1 The Basics:

Perspective and composition pretty much go hand-in-hand. Good perspective in a scene can greatly increase the effectiveness of your composition. Likewise, a bad composition can greatly diminish the effectiveness of your perspective.

Today we're going to focus on **Linear Perspective**,
and help give your pictures some real depth and setting.

Intro to Compositional Point of View:

No talk on perspective can begin without first mentioning the horizon line of a scene. The horizon line is the most basic component of any scene's perspective. It determines what is above or below, what is tall or short, where things go and how far away they go. The horizon line represents the most distant thing our eyes can possibly see. It's where all detail is reduced to a single point. Where the ground and sky meet.

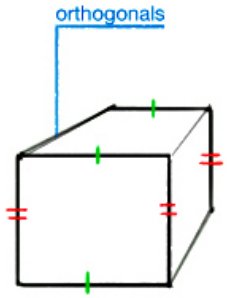
In a scene, the direction, angle, and height of the camera are what's known as your **point-of-view**, or "**POV**." The POV is crucial in setting the mood or feeling of a scene. If we look up, the POV places the horizon line lower on our picture plane, which gives dominance to the sky. If we look down, the horizon line moves up in the picture plane, and we see mostly ground. We have to consciously decide which we see more of, and we can't just place the horizon line where we want just because " we felt like it." For instance, a POV looking up shows us mostly sky, and there has to be a reason for this.

While planning the initial POV, ask yourself questions, such as...
"Why am I showing mostly ground or sky?"
"How far up am I looking? Is the horizon line even visible?"
"Are there objects or characters blocking the sky? Standing in the way?"
"Is it covered by a ceiling or surface? Or is the sky completely clear and open?"
"What feeling does this POV give the viewer mixed with those elements?"
"Is that feeling what I'm going for in this picture?"

Observe these drawn examples:

Here are three picture planes each with a different position for the horizon line. Notice how placing the horizon line higher or lower within the plane completely adjusts our POV? For example, which horizon line placement would be better suited to show an overview of a race course or stadium? How about an air show? What about the middle example? Why does it appear a little plain compared to the other two? The middle example is dividing the picture plane in half. There's no dominance between the sky or ground. This can be a desired effect if the background is not your focus.

One Point Perspective:

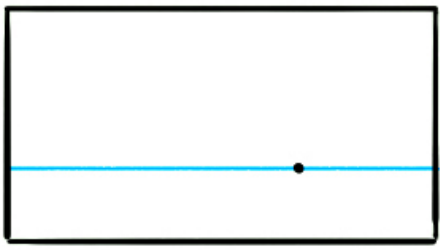


Since the horizon line is where all detail merges when the ground meets the sky, logically we should be able to trace back where objects go based on the POV.

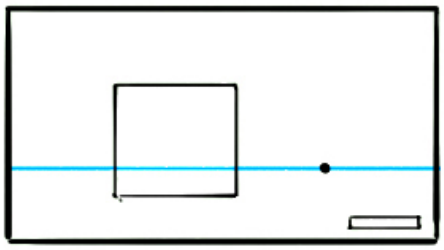
In one point perspective, all detail converges at a single vanishing point on the horizon. All objects facing us have parallel sides. That is to say, all verticals are purely vertical, and all horizontals are purely horizontal. The only angled lines are the ones actually receding back to the horizon line's vanishing point from the edges of objects.

These receding lines from objects are called **"orthogonals**," and will be referred to as such from this moment on.

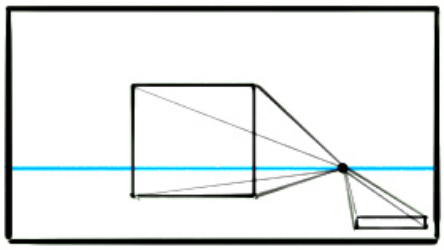
Observe these drawn examples for a better understanding of one point:



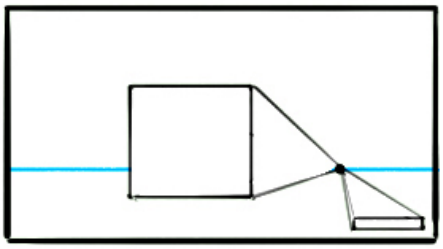
1) Here we have a horizon line within our picture plane. On the horizon line, there's a vanishing point. This point represents where all of our orthogonals will recede from our objects.



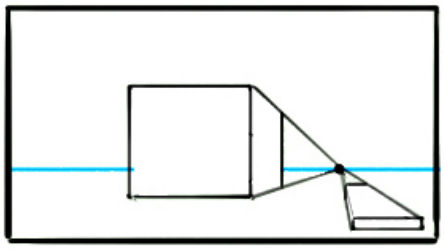
2) Here we've drawn a square and a small rectangle . Note that the square is intersecting the horizon line while the smaller rectangle is below the horizon line off to the side.



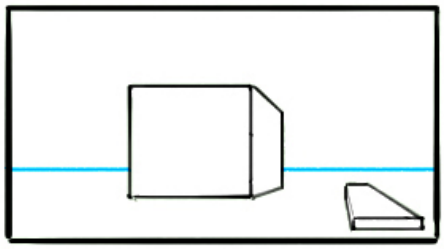
3) From each of the corners of the shapes, we draw orthogonals to the point. They all converge at the point.



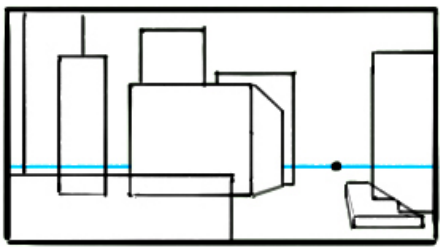
4) Now we erase the orthogonals which appeared behind the objects to make them appear solid. [Optionally, you can just not draw these hidden orthogonals if your object doesn't need them, such as in this example. Drawing the hidden orthoganals can help understand the form of your objects better, however.]



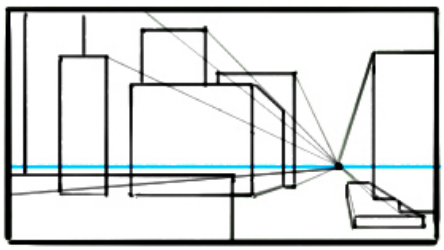
5) To keep these blocks from appearing as though they're receding back into infinity, we can cut off their backsides by intersecting the sets of orthogonals for each of the objects. Notice that the front faces of each block still have straight up and down, left and right lines. Note the new vertical and horizontal lines we've added to mark the rear face of each block?



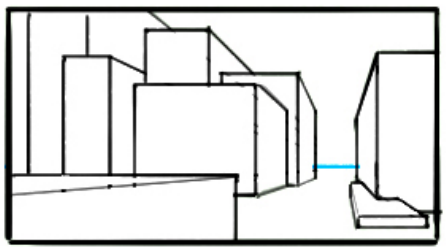
6) Finally we erase the orthogonals up to the point where we intersected them, forming the definite edges of these blocks. They appear to have believable depth now, sitting on the ground.
We can continue to build up the scene with more forms to recede to the horizon line.



7) Look at all these new blocks we added to the scene! Let's give them orthogonals to create better depth.

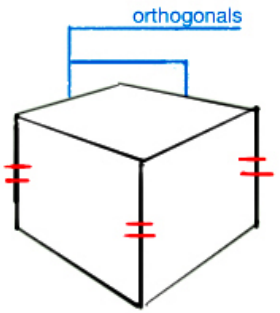


8) Okay, looking pretty good! Once again we can intersect the receding sets of orthoganals just as we did before to give these blocks believable depth
Then, again we clean up the leftover receding orthogonals and overlapping shapes.



9) Now we have a nice buildup of objects in one point perspective.
Look at the possibilities of what this scene could be. A city street perhaps? How about big stacks of storage palettes in a warehouse? In just these 9 steps, we've established a great base for a setting!

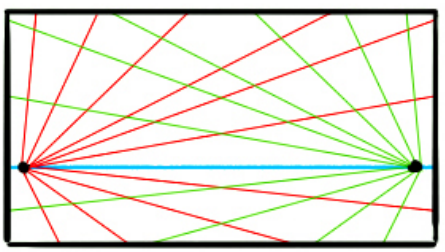
2 Two Point Perspective:



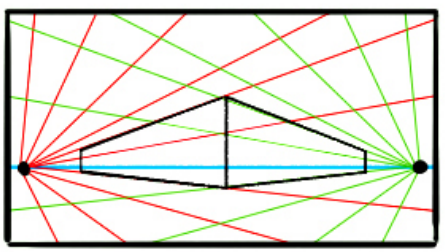
While one point perspective is common to find in drawings, it really does only exist when you're facing something directly straight-on. Otherwise, if your POV is turned a couple of degrees left or right, it instantly becomes two point.

One point perspective only utilizes one vanishing point and one set of orthogonals. As you can most likely assume, **two point perspective utilizes two vanishing points and two sets of orthogonals**. That means that in two point perspective there are only one set of parallel lines on your objects which are usually [but not always] the verticals. When you think about how environments rotate around you when you turn in place, you can see how things can change from one point to two point very quickly. While looking forward, we experience most of our world in two point perspective, and it should be one of the most common forms of perspective used in most drawings. Observe the drawn examples:

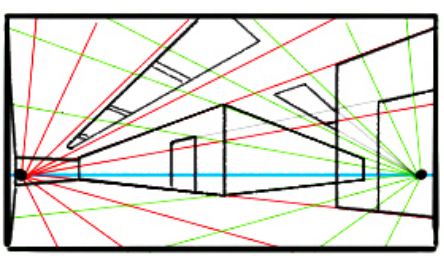
1) Here we have our horizon line with two vanishing points on it. To start, we're not going to begin drawing flat shapes like in one point. Instead we're going to start drawing random orthogonals extending out from the points to "feel-out" the object we want.



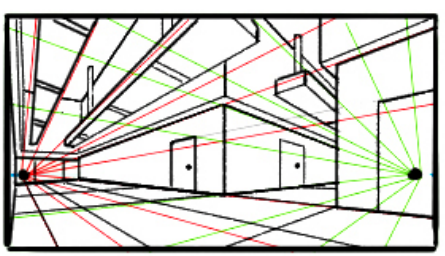
2) Radiating outward from each point are a grid of orthogonals. I've given each point a different color to keep them differentiated. This grid will serve as a handy guide to create the angles of the perspective within our scene.



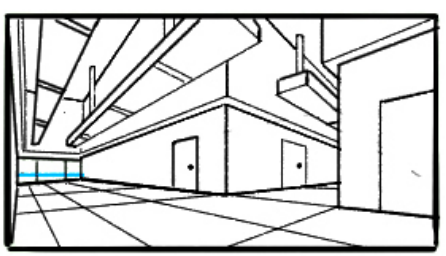
3) Using just the orthogonals from the points, we've created two walls coming together at a corner. Note that the vertical edges of the walls are all parallel.
This could be the setup of an interior or exterior. Is it a building or a large corridor intersection? It could be either.



4) Here we're creating an interior! Using the orthogonal grid some more, I've added additional walls, some doors, and some lights in the ceiling. All of these lines simply follow the set of orthogonals they belong to. The red vanishing point handles all the left facing walls, while the green vanishing point handles all the right facing walls.



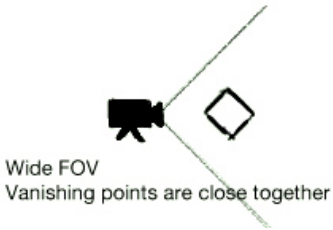
5) So now we've gone through and added more detail just based off of the orthogonal grid. Check out how we made a higher ceiling by extending the walls higher and receding them back to the vanishing points. You can use temporary orthogonals to measure out things like the heights of the doorways so that you know they stay consistent.



6) Remove the orthogonal grid, clean up the temporary orthogonals, and we have the beginnings of a pretty great scene!

Think about how easily we could turn this scene into an exterior shot where the ceiling is gone and the walls form buildings instead.

Zoom Level & Field of View:

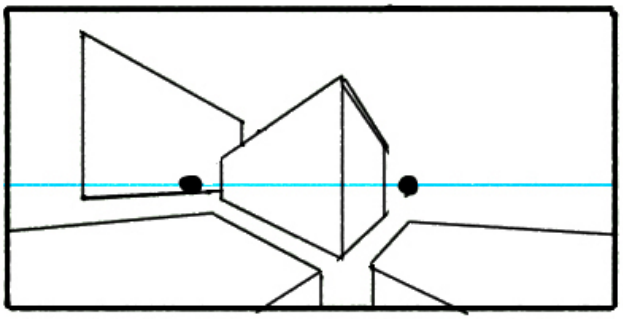


Wide FOV
Vanishing points are close together

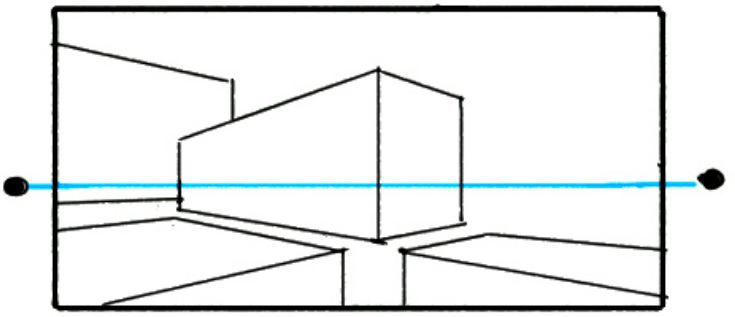
Narrow FOV
Vanishing points are far apart

Unlike Point of View which determines where we're looking, **Field of View** [or **FOV**,] determines how much we can see. Don't confuse FOV for zoom, though. They are both distinctly different things.

FOV deals directly with how close together or far apart the points are on your horizon line. If the lines are close together, you begin to see more of your scene and things start to look thin, tall, and pointy -- kind of like a widescreen movie squeezed onto a normal box TV. We're seeing more of the scene without zooming out. Likewise, when the points are farther apart, we're seeing less of the scene without zooming in. So details begin to appear horizontally stretched, fatter, and flatter.



Here we see the two vanishing points very close to each other. This creates a very wide FOV since the orthogonals have to recede in a more confined space. Note how the taller block to the left is receding behind itself and we only see it's front. Also notice the obvious distortion in the perspective, where the corners are jutting out far and sharp. This can be a desired effect if you want to create that "wide-angle lens" effect from cameras. However, in most natural situations a scene like this isn't common to have.

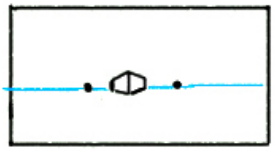


Here, the vanishing points were moved outside of the picture plane. This creates a more normal proportion for the orthogonals to recede to, giving a more natural look to the perspective in the image. You could say this image is more like normal eyesight versus a wide-angle camera lens.

Zoom level and FOV often work in tandem. As you zoom out, [like zooming on a camera,] the vanishing points will come closer together at the same time, forming an optically wide-angle view. As you zoom in, the vanishing points will move farther apart and the scene will grow in size, creating an optical telephoto view. As you zoom in and out, the perspective never changes. The scene either just gets bigger or smaller within the picture plane, and cropped depending on where you're zooming in to.

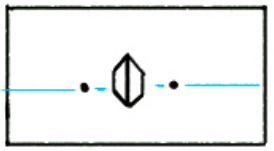
The key to FOV is finding a good balance for the positioning of your points to avoid unrealistic distortions. Sometimes your points will be inside your picture plane, sometimes they'll be outside. It all depends on the composition you're going for.

So when drawing your scene, remember to keep FOV and Zoom in mind!

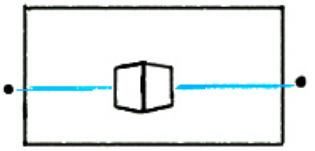


Zoomed out, Wide Angle

Zoomed In, Telephoto
Vanishing points move apart as the scene grows larger, leaving the original perspective intact.

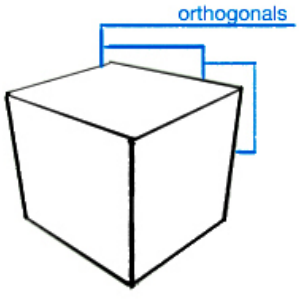


Wider FOV, we see more since the points are close together on the horizon line.



Narrower FOV. We see less of the scene since the points are much farther apart. Note how the cube has not grown in scale.

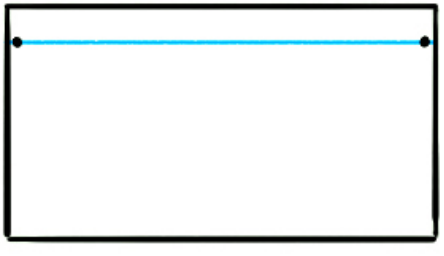
3 Three Point Perspective:

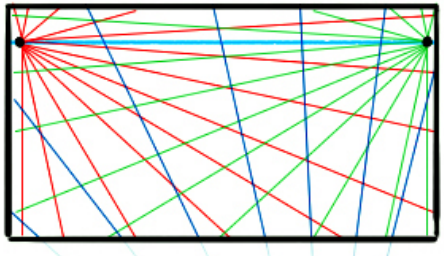


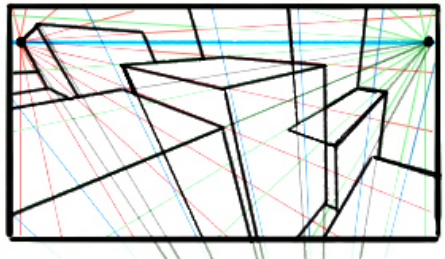
Now for the main course.
While most of what we experience from day to day is two-point perspective, this is assuming that we're always looking forward, eyes level to the ground. If we begin to look up or down, we introduce a new, third vanishing point. As we have two vanishing points on the horizon line, looking down will create a new one far below in the ground. Looking up will create one high above in the sky. In most cases, this third vanishing point will be far outside the picture plane, unless we look up or down at a more extreme angle to the point it's actually in view.

In three point perspective, no lines are drawn parallel anymore.
All lines drawn will recede to a point.

Observe the examples to see three point in action:



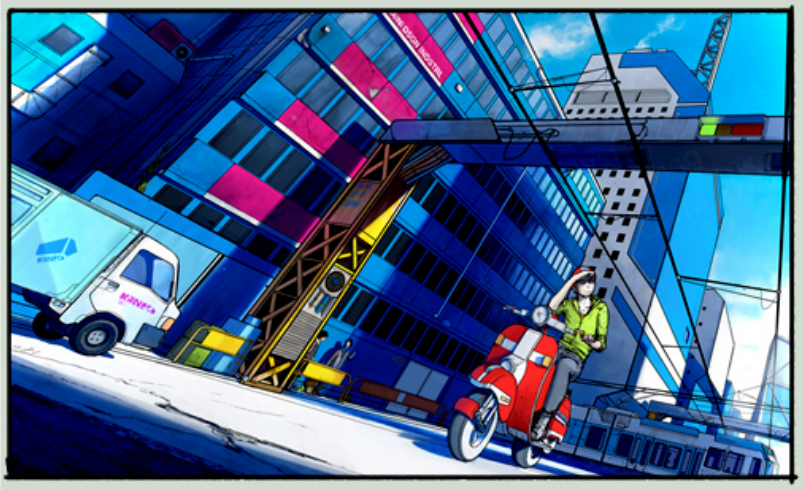




1) Here we have two vanishing points on the horizon line as well as a third point far below the picture plane. See it down there? There's an arrow pointing to it. This is the where all of the verticals will recede to in this scene. We placed the point way down here to avoid vertical FOV distortion in the perspective of the image.

2) Just as in two point perspective, we begin by drawing orthogonal grids from each of the vanishing points. I've differentiated each orthogonal set again with a different color to make it a little less confusing.
Note especially the positioning of the third vanishing point. It's not centered with the picture plane. The offset will create a shifted POV in the image.

3) I've dimmed the orthogonal grid so the drawing is a little more easily visible. But as you can see, we're following the same steps here as two point perspective, using the grids as guide. Except, this time we're taking into account the vertical edges of the objects receding to the third vanishing point below. I'm still drawing temporary edges of these blocks behind other blocks to make sure I'm getting their angle and thickness accurate.



Here are some examples I've drawn utilizing three point perspective.
Look at the example above. Where is the horizon line in this image? Is it tilted?
How close is the camera to the ground in this picture? What feelings does it create?

Look at the example to the right. Here we see a wide FOV used in conjunction with a medium-wide zoom level. How do we know the FOV is wide? The building closest to us is jutting out at a sharp angle. If this was intentional, does it make the building feel larger in scale than it normally would? In the confined picture plane, would the street be no longer visible if the FOV were narrowed and objects get wider?

POV determines perspective:

In a three point scene, if the third vanishing point is placed high in the sky when we look up, or placed far in the ground when we look down, this does not mean that we will always use three point perspective whenever we're looking anywhere but straight ahead.

Remember that the POV you've chosen in the scene determines whether you'll use one point, two point, or three point perspective.

For instance, lets say you're standing on a street in New York City looking straight up. You would draw the buildings towering above you in one point perspective because you would only be able to see a single point where all the buildings are receding toward -- up in the very top of the sky. If you were looking at a 45-degree angle up into the sky, you'd have to use three point perspective since you'd have to draw the buildings receding into the sky as well as off to the horizon line's vanishing points.

In this first photo on the left, we're looking straight up. This building is currently visible as one point perspective.

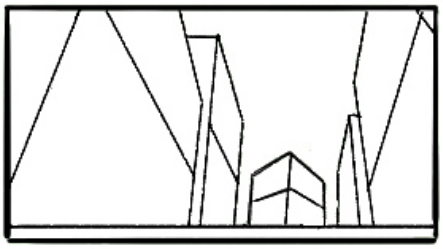
As we step back from the building and look up at it, its perspective has shifted very noticeably into three point. The windows make the orthogonals of this building very obvious. Is the third vanishing point above or below the horizon here?
If we looked straight ahead, do you see how the scene would become two point perspective since the building would become vertical? As well, the whole building wouldn't be visible anymore, would it?

POV Height Can Determine Scale:

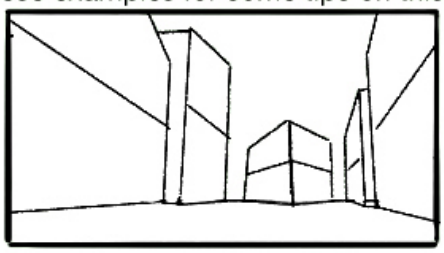
This is very important.
Depending on how high off the ground your POV is, your scene will either feel very large or very small in context.

Think about the view a mouse has when scurrying around on your room floor. Tables, desks, beds, would all look monstrously tall. If we wanted to show the room through the eyes of the mouse, we would use a POV placed practically right on the ground. The scale of all objects by context to the mouse would make them drastically larger. By contrast, the view of you sitting in your room would be much higher, and the objects would be much smaller in scale in context to yourself.

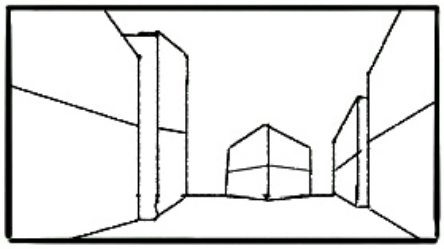
Observe these examples for some tips on this matter:



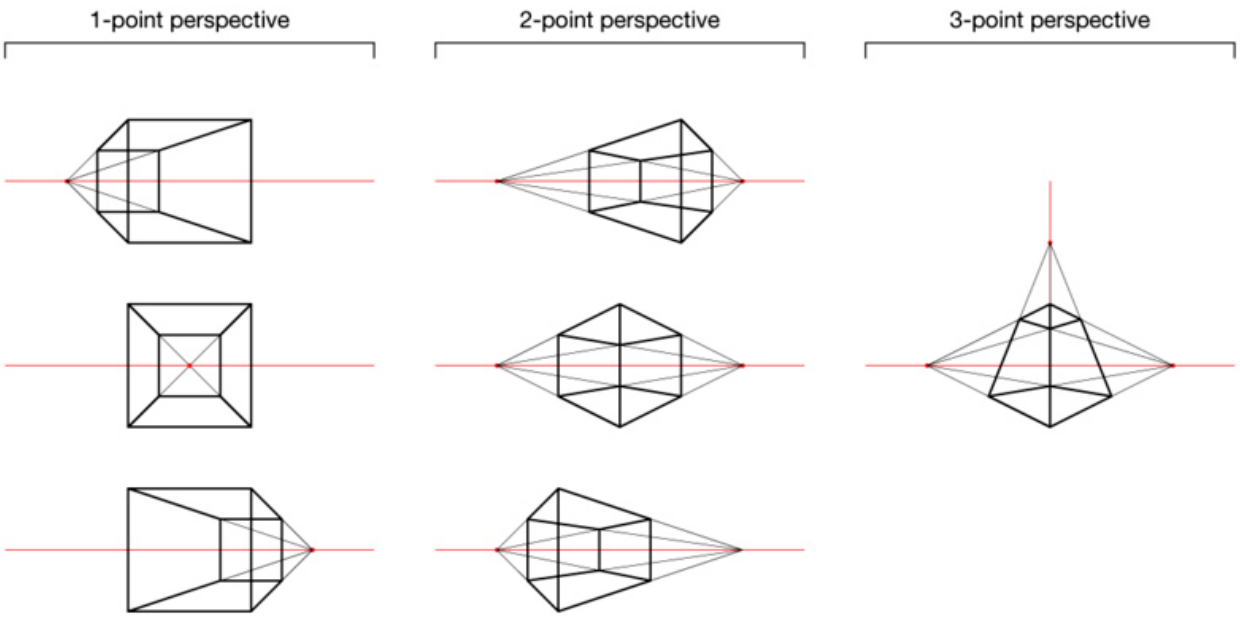
Do you feel really tiny in this example? Or do the objects appear REALLY BIG? It's true either way, honestly.
This is because the objects are not passing down below the horizon line, giving us the illusion that we're down close next to the ground since there are no receding lines beyond it. Are you an ant in this picture among a bunch of boxes? Or a man among huge buildings? It's all dependant upon the context.



How about now? Do you feel a little bigger? Since the objects are penetrating slightly below the horizon line, we're given a hint of receding depth from the ground. We still get the feeling we're very close to the ground, but not so much so that our camera is placed directly on it.
In the scene, is this normal standing height for those objects that could be as large as normal buildings or houses? Or are we laying down, hiding among boxes in a closet?



Now we feel even taller. Since we can see even more of the ground and the edges of the objects touching it, we get the feeling that either we've grown bigger in scale, or we've somehow gotten higher off the ground. In this scene, could we be looking out of a second floor window perhaps, or we're up in a tree?



SUMMARY

In Point-Constructed Perspective, all lines are taken back to a point, called the Vanishing Point (VP), on the Horizon Line for 1 and 2 point perspective. In 3-point perspective, there is another, not on the original Horizon Line but on a vertical line crossong the Horizon at an arbitrary point. When constructing a scene using these methods, remember that scenes in reality have mulitple Vanishing Points, there is a set of points for each object on the Horizon Line.