 1

The first pass is about working loosely, scribbling down shapes, hinting at details, and trying to capture the overall goal. An artist needs to switch their brain off from overthinking the pixel art elements in the piece. First and foremost, an artist is creating an illustration that also happens to be a pixel art image; it's essential always to keep that in mind. ✎



STEP 2

STEP 2

After an artist creates the rough layout, it's time to think of the image as pixel art. Clarify the lines with a Pixel Dot tool (similar to **Photoshop's** pencil tool). The lines are still rough around the edges, but this pass clarifies the image's final look. ✎



STEP 3

Once laying the outline down, block out the colors and shading. It's important to maintain energy in the work, so if tackling details too early, the artist could lose the energy. Only do the final detailing as a final pass. Artists are less likely to want to change an element if they've already spent a long time. Keep the work quick and rough until the details work themselves out. ✎



STEP 4

With everything blocked in, start working on the meticulous pixel work. As an observer can see from the turtle's head, replace a lot of the original line work with natural-looking shading and texture. Sometimes the outlines can serve as a guide, as they are in this illustration. ✎



STEP 5

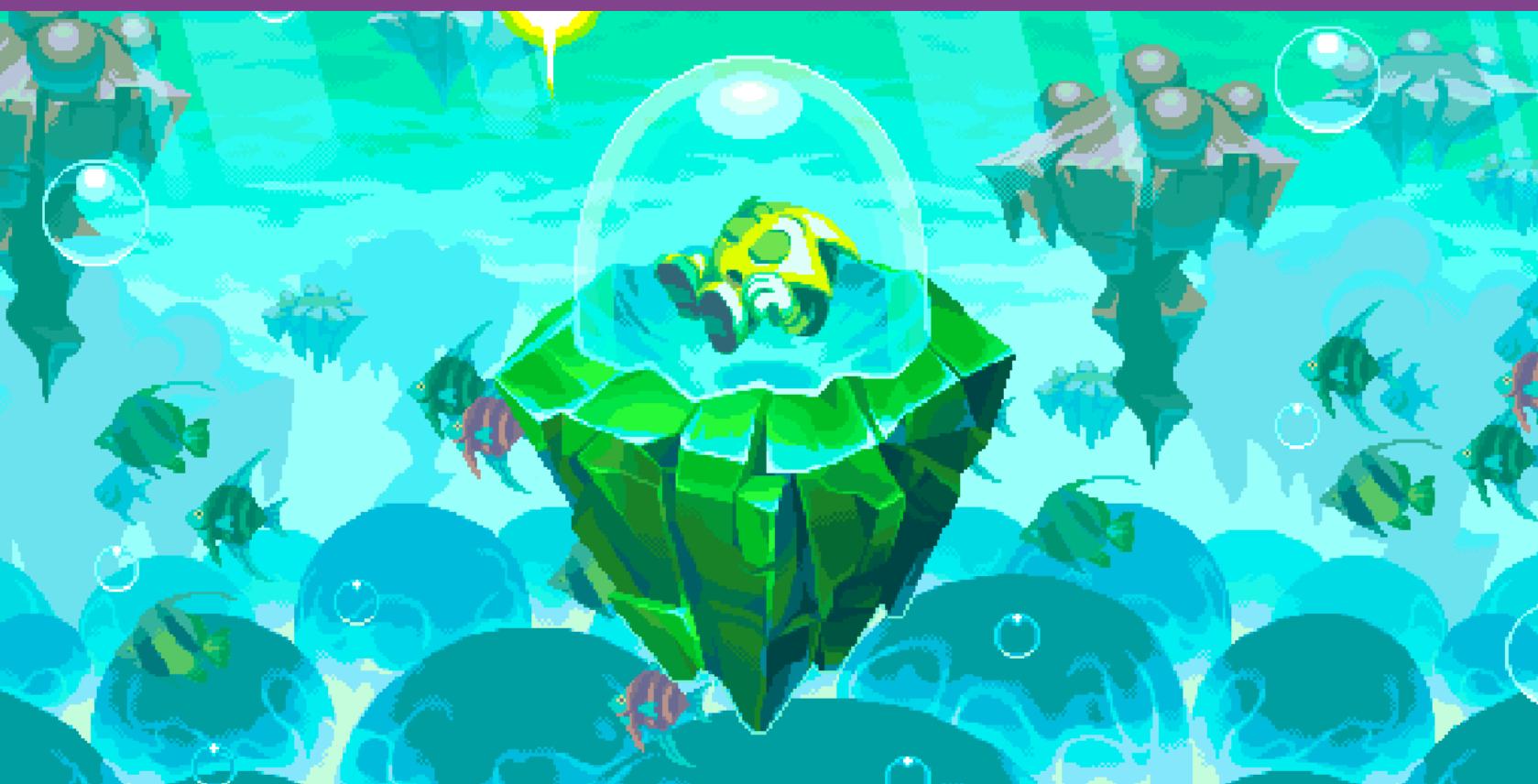
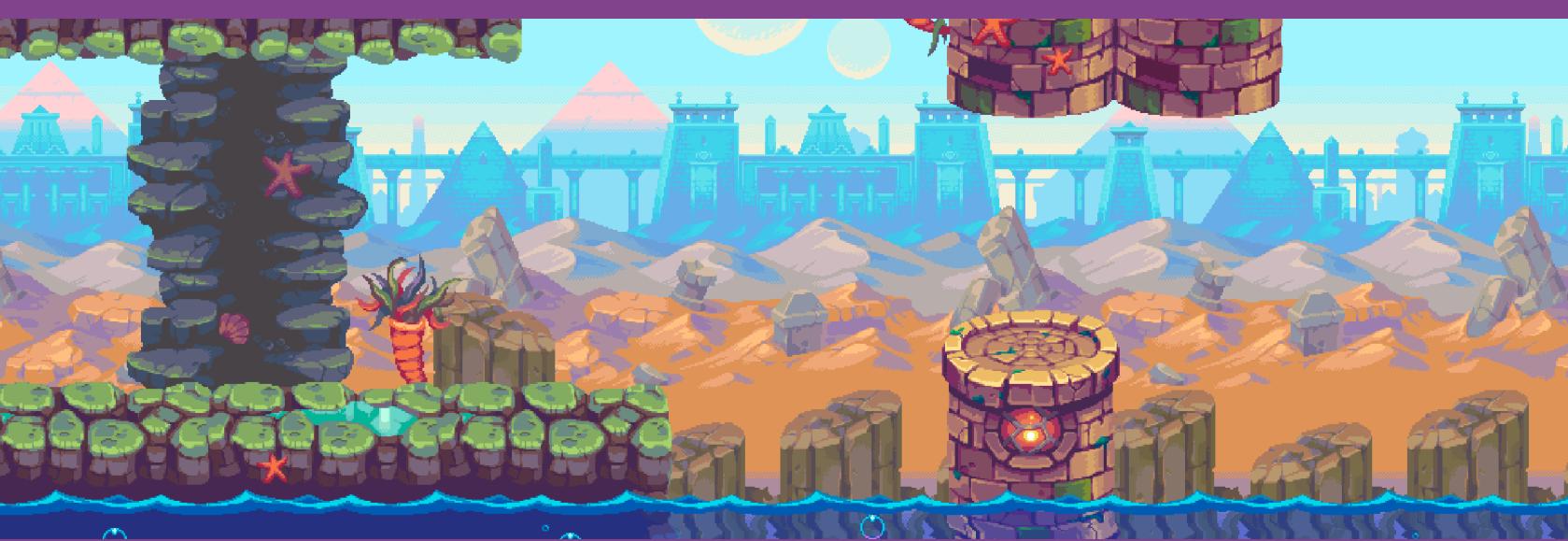
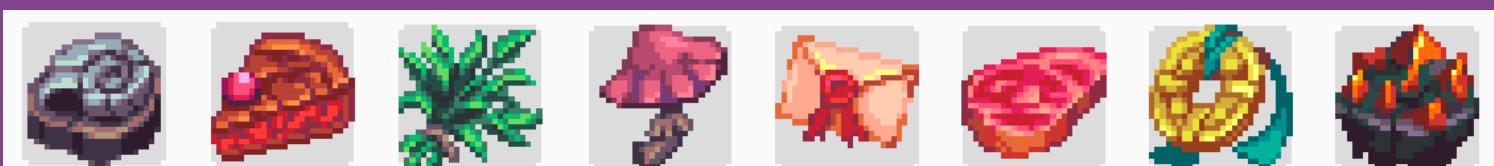
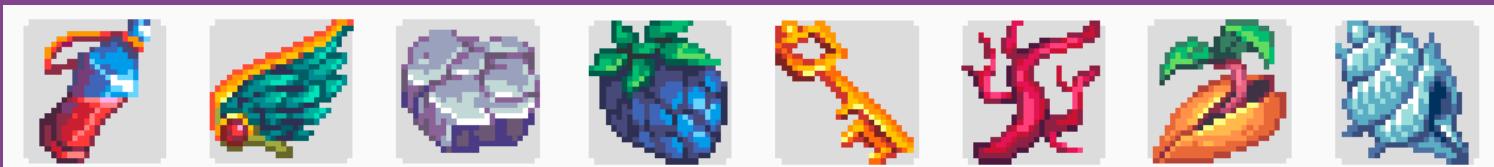
With the details slowly coming together, look to balance the colors further. It becomes apparent that the tree blends too much with the turtle. It is always important to step back from the work and look at what is visible at various stages. Paint in four dimensions, convey that every element in the picture appears from an intentional atmosphere. ✎



STEP 6

Once all the final details are in, do a color grading pass over the whole image. With the best will and intention, the image usually becomes darker and muddier than an artist prefers the final look. A color grading pass unifies the picture and gives it a much-needed visual boost. ✎







NERKIN

Jesús Campos (aka Nerkin) is a Spanish 2D artist who works in the video game industry – specializing in environments, concept art, and (obviously) pixel art.

Nerkin works at the indie video game studio, The Game Kitchen, in Seville, Spain. Nerkin has worked on the video game *Blasphemous* and its DLCs, which is anticipating its sequel in late summer 2023, along with a few other projects.

Nerkin is a big fan of pixel art from the 90s, and he finds them very inspirational, even trying to learn from the classic Japanese masters (SNK, Capcom, Konami, SEGA, etc.). In his free time, Nerkin makes “mock-ups”

of classic games in pixel art (recreating a game screen he imagined or a pixelled recreation of an existing shot). Find some examples on the following pages.

Nerkin’s biggest advice for beginner artists looking to improve their skills is to make mock-ups – learning how to create a style, choose the color palette, make tileable elements, create parallax layers, design a main playable character, immerse viewers in a game’s interface, and more!

Understanding the pixel art language is fundamental, especially for video game creation. It’s also a lot of fun to try different genres and styles, similar to completing exercises that strengthen muscles in the body.

Twitter: NerkinPixel

Artstation: nerkin

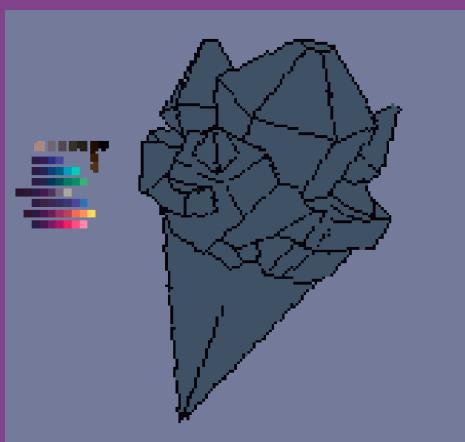


ELECTRO POTION TUTORIAL



STEP 1

It is important to decide what resolution the artwork will have in advance. It won't have much detail if it's too small, but it will be exhausting to create if it's too big. An artist chooses the correct resolution based on the element they're creating and their own artistic style. Draw the element's basic lines and create a color palette. ✨



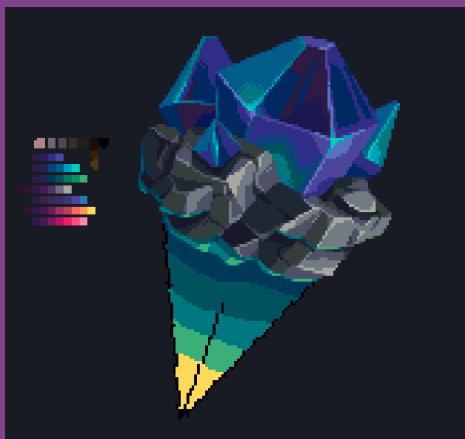
STEP 2

This step is very fluid and fun; it's time to test the color palette and adjust. The magic potion contains electrical properties, so the top resembles rock and gems, while the bottom is a glass filled with liquid. ✨



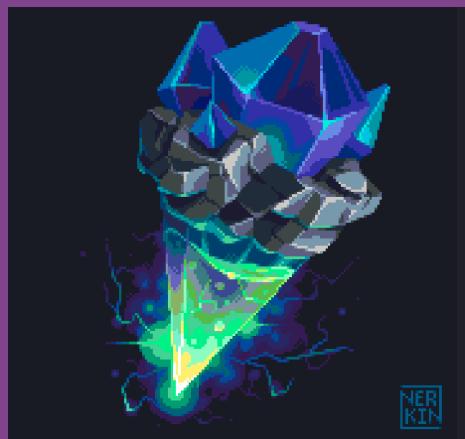
STEP 3

It's time for the hard work! This step is where an artist creates all the final details and textures, so it's the most extensive. Add glitters and reflections while making more color corrections. The top part is complete! ✨



STEP 4

Finish the lower part and add new details (such as small bubbles and rays). Finally, apply image corrections: saturation, brightness, contrast, etc. Don't forget to add an artist's signature... and the piece is finished! ✨









1984 Pxls

Richard Townend (aka 1984pxls) is a pixel artist and game developer, based in London, UK. — creating art that fuses nature and technology.

The primary focus of 1984pxl's artwork is their fusions, such as cybernetic plants, robots, and animals.

While a viewer could interpret this style as futuristic, he is inspired by the notion of advanced ancient civilizations and lost technologies — as though his subjects have been unearthed and reawakened.

1984pxls typically uses muted palettes accented with bright colors.

Instagram: [1984pxls](#)

Twitter: [1984pxls](#)



1984pxls

1984pxls



ଶ୍ରୀମଦ୍ଭଗବତ



ଶ୍ରୀମଦ୍ଭଗବତ



הַשְׁׂרָפָה



גָּדוֹלָה



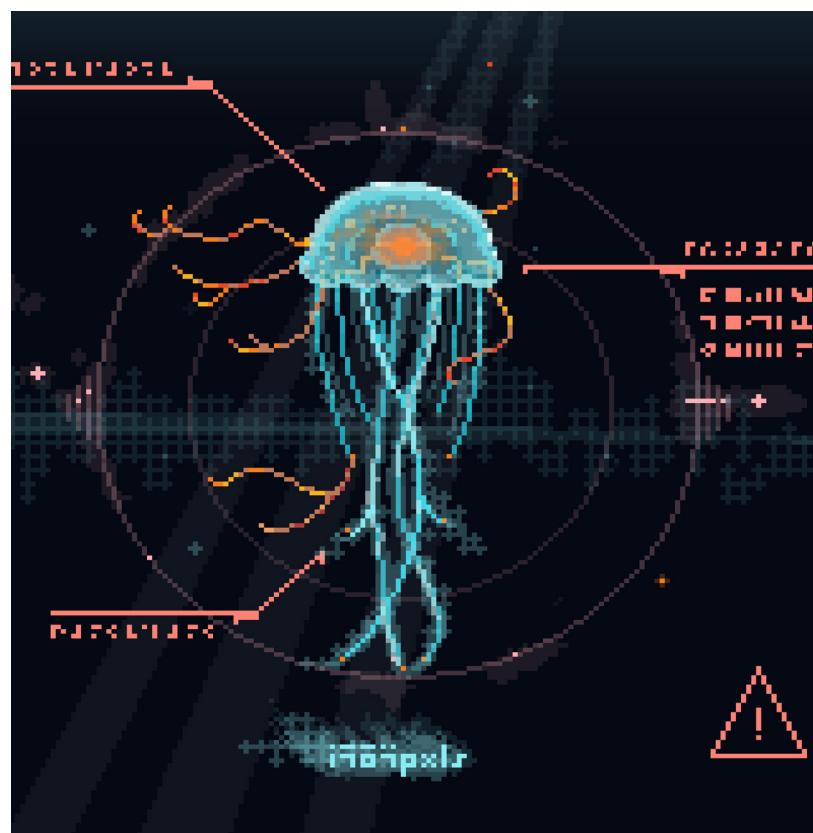
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1600px x 1600px



FUTURE RETRO TUTORIAL

The following process is an overview for artists to create their own cybernetic creature. These steps apply to animals and plants alike – with the addition of robots and other technological subjects.

STEP 1

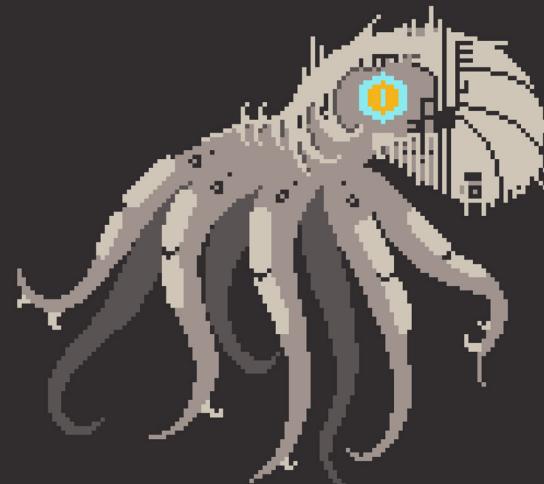
Start with the silhouette. A strong composition is essential to the success of a piece. An artist can sculpt a simple grayscale silhouette until the subject is readable with a visually interesting shape and arrangement. It also allows for quick iterations – not every arrangement is successful, so establishing an effective composition allows confident progression. ▶



STEP 2

It's time to power up. To portray the technological component, focus on integrating a power source and robotic/armored plating.

With the silhouette defined, it becomes simpler to define the subject's contours and locate natural positions for any plating to sit. This approach creates a more harmonious fusion of beast and machine and sells the idea of symbiosis.



Typically the eye becomes the focus of the piece. Introducing a power source in this location draws the viewer's attention – suggesting that this fusion fundamentally alters the subject. ▶

STEP 3

Ready for the details? Place the plating – typically populate further with circuitry and wiring. Bold colors are helpful to accent plating, indicating lights, switches, and cables. Add moss and blemishes to the plating to give the subject context.

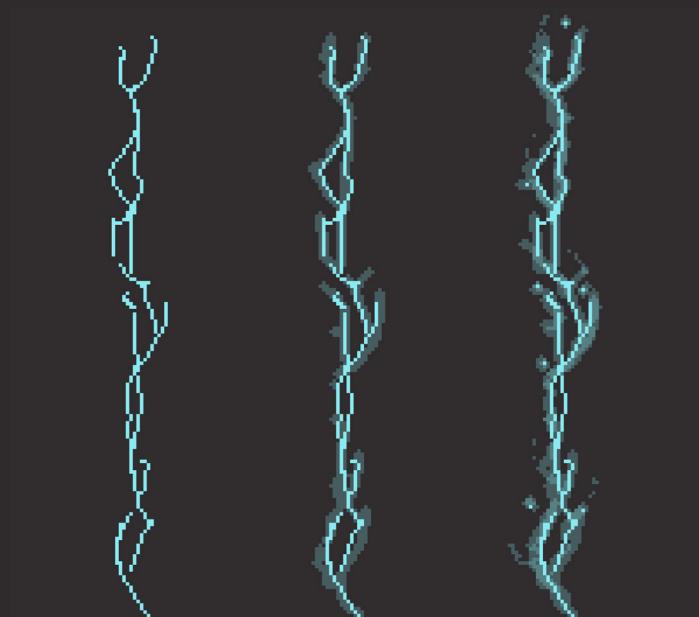
Use hanging cables to sell the context further to tweak the composition and break smooth lines up for visual interest. In this piece, take the same approach for the plating. Vertical and horizontal lines are cut in and out of the plating around the creature's head to break the smooth exterior profile. ▶



STEP 4

A primary feature of the 1984pxls' work style is integrating a power source or flowing energy. Draw a simple energy "surge" using a single bold color to achieve this look. Using the same color, overdraw this line with two or three layers of varying opacity (15-35%).

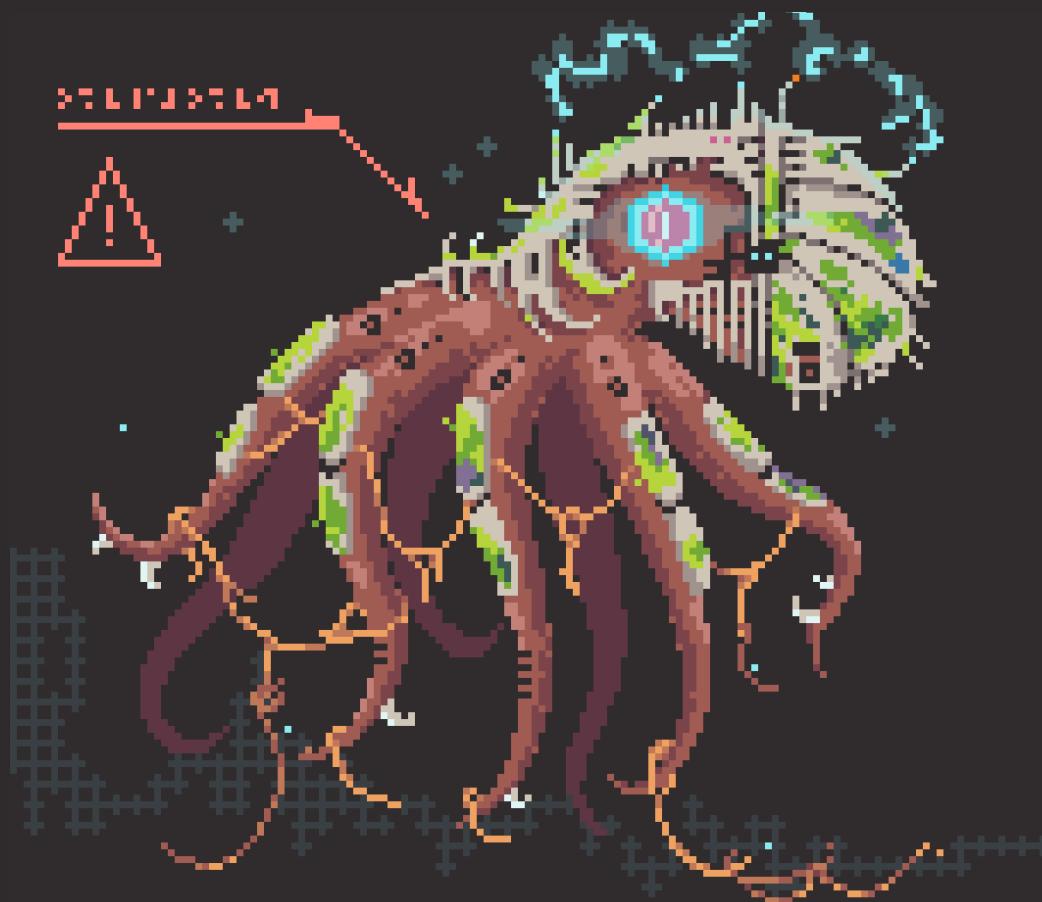
Apply these layers relatively loosely with a three-pixel brush. The low opacity gives a feeling of light emission. A stronger color develops where these stacked layers overlap, creating a more natural, organic feel. Use this approach for highlighting the main subject, and tinting the underlying color. ▶

**STEP 5**

To finalize the piece, perhaps it requires color balancing. For instance, introduce contrast to the body of the subject and the eye (noting that the red-ish brown and green are nearly complementary colors). Similarly, add accents and further contrast to the spark of electricity around the subject's head and the particles around the body.

Highlight the eye using the previous opacity method explained above – adding life to the subject and focusing the viewer's eye on the piece's main part.

Implement pseudo-writing and eye-catching symbols to further add to the mystery and subject's context. ▶



JUDGE OF PIXELS

RELAX, ENJOY & HAVE FUN!

YOU CAN
DO IT!





MISLAV MAJDANDŽIĆ

Mislav Majdandžić is a Croatian pixel art teacher and indie game developer known for his relaxed and beginner-friendly approach to learning.

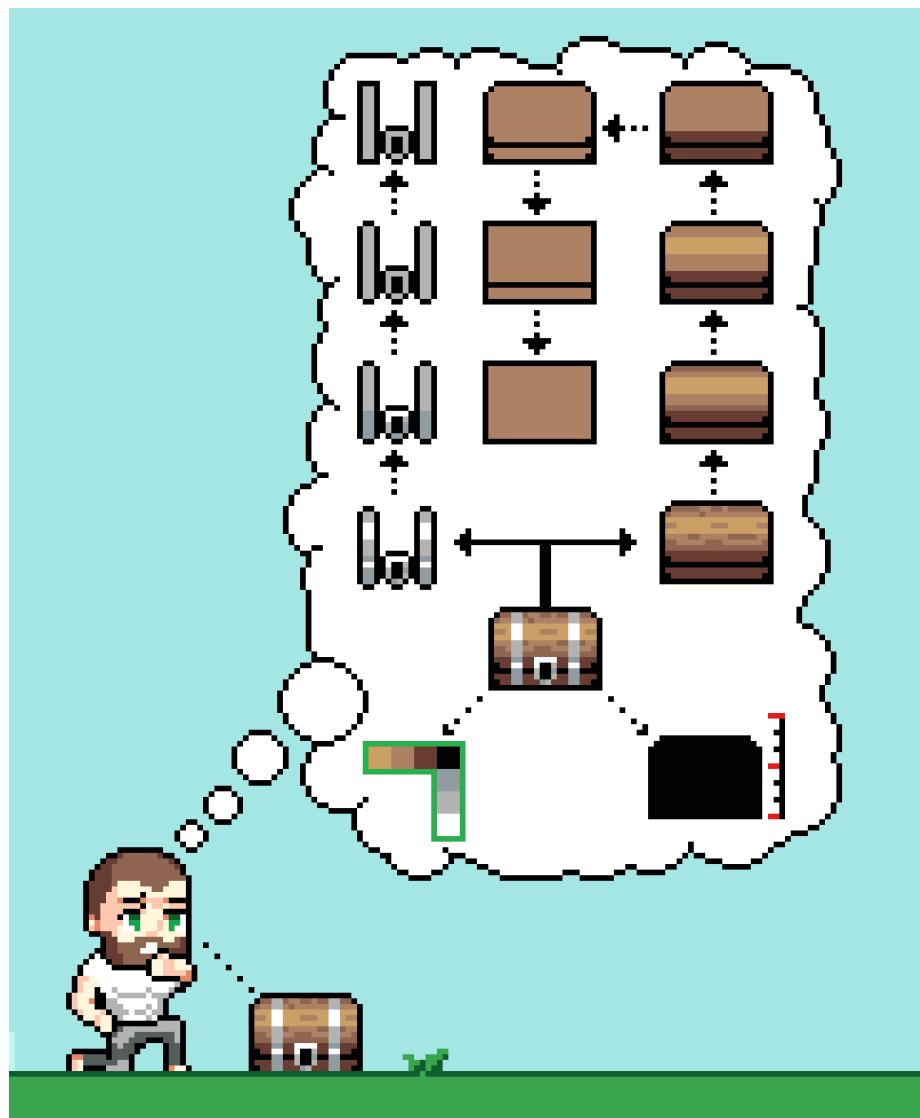
Mislav has enjoyed creating games from early childhood, and once discovering the Unity game engine years ago, he decided to start making video games. There were many forms of digital art to dive into, but he decided to go with pixel art since it held a special place in his heart from all the games he'd previously played.

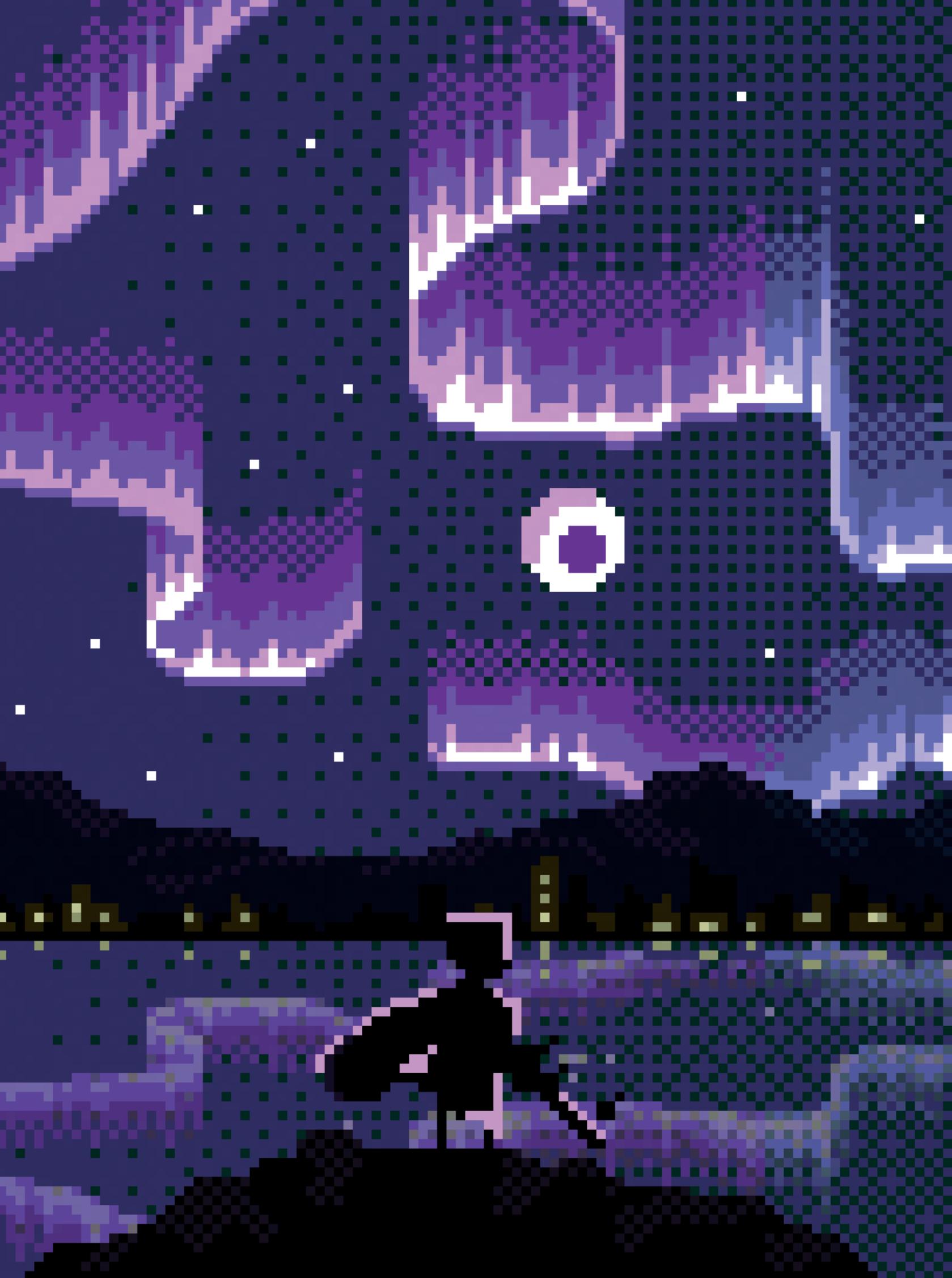
Mislav has worked as a freelancer for a few years, where it was fun to learn different art styles.

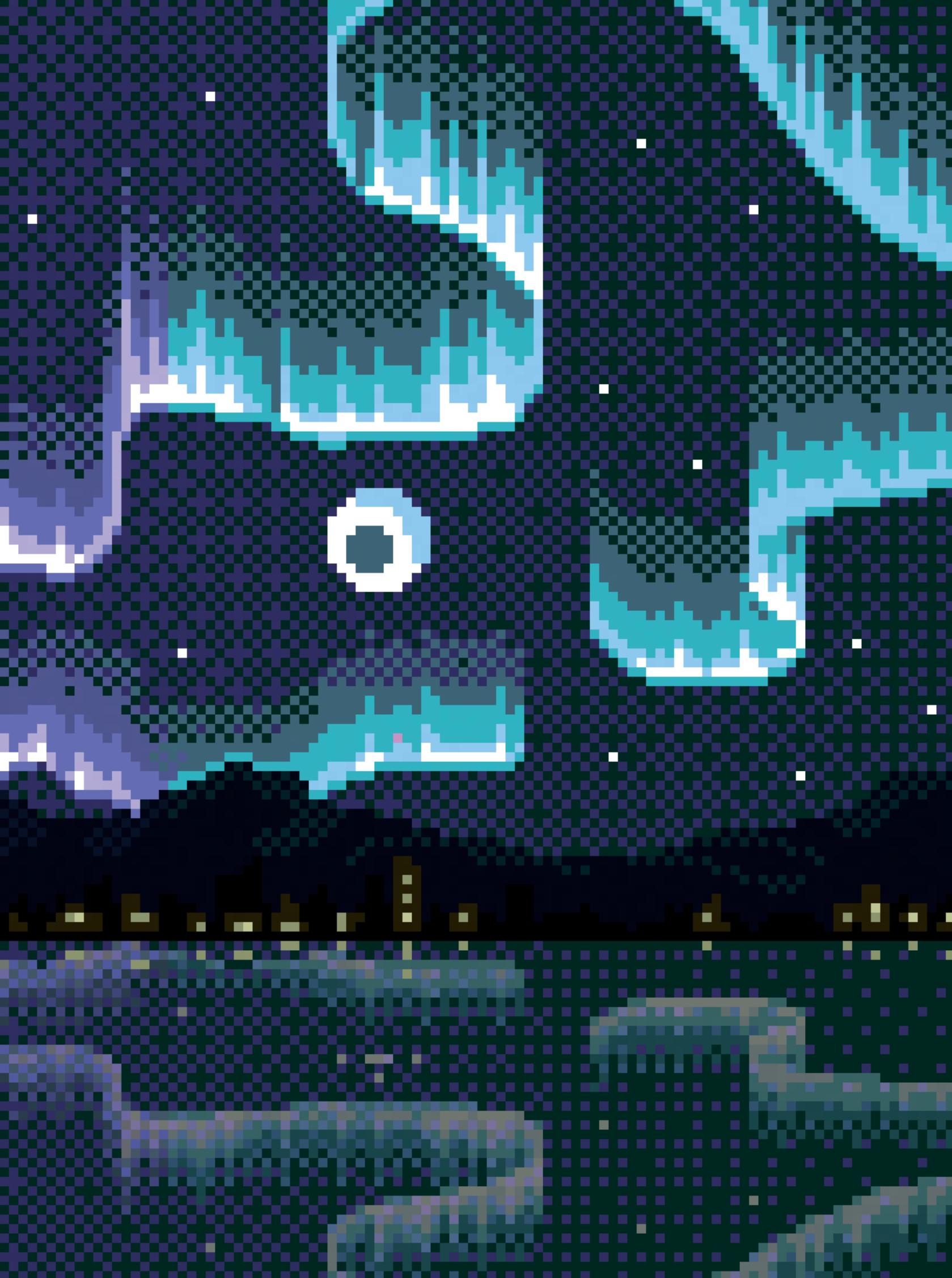
After a few years of experience, Mislav decided to share his knowledge online and started teaching pixel art on websites such as Udemy and Skillshare. The course has over 50,000 wonderful students gathered from all over the world. Teaching others is a special source of joy for him.

Mislav is building his brand, 1 Bit Studio, which focuses on creating pixel art games and teaching pixel art to create the best online source for pixel art knowledge as his long-term goal.

YouTube: 1 Bit Studio
Website: www.1bitstudio.com







STYLE BREAKDOWN

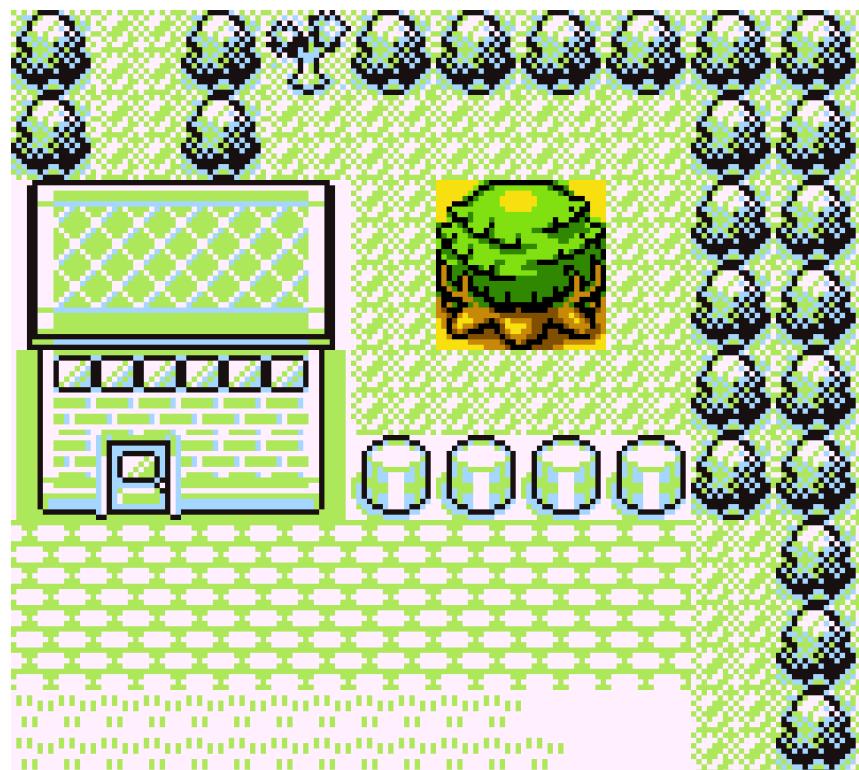
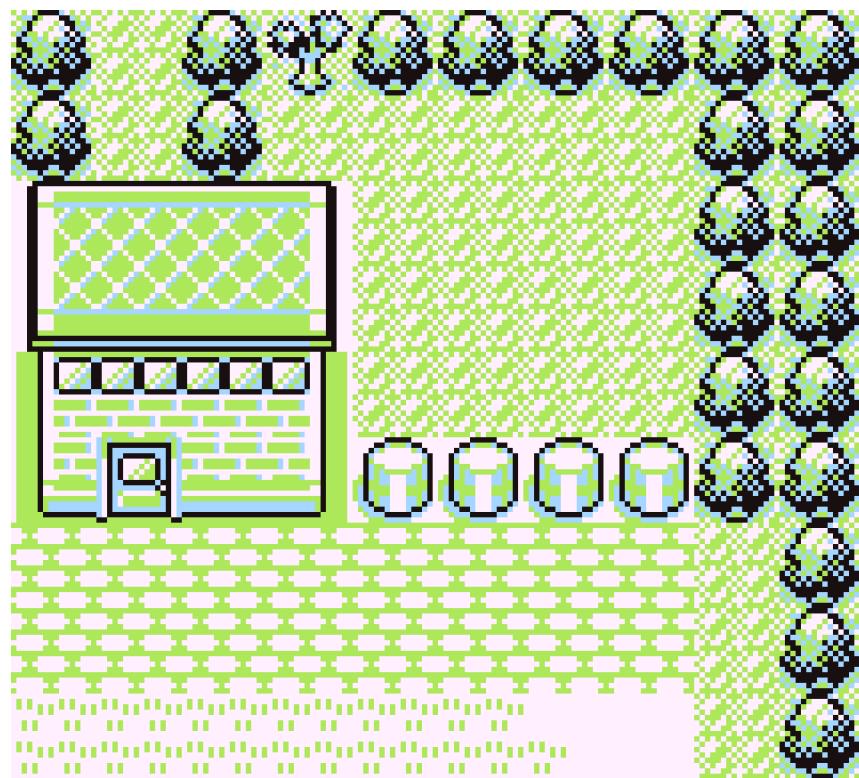
Have a beautiful game or artist that is inspiring? Perhaps someone has experienced joining a team and having to make their art match the pieces that already exist for the project? Every artist has their preferences, and those influence their style. Understanding how to break down a certain style is extremely beneficial. For this example, let's go through a snapshot from *Pokémon Yellow*.

In pixel art, four main components determine the style: perspective, resolution, color palette, and rendering. The perspective is top-down, which means the viewer looks at the scene from above and can see the object's top and side planes. The resolution is the canvas size for a specific sprite (a 16x16 px in *Pokémon Yellow*). The color palette only has four colors. The rendering refers to every other element – the outline style, use of dithering, highlights, light source placement, etc.

There are four important rules for rendering the trees:

1. Use the darkest color for the outline.
2. Have a solid cast shadow below the leaves.
3. Use a checkerboard pattern for dithering and texture.
4. Have a very slight preference for left-side lighting, so shadows are on the right side.

There are two ways to these notes. Either create another tree from scratch and keep these rules in mind, or the more challenging (and fun) way is to take a finished tree that breaks all the above rules and make it match the style required with as few changes as possible. Let's take on this fun challenge together! Here's an attractive tree from *The Legend of Zelda: Oracle of Ages*. This tree checks all the required boxes: a resolution of 32x32 px (four times larger than other trees), using more than four colors, and the rendering style is different.



Keep the size the same (assume this tree plays an important role in a quest game) – but adjust all other elements.

Let's start with the easiest and fastest step: the colors. Replace the old colors with the new ones by applying to the closest value from the Pokémon color palette.

The different colors already blend the tree quite nicely with the game, but it's not enough.

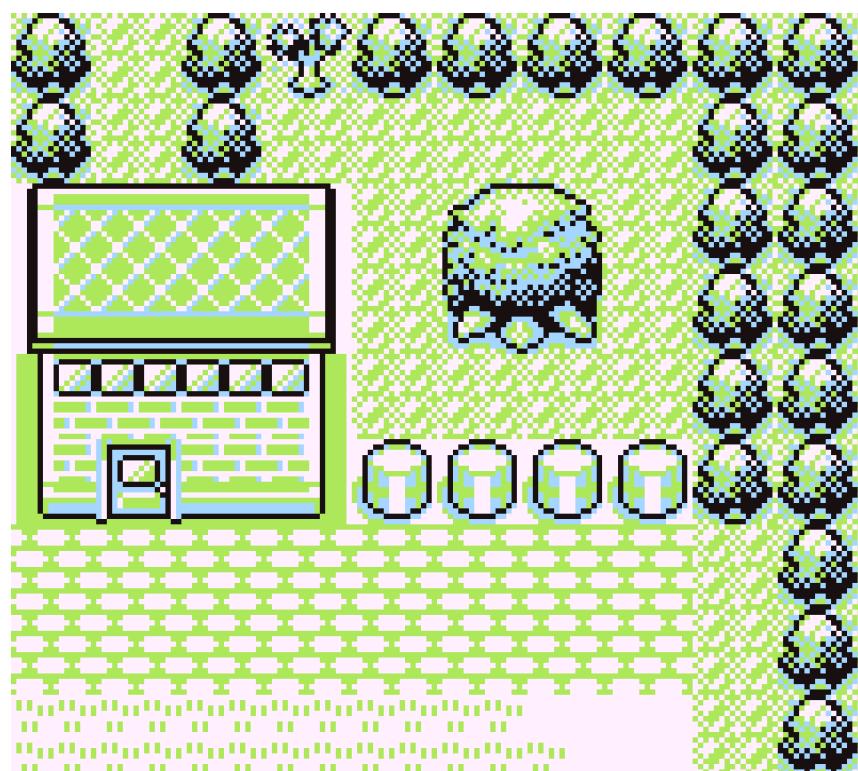
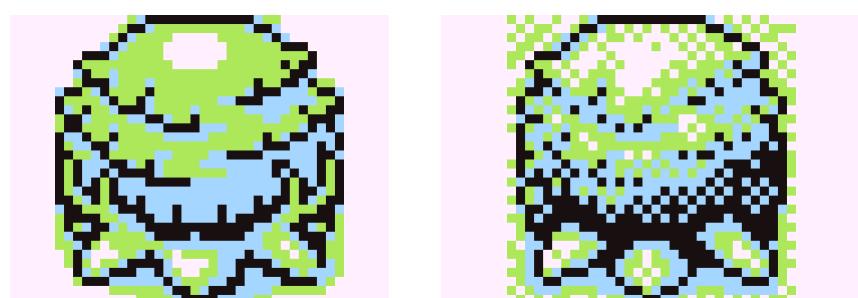
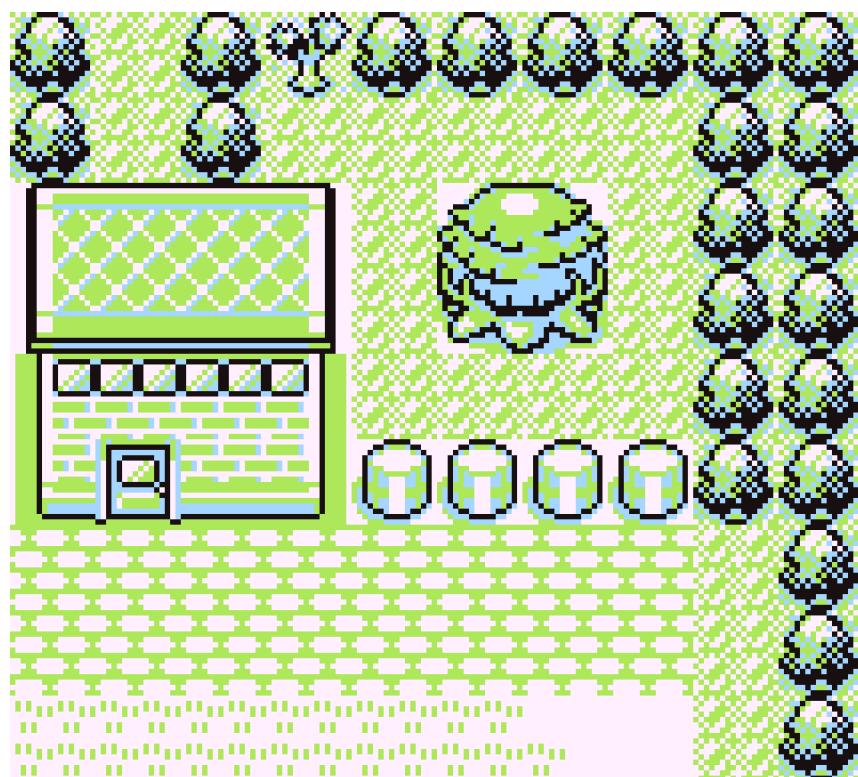


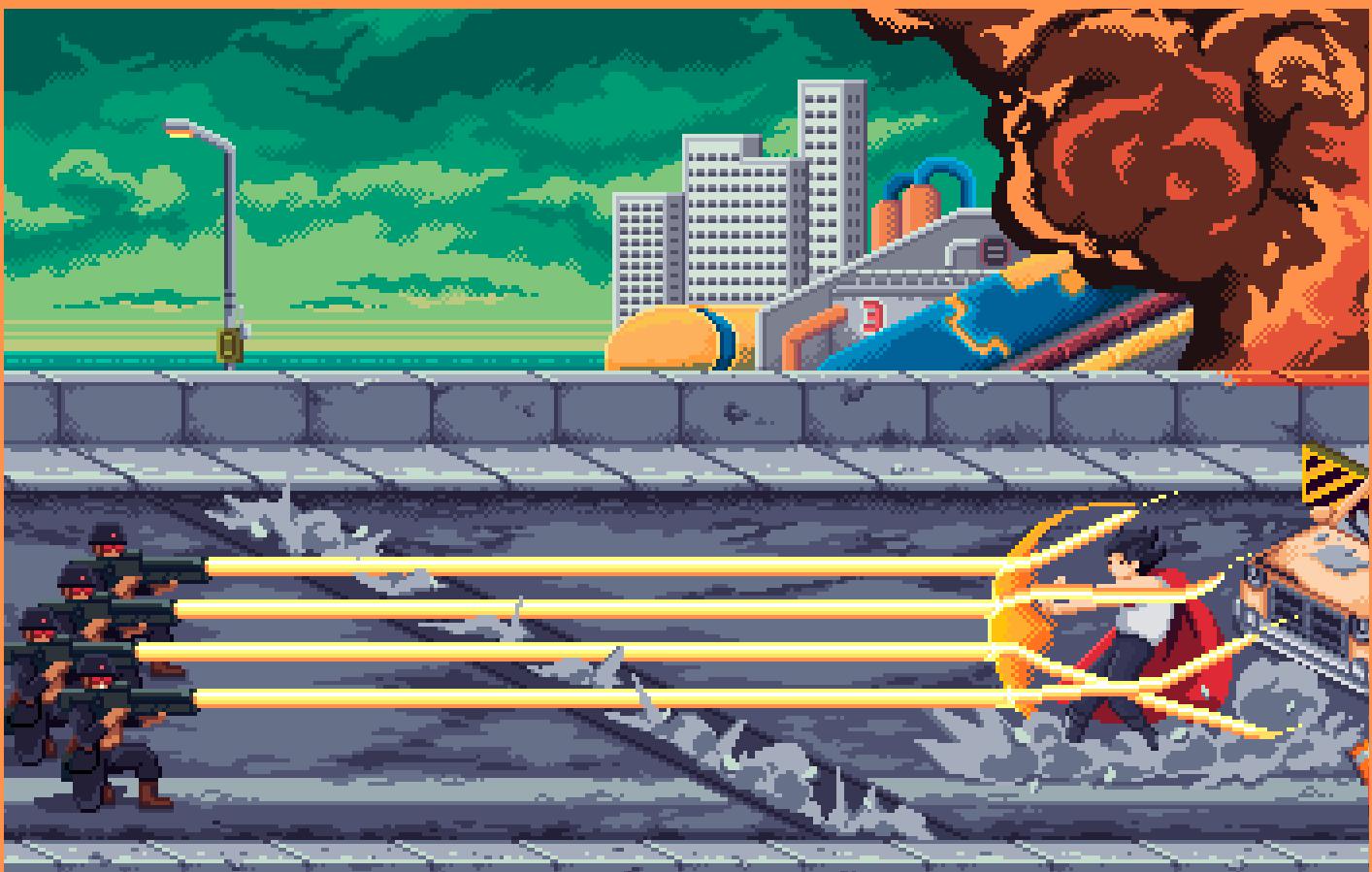
Time to adjust the rendering to match the Pokémon style a bit more. Here are the steps:

1. Change the area around the tree. The corners only use one color, which doesn't match the other tiles of the game.
2. Clean the outlines a bit, especially around the roots. The area where the Pokémon trees' trunk touches the ground has a 1 px thick outline, so thin out the outlines in some places.
3. Add a solid shadow area underneath the leaves.
4. Add a dithering pattern (mostly in the shadow area) and the top of the highlighting area.
5. Break the outlines inside the tree (which separate the three "floors" of leaves) by roughly erasing every other pixel.
6. Increase the highlight area size with a slight preference for left-side lighting.
7. Decrease the tree's width by 1 px on the left and right sides. Not a necessary step, but it's good to have 1 px of breathing space in case of reusing this tree in other areas. This way, an artist can place other objects around the tree, and its outline won't touch the surrounding elements.

Here it is! After confirming that the rules about the Pokémon trees are true, an artist now knows the style's core.

Well... at least for the trees!







PIXEL JAD

Jadson Holanda (aka Pixel Jad) is an independent pixel artist and game developer from Timon, Brazil. His art regularly leans into recreating notable television and film moments into the pixel format.

Pixel Jad often has a retro style in his work to express his love for the games that once influenced him. The colorful work that he leans into occasionally homages his favorite characters and media, such as "Tetsuo's Fury" from Akira, "Run Forest Run" from *Forest Gump*, "Max's Song Feat. Kate Bush's Running Up That Hill" in *Stranger Things*. Pixel Jad's recognizable art style also features as the cover art on Redsigned's album, Curiosity.

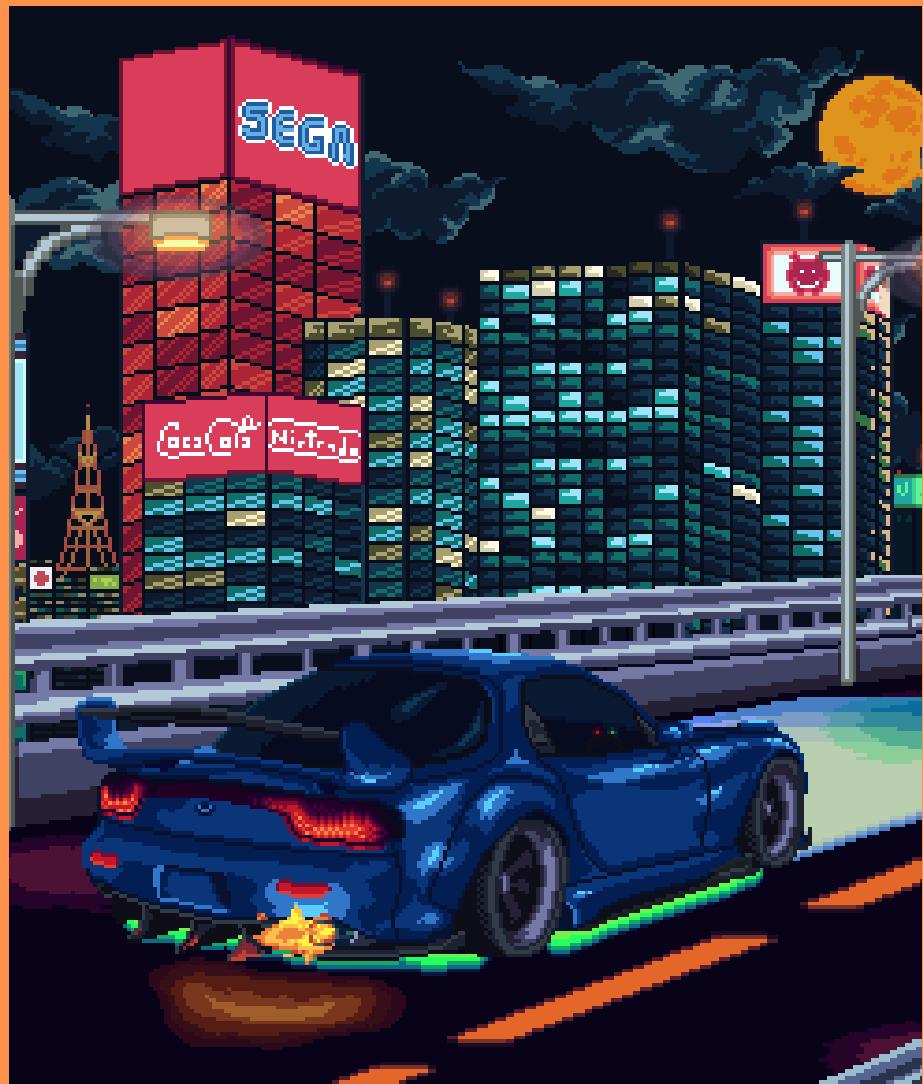
Pixel Jad also creates pixel art tutorials for his audience, such as going through the steps of creating clouds and grass. Additionally, Pixel Jad makes game assets on itch.io for other game developers, such as a Harvest Tiny Farm playable interface for anyone who enjoys farming games!

Patreon: [pixeljad](#)

Instagram: [pixeljad](#)

Twitter: [holanda_jadson](#)

Artstation: [pixeljad](#)

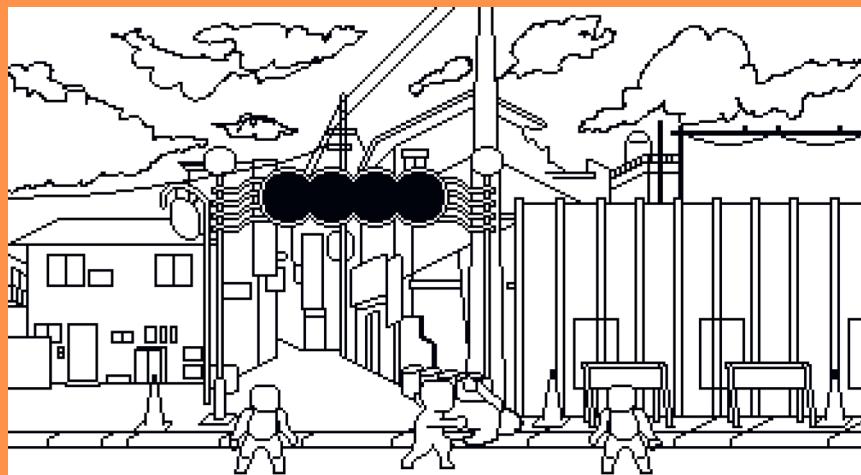




GAME MOCK-UP TUTORIAL

STEP 1

Define how the entire scene will appear. Look for references and create a sketch to ensure that the characters have proper spacing between each other while also leaving space for the setting to be fully visible. Already anticipate what details to add later on. ➤



STEP 2

Set the base color for each object. Don't feel this has to be perfect on the first attempt; there's always time to go back in the later stages. Creating a color palette for the specific game vibe an artist is attempting to achieve is beneficial here. ➤



STEP 3

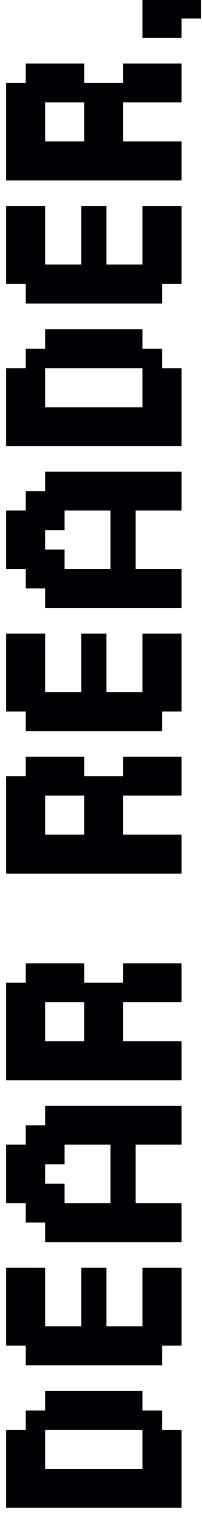
The most fun part is beginning to refine a piece, so spend a lot of time on the details. Notice that many of the previously chosen colors aren't even visible once adding details of new layers on top. See that the sky fills with fluffy, yet stormy, clouds – the original outlines aren't remotely visible. ➤



STEP 4

Make the last adjustments, add effects and filters, and try to make the art more harmonious. One embellishment this step adds is a bright light source peeking through the side of a building, giving new information that this scene takes place early in the morning, perhaps explaining why the street is empty, except for the four characters at the forefront. ➤





The journey of *Pixels Forever: Volume 1* has been thrilling – beginning with the initial sparks of an idea and culminating in assembling an international team of pixel artists, each with unique expertise levels. We wish to extend our deepest gratitude to you, not only for embracing this book but for supporting us in this exceptional and personal endeavor.

Choosing the route of crowdfunding was not simply an alternative for us. Rather, we strongly believe it to be a superior method. In stark contrast to traditional publishing, crowdfunding has enabled us to directly present our work to our audience, fostering an intimate relationship between creator and backer. This relationship that is often absent in the traditional publishing world.

When we embarked on this venture, we were stepping into the unknown. Publishing a book solely on pixel art was a leap of faith on our part. This medium of art, embedded with nostalgia and a distinctive charm, was one we deeply admired, yet we were unsure how the world would receive it. The joy and excitement you've shown us for *Pixels Forever* have been overwhelming and humbling.

This book was designed to serve as an introduction to pixel art. Our goal was to provide a comprehensive overview, equipping readers with an arsenal of tools and, most importantly, encouraging artists to perceive the creative process from a fresh perspective. We sincerely hope we have achieved this. The enthusiastic reception and support have bolstered our commitment to this series. With forthcoming volumes, we plan to delve deeper, explore more complex facets, and present a systematic curriculum for those who have mastered the fundamentals of pixel art.

The future looks exciting, and we are grateful for your trust, support, and shared passion. Each of you has played a vital role in bringing *Pixels Forever* to life. Surprisingly, even to us, this has been our most successful book yet. It is your contribution that has made this vision a reality, and for that, we thank you from the bottom of our hearts.

Yours,


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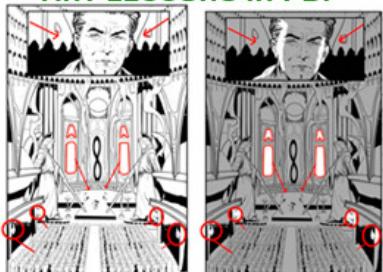
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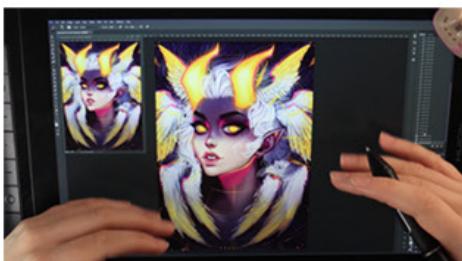
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Mike Oakley
Nerkin
1984pxls
Mislav Majdandžić
Pixel Jad

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EDITOR

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SPECIAL THANKS TO

Apoonto
Mislav Majdandžić
Penusbmic

