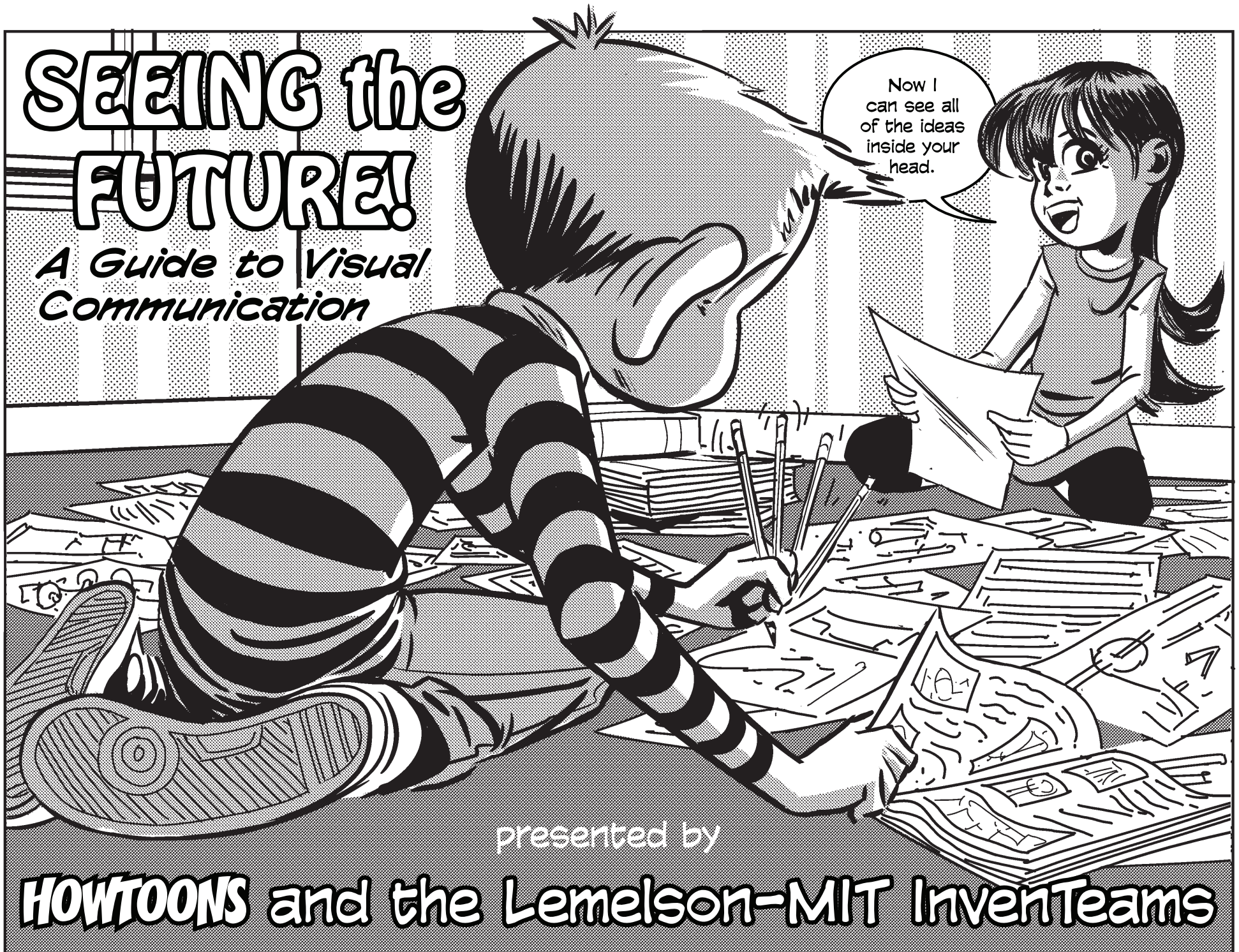


# SEEING the FUTURE!

*A Guide to Visual Communication*

Now I  
can see all  
of the ideas  
inside your  
head.



presented by

**HOWTOONS** and the Lemelson-MIT InvenTeams



# SEEING the FUTURE!

## *A Guide to Visual Communication*

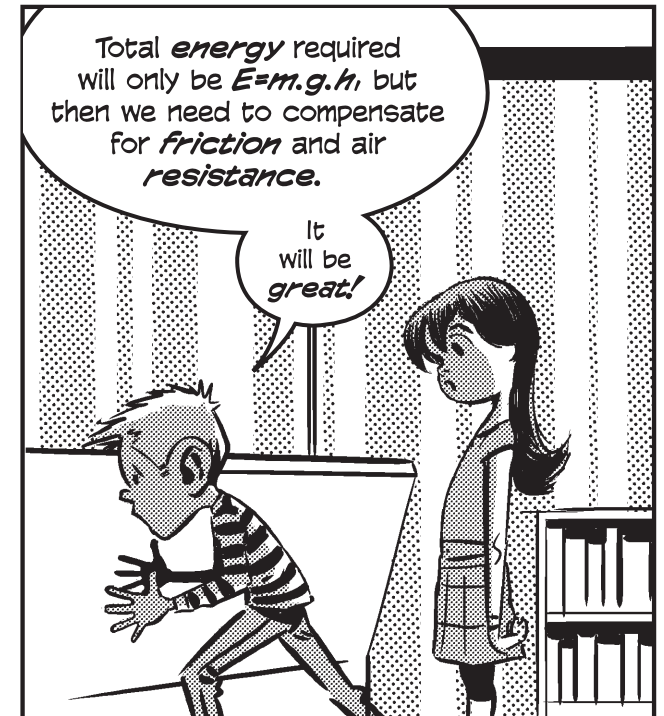
(OR... HOW TO GET THOSE BIG IDEAS DOWN ON PAPER!)

*CREATED BY HOWTOONS AND THE LEMELSON-MIT INVENTEAMS*











Tuck...  
You might not realize it yet, but everyone can draw!

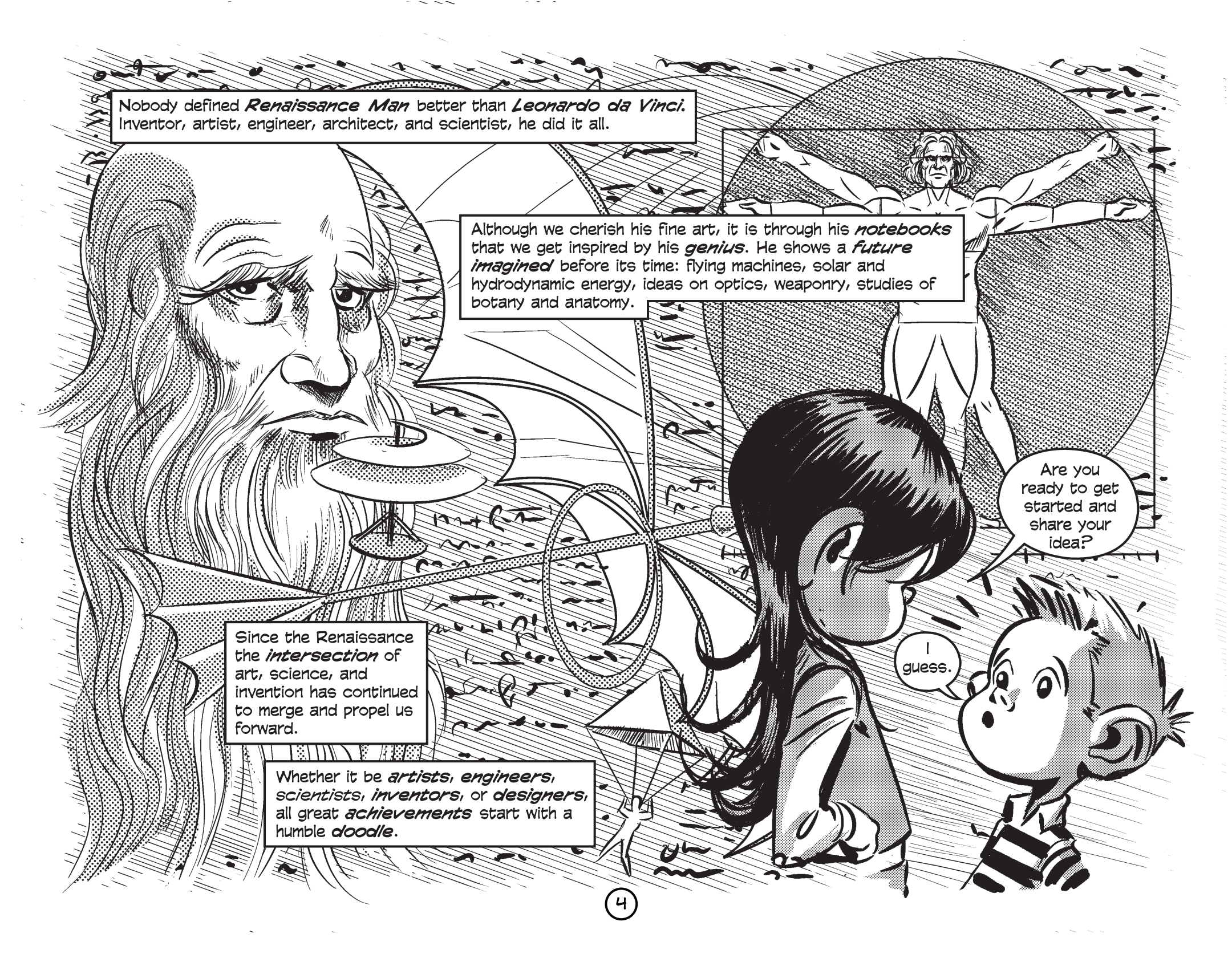
Since the *dawn* of man we have used *pictures, drawings, symbols, and doodles* to *communicate* and *share ideas*.

In the *Stone Age*, cavemen painted nearly **2,000** images on a cave wall in Lascaux, France. These paintings depicted *humans, animals, and symbols...* What were they trying to tell us?

In *500 BC* the *Greeks* shared their *ideas through art*. From *sculpture*, to murals on the walls to portraits on wood, the *Greeks passed on their history* and recorded their *culture*.

Inspired by the *Greeks*, the *Italian Renaissance* saw great progress in the visual arts. *New technologies* gave people the tools to *communicate* advancing *ideas*.





Nobody defined *Renaissance Man* better than *Leonardo da Vinci*. Inventor, artist, engineer, architect, and scientist, he did it all.

Although we cherish his fine art, it is through his *notebooks* that we get inspired by his *genius*. He shows a *future imagined* before its time: flying machines, solar and hydrodynamic energy, ideas on optics, weaponry, studies of botany and anatomy.

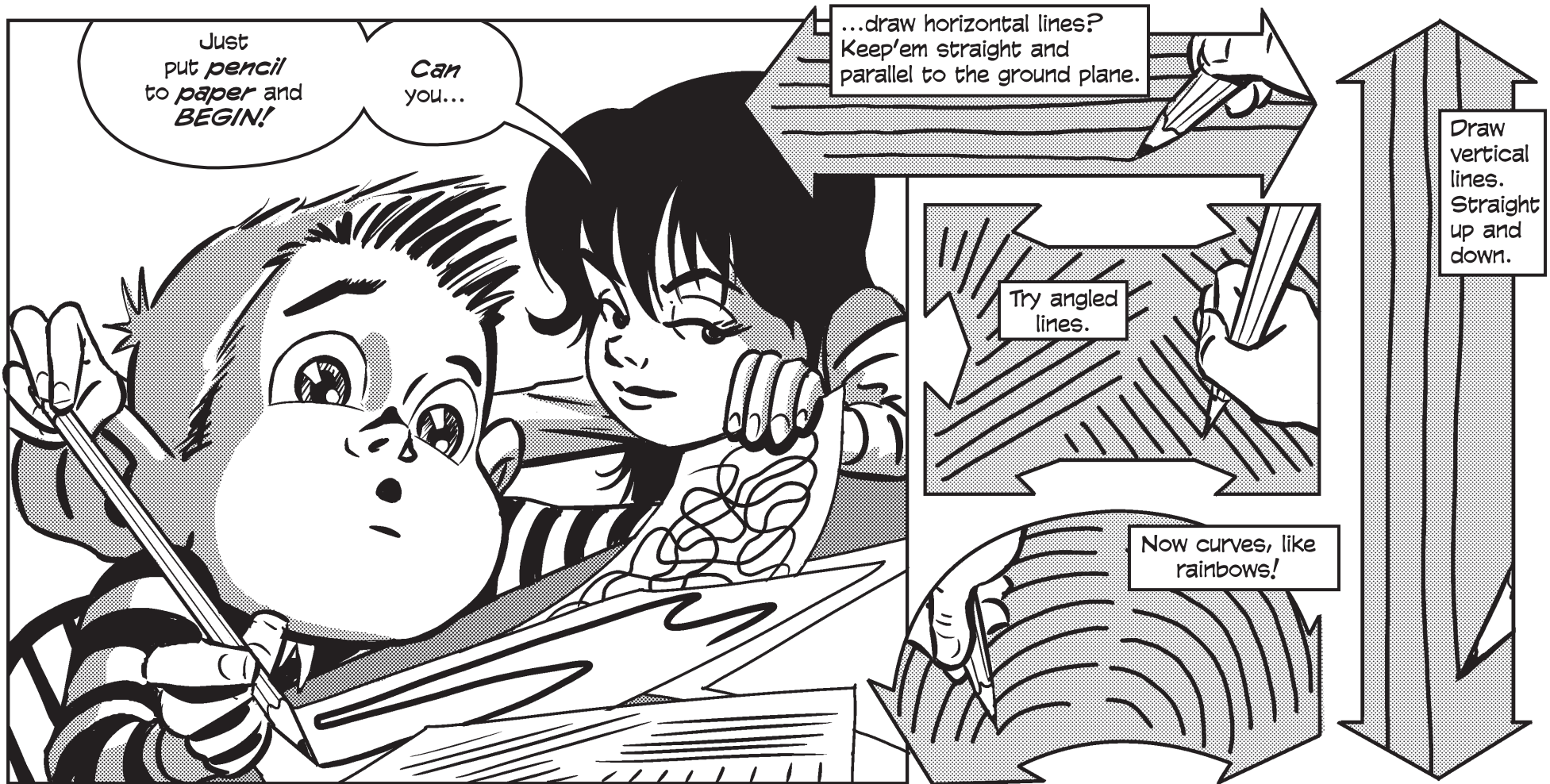
Since the Renaissance the *intersection* of art, science, and invention has continued to merge and propel us forward.

Whether it be *artists, engineers, scientists, inventors, or designers*, all great *achievements* start with a humble *doodle*.

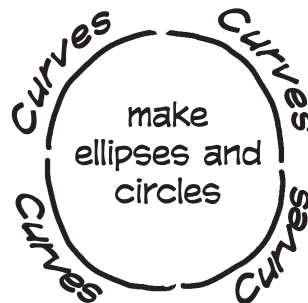
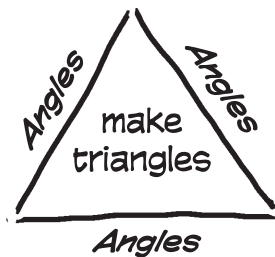
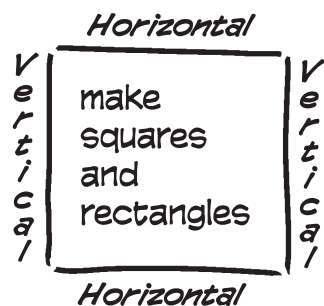
Are you ready to get started and share your idea?

I guess.

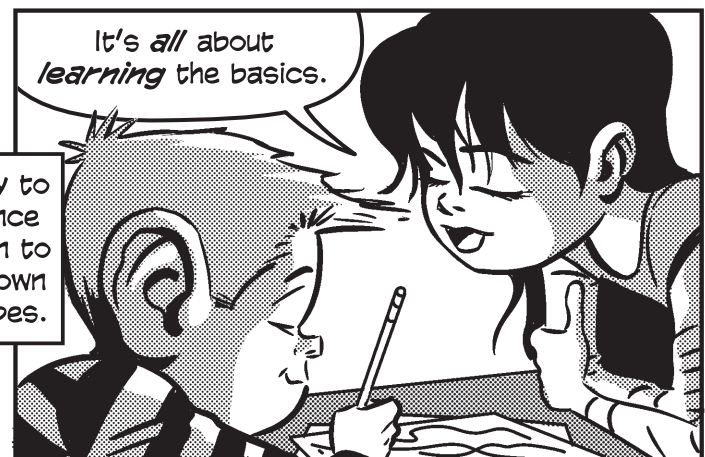




These lines can work together in a variety of ways. By training your artist's eye we can draw them to communicate, like the shapes below.



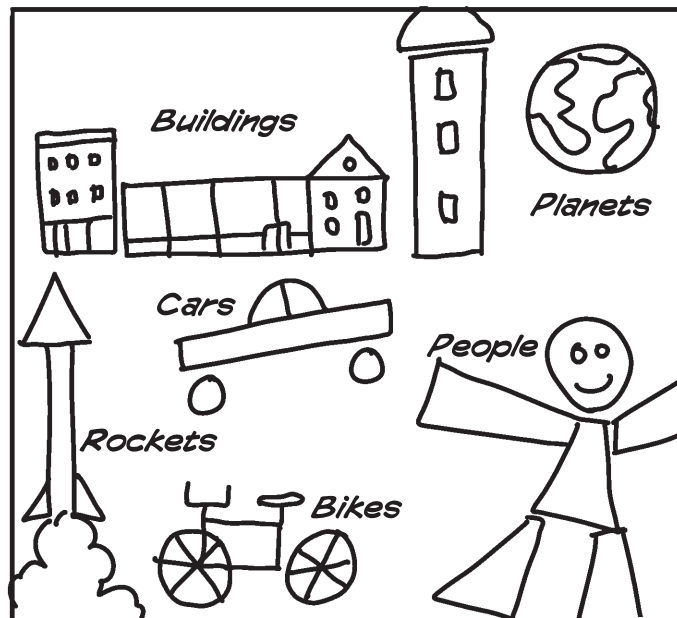
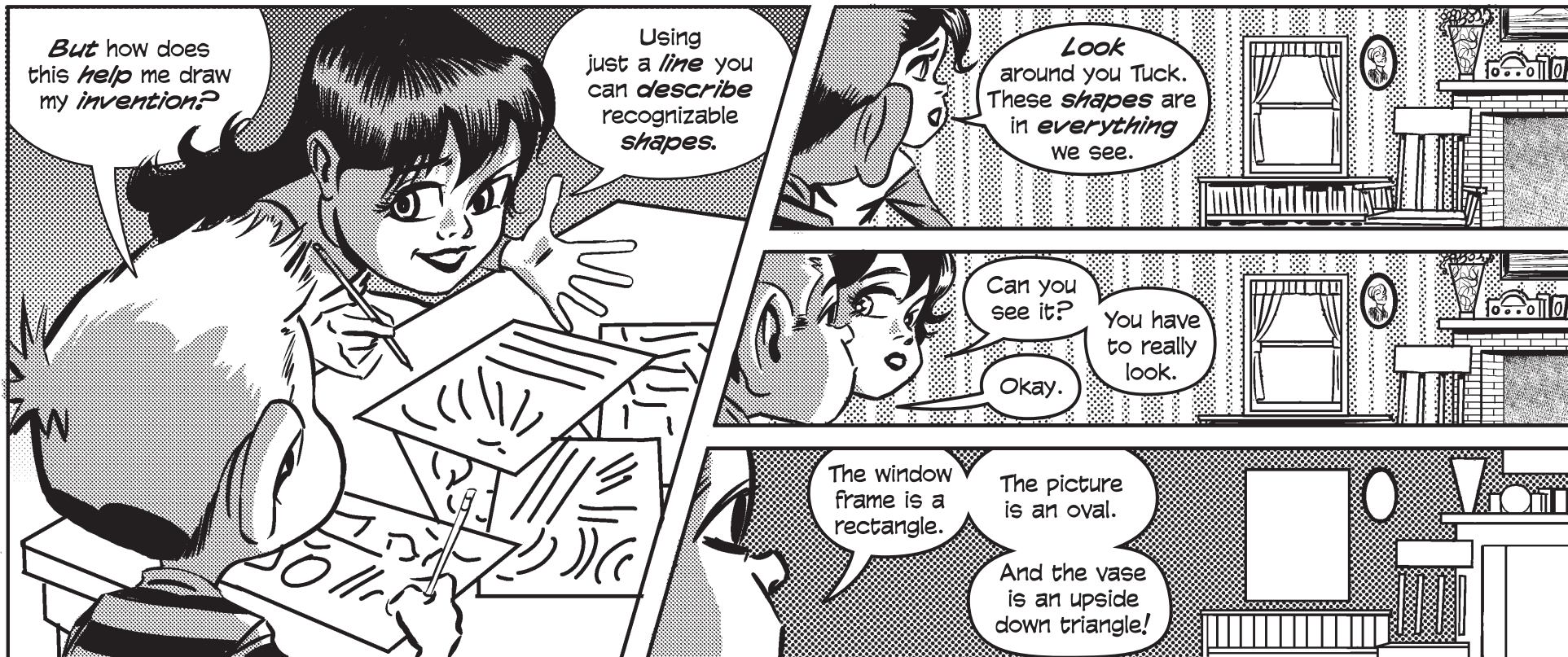
It's easy to draw once you learn to break down the shapes.



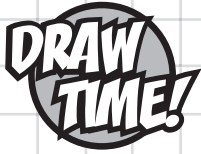




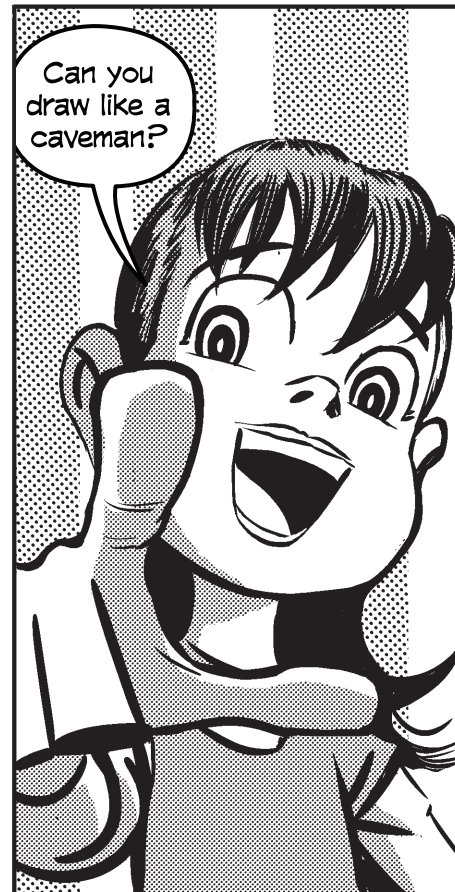
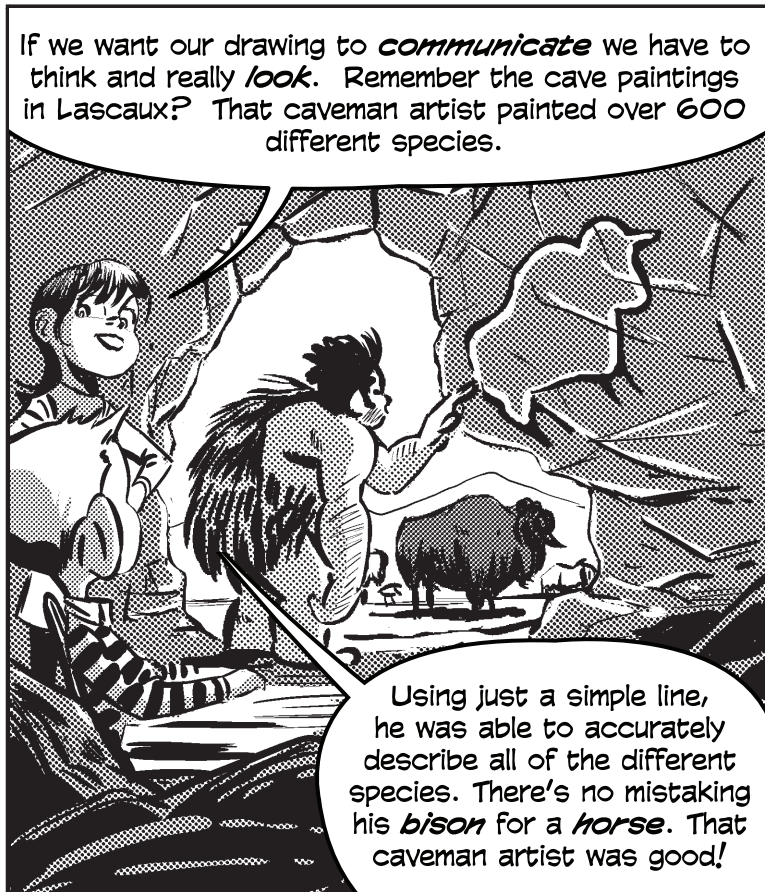
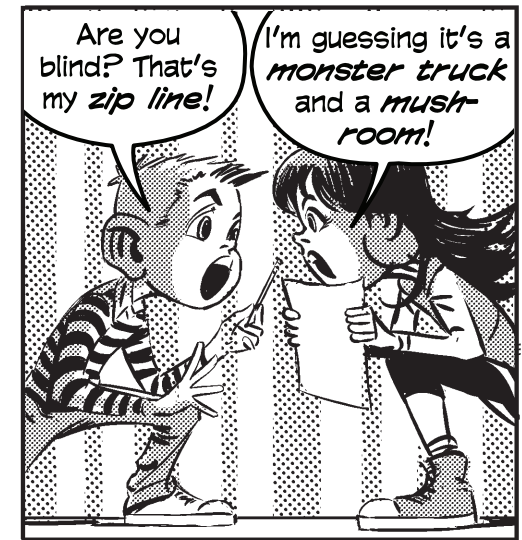
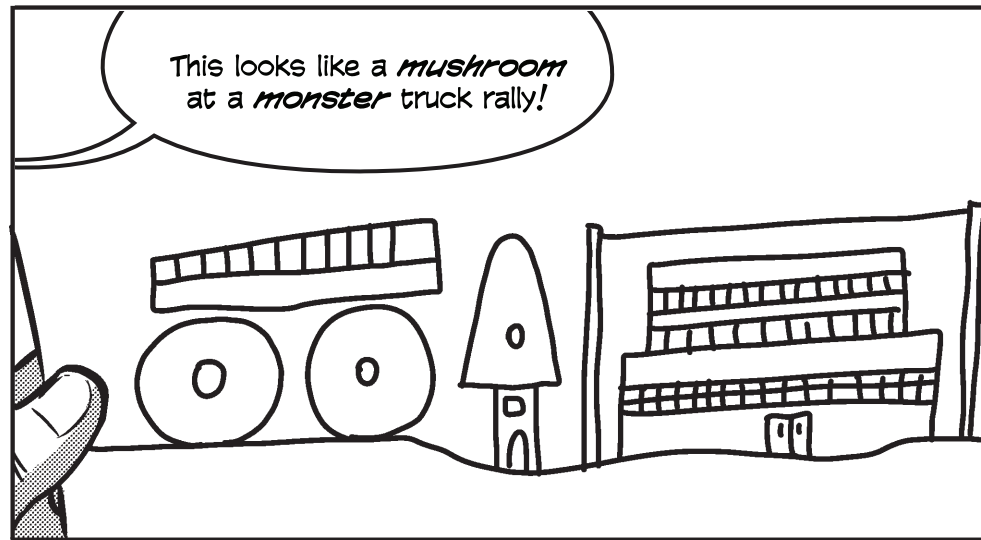
"Now *you* try! Start by drawing *lines* and *curves*. Then put them together to make *shapes* like *squares*, *rectangles*, *triangles*, and *circles* of all sizes. *Don't* make mindless *scribbles*. Make marks with a *purpose*. All real inventors use graph paper. The guide lines are great for helping you write those equations neatly so they're easy to follow and capture the scale of things. Practice how straight you can draw those lines. How smooth can you draw those curves? Have *fun* and get *loose*!"



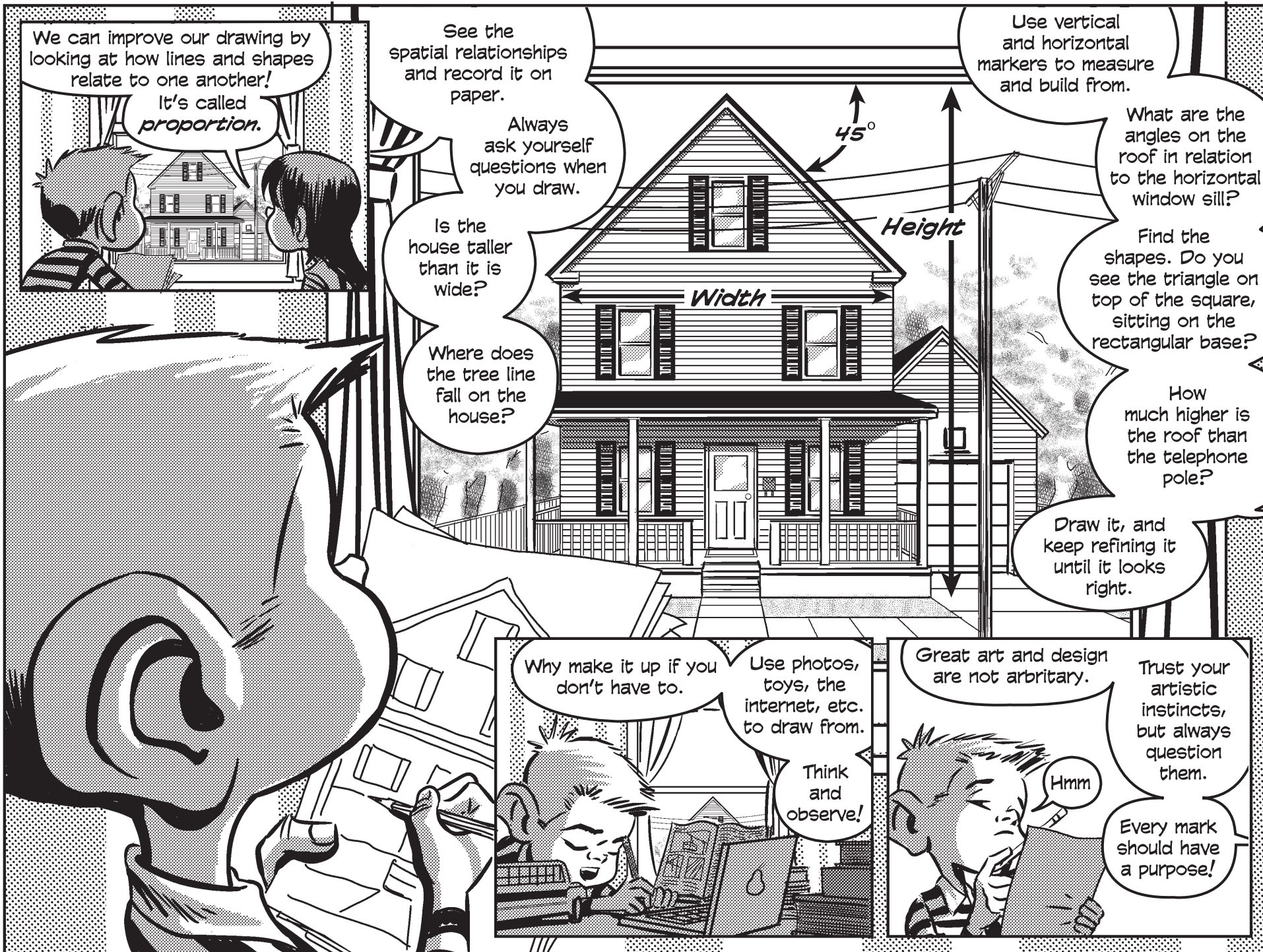




"Now *you're* just getting *started*. What's your *big idea* for an *invention*? *Draw it!* Break down the *shapes* of what you *see* in your head and *visually record it* on the *paper* with your *pencil*."



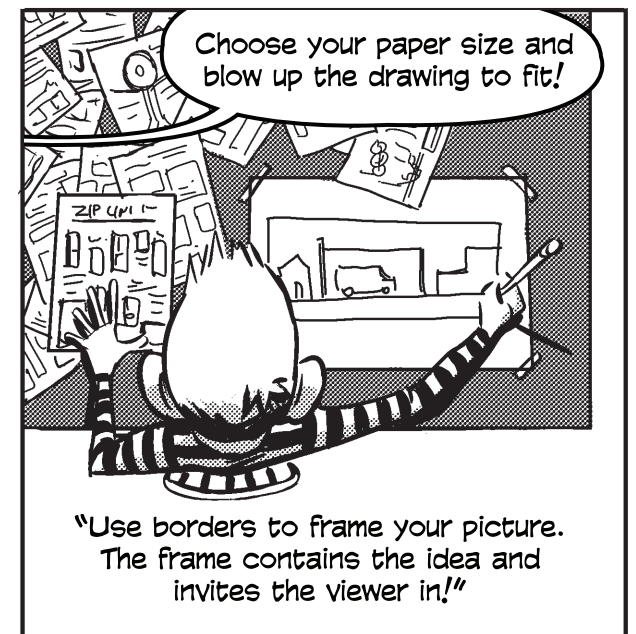
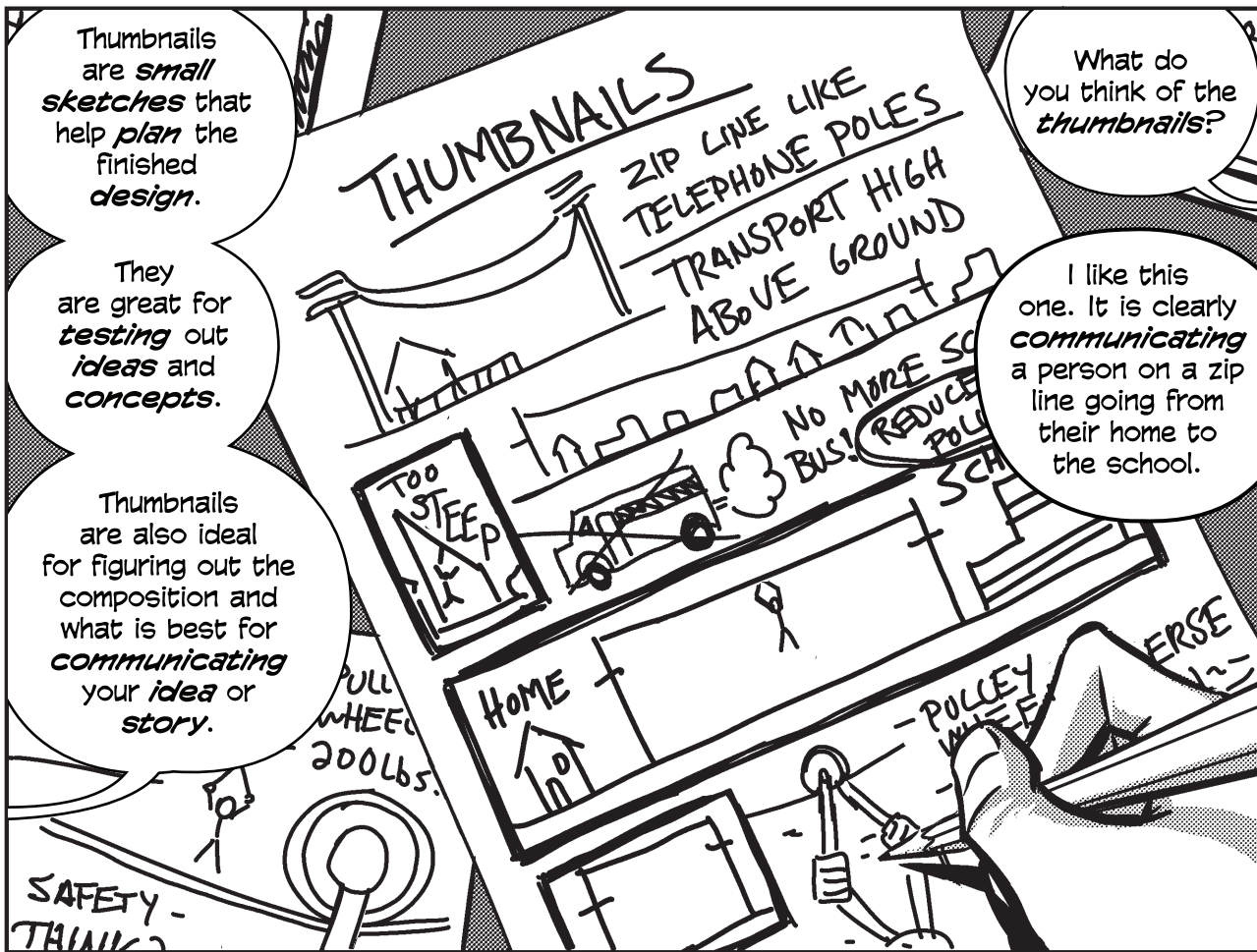
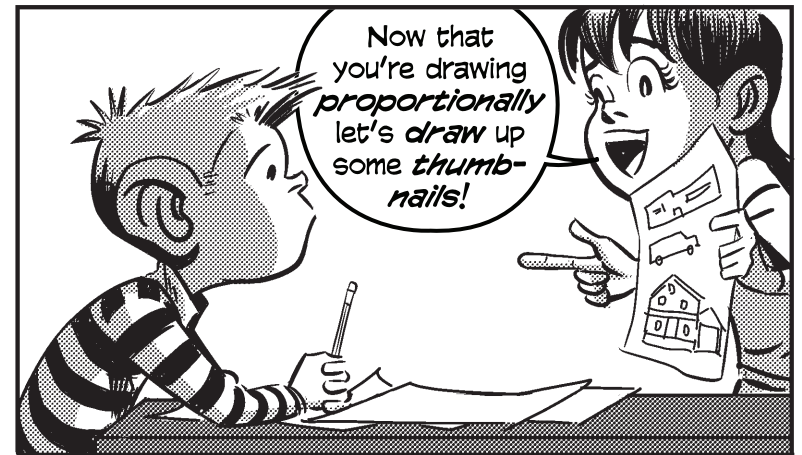
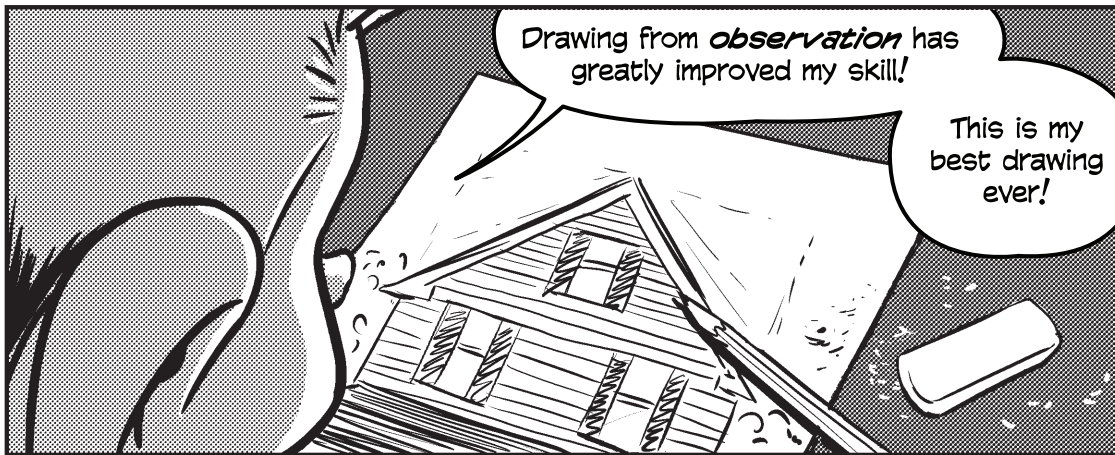


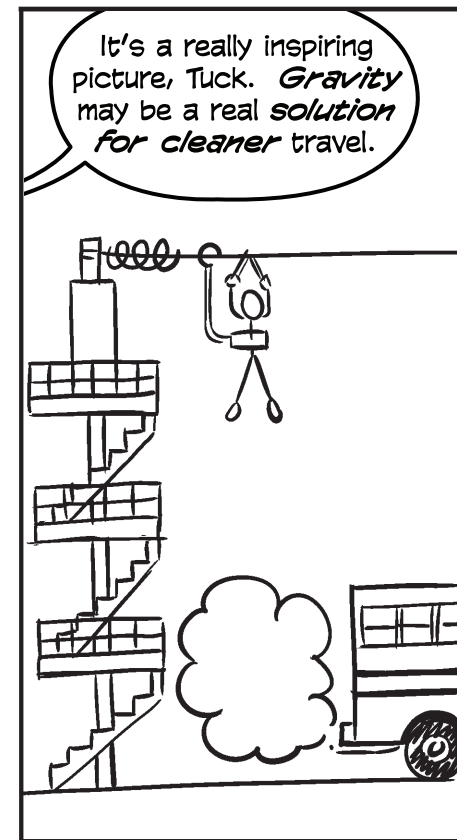
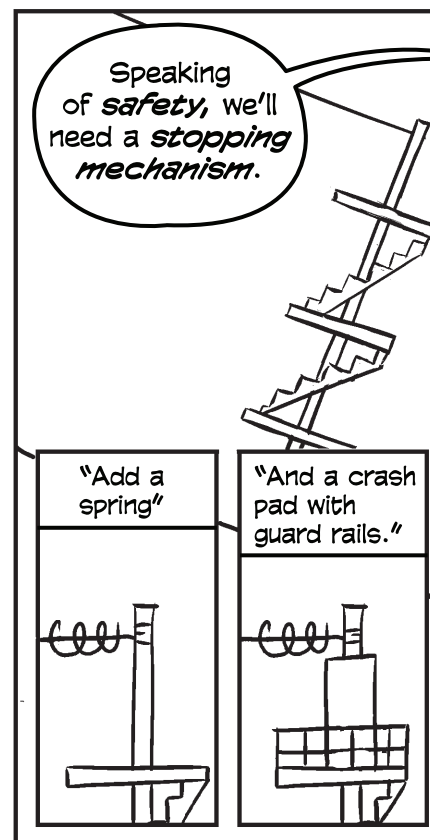
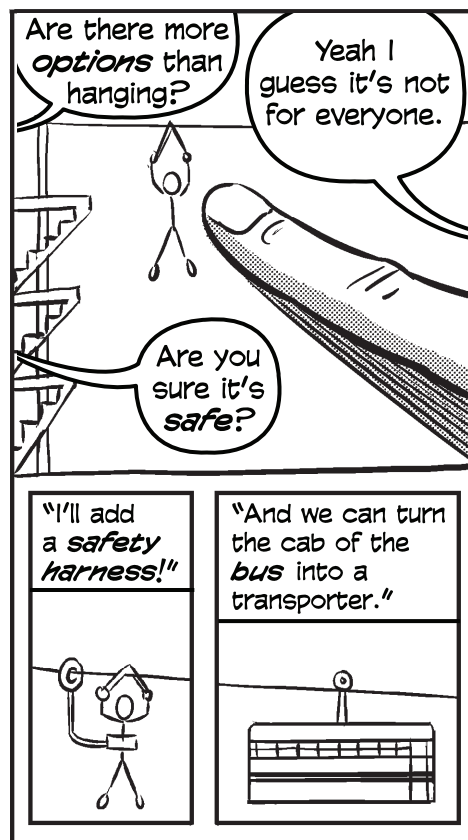
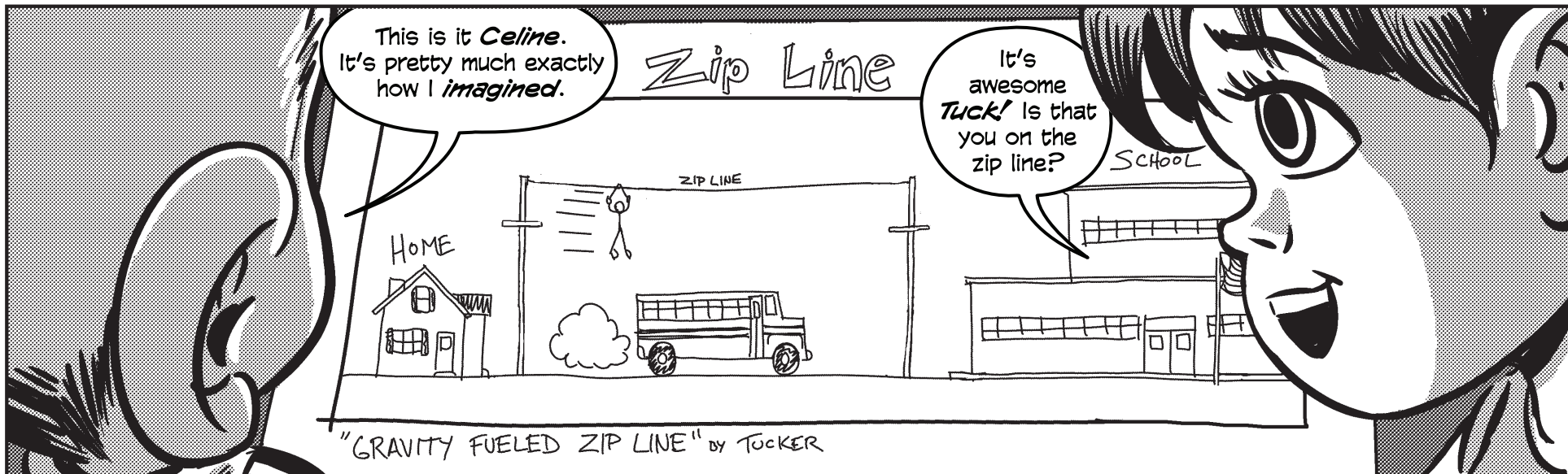




"It's your turn to *draw* from *life*! Look around you and try, as *accurately* as possible, to draw what you see. *Don't* make anything up for this one. *Copy* and *reference* anything at your disposal. Look at books, pictures on the internet, and most *importantly* look at the *world* around you. Ask yourself, why you're making each mark, what purpose does it serve?"





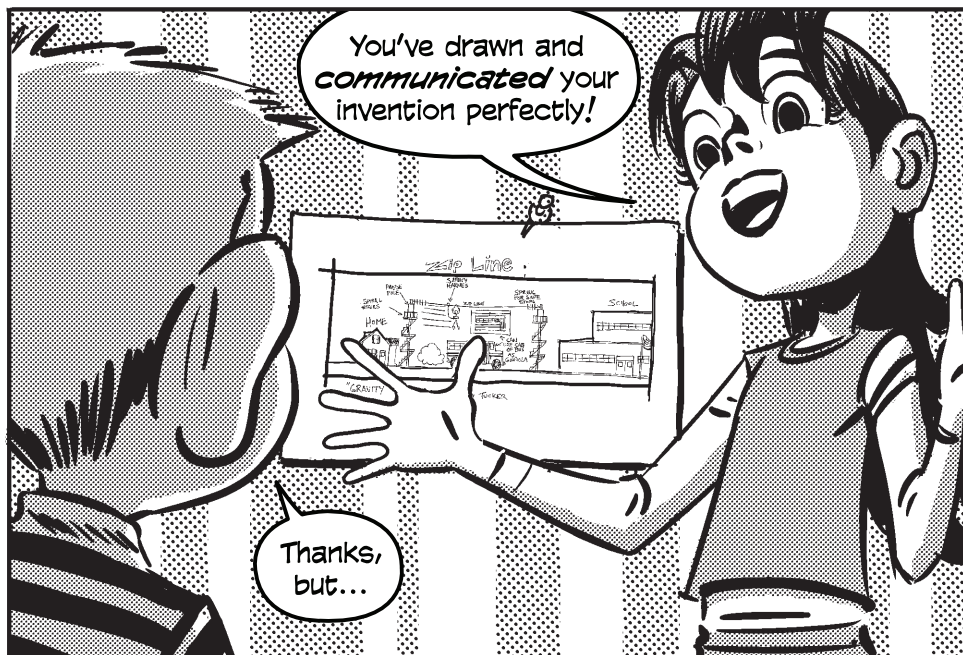
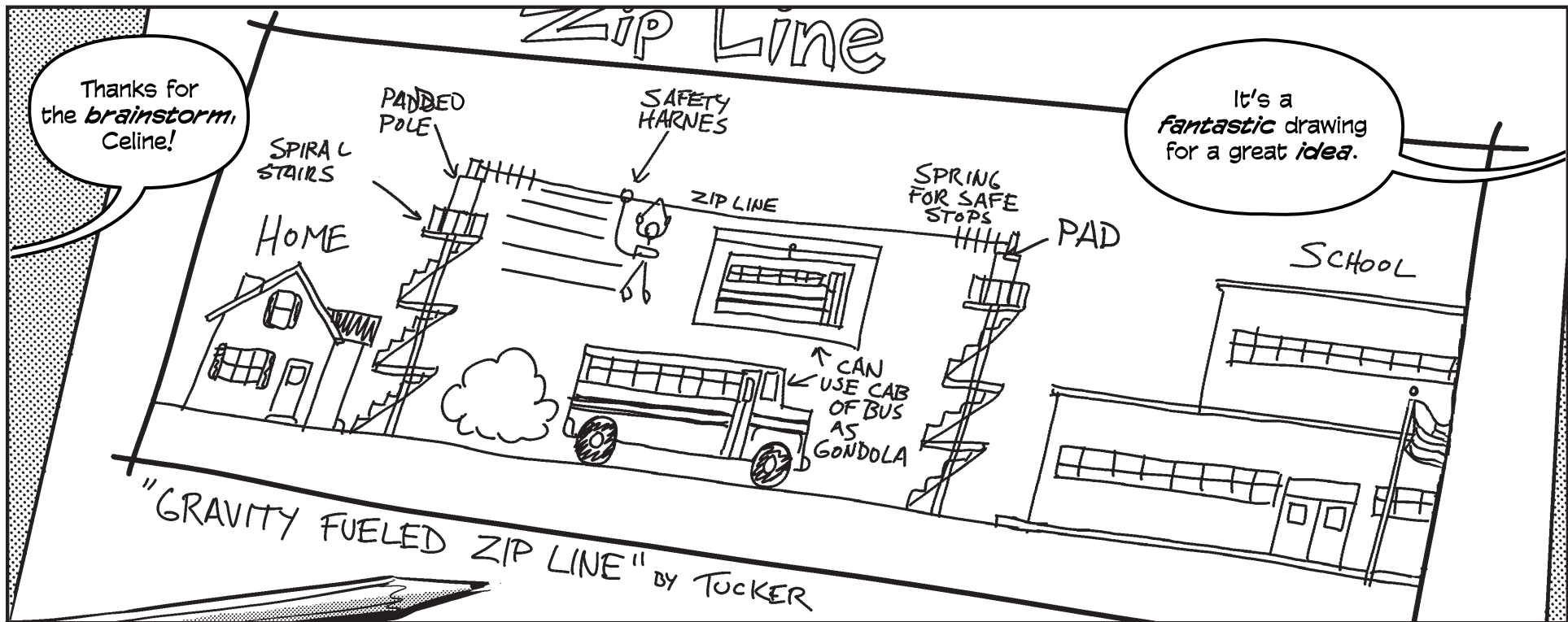




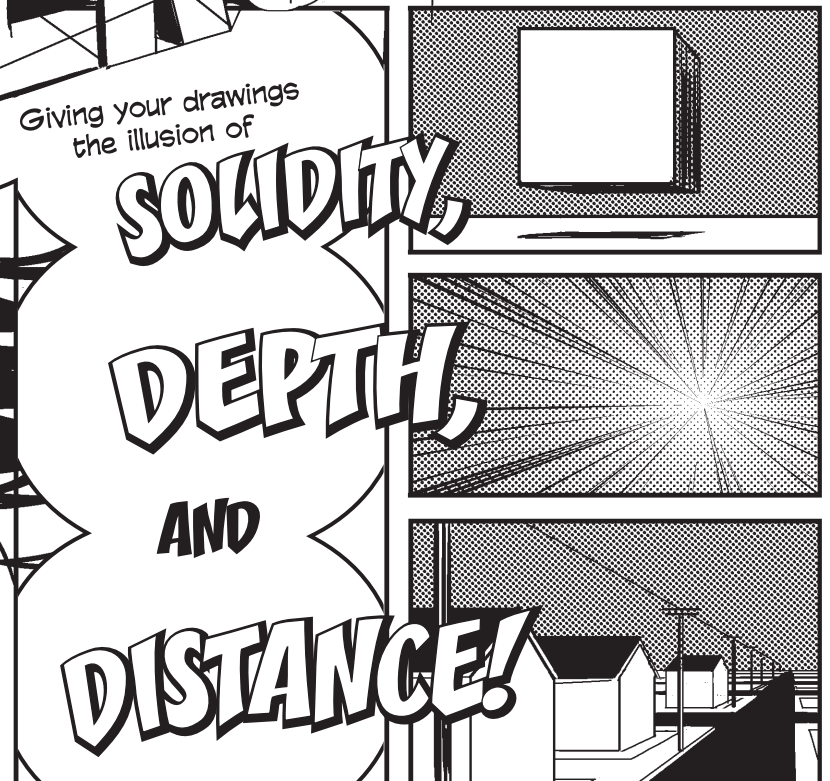
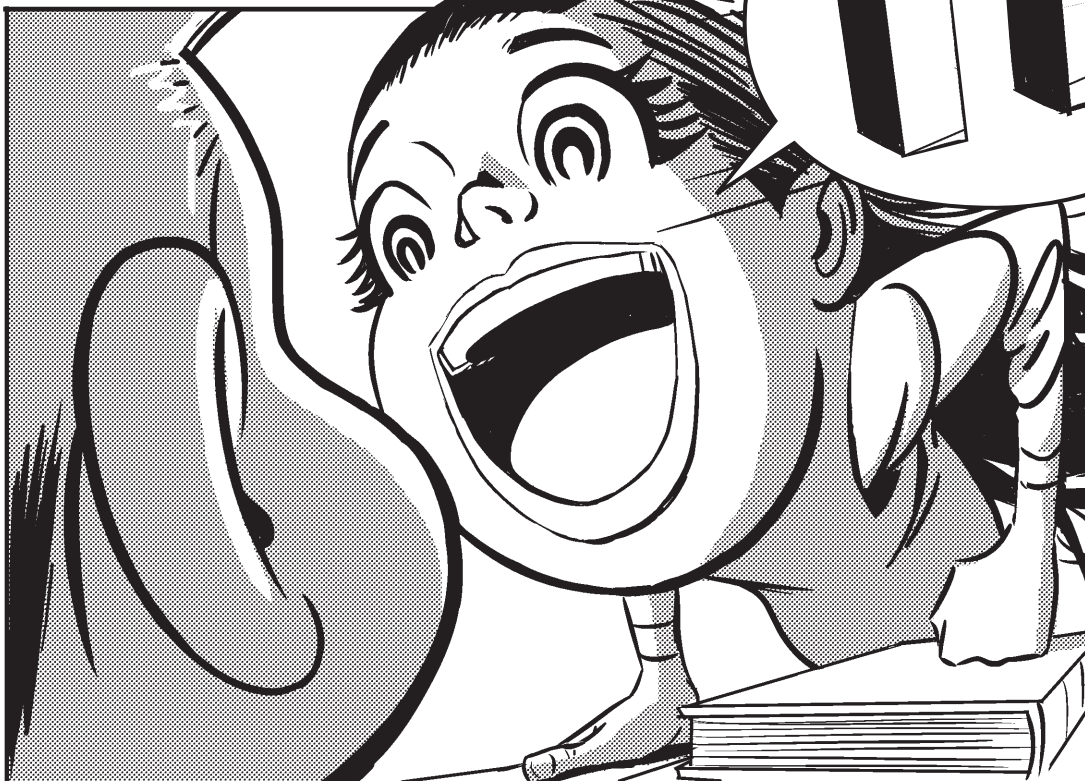


"*Alright*, now it's time for *you* to really think about and plan out that big idea. *Using* your pencil, generate some *thumbnails* in the smaller frames. *Think* about the different options for working out your idea. Remember *thumbnails* are *loose* concept sketches, *don't* get carried away with detail. Choose the best *thumbnails*, *refining* and *thinking* to make the finished fully realized drawing of *your* invention below!"

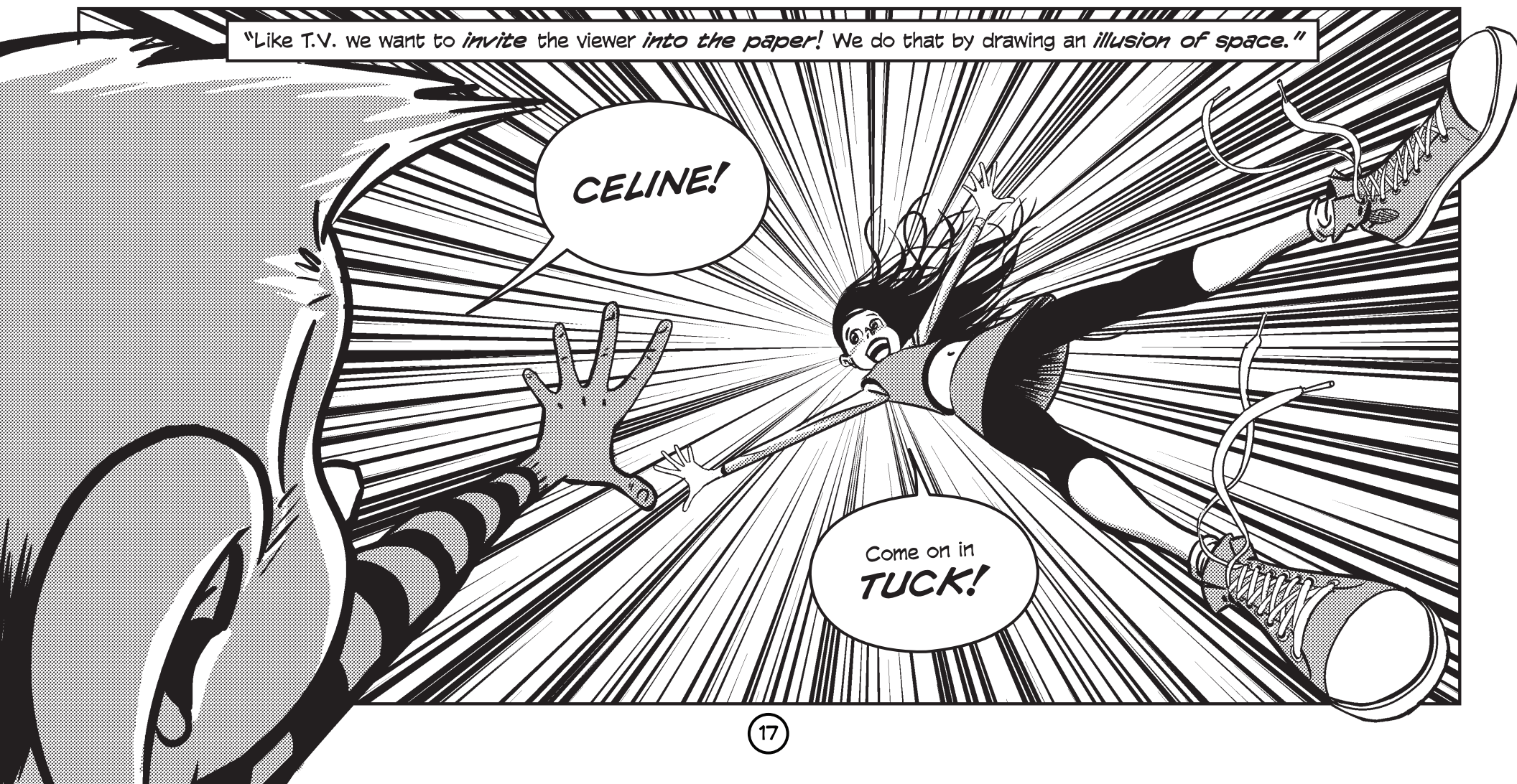
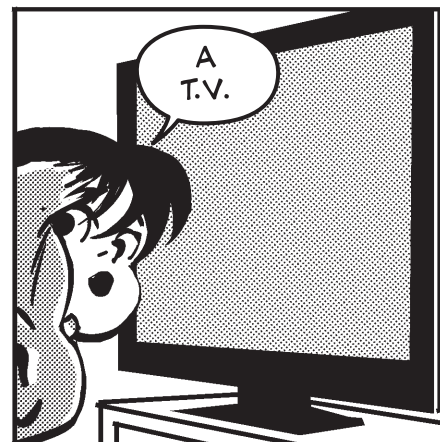
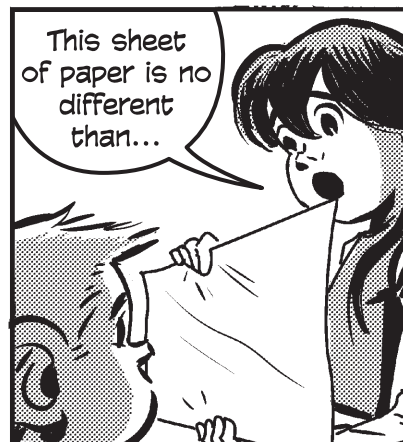
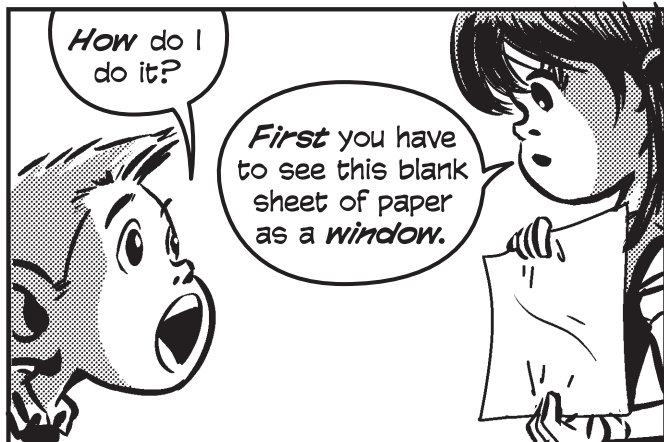

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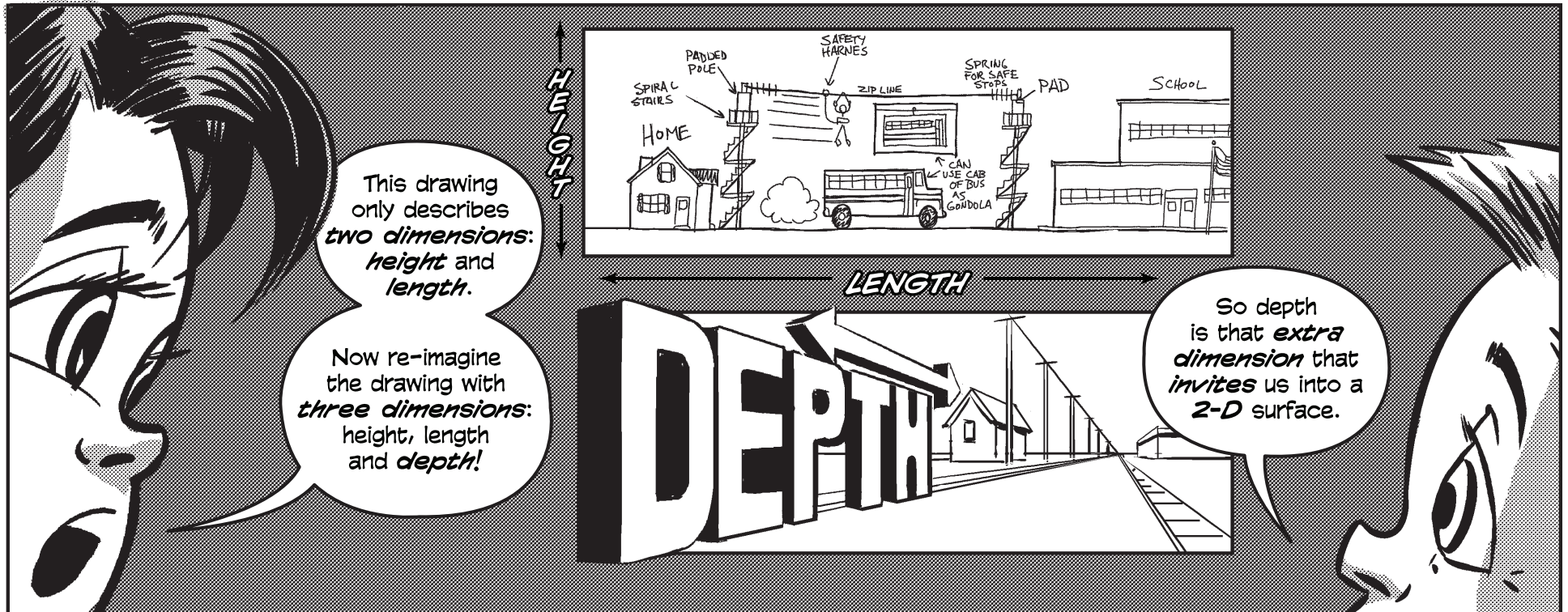




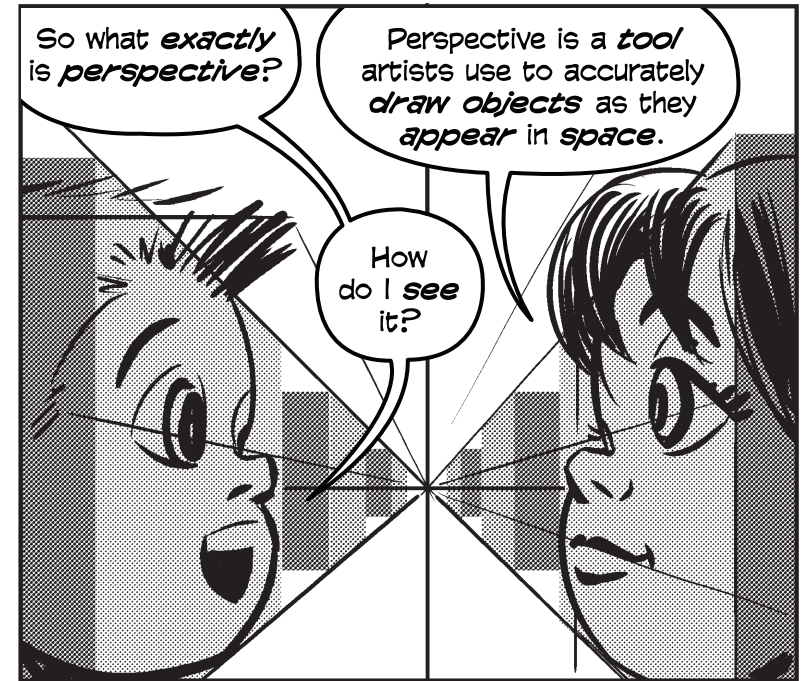
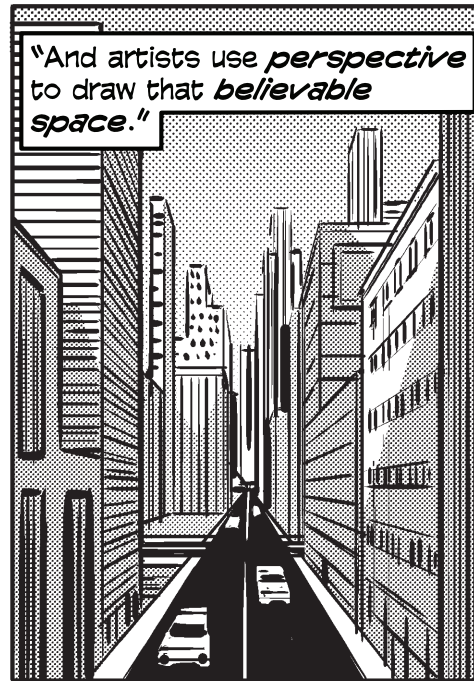
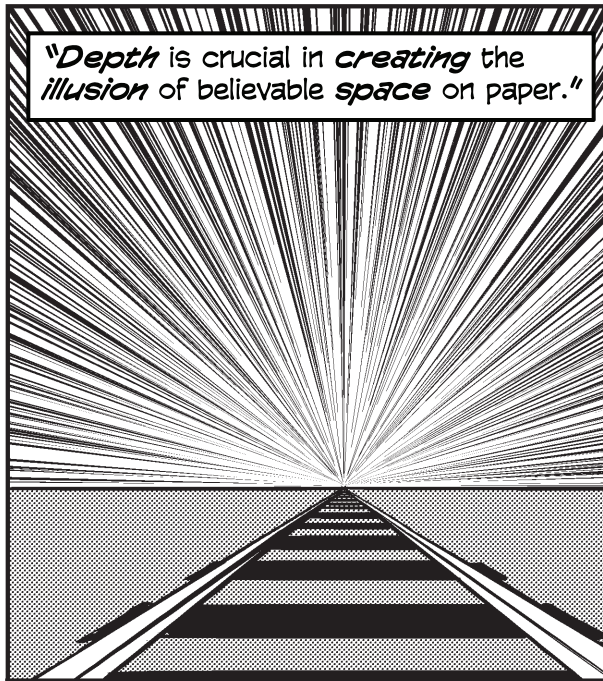




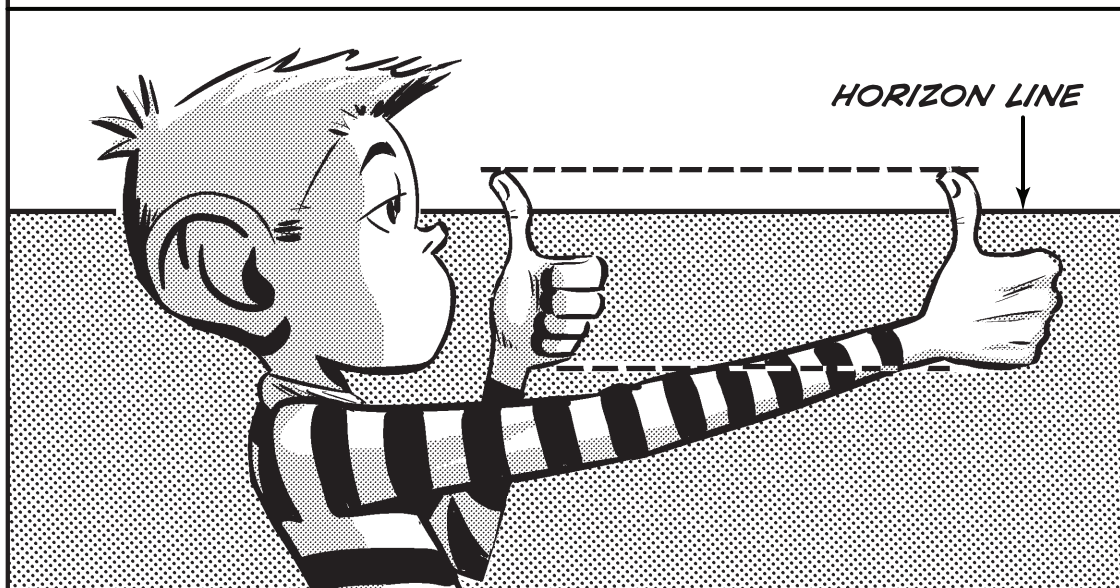
RRR!



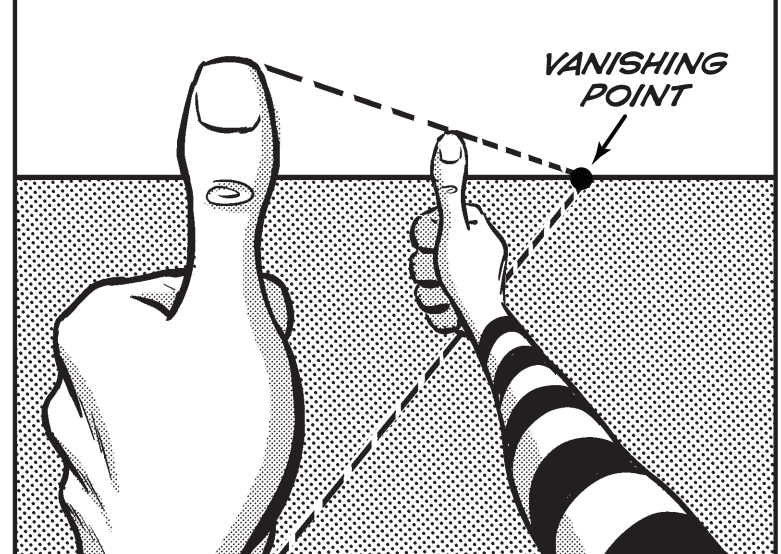




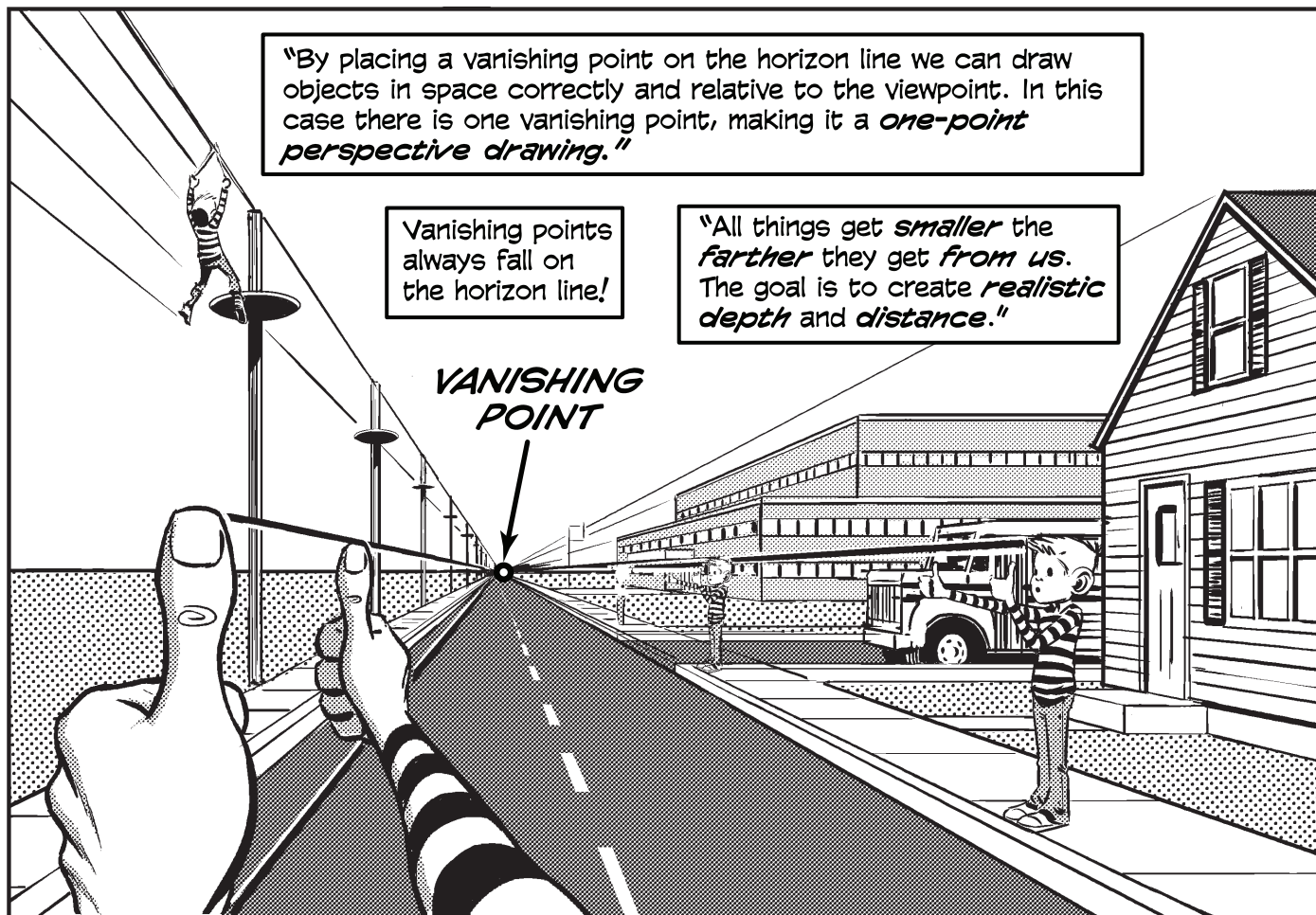
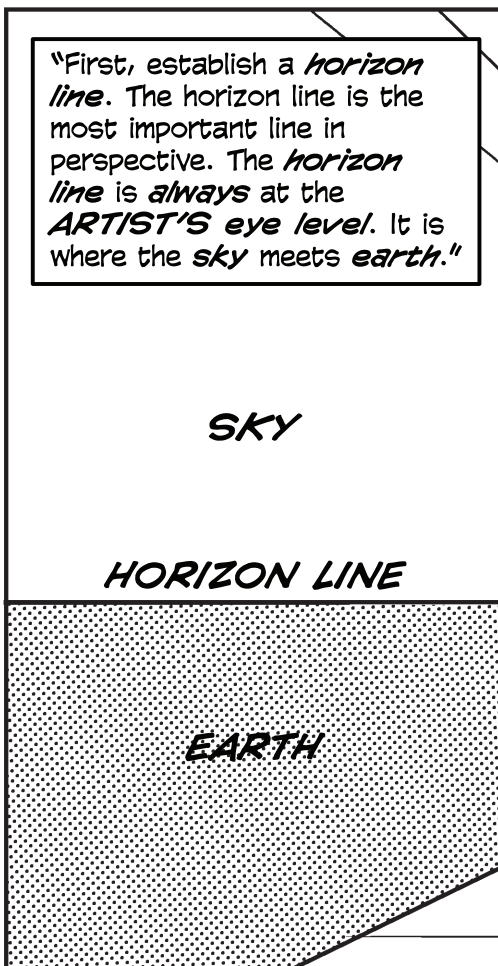
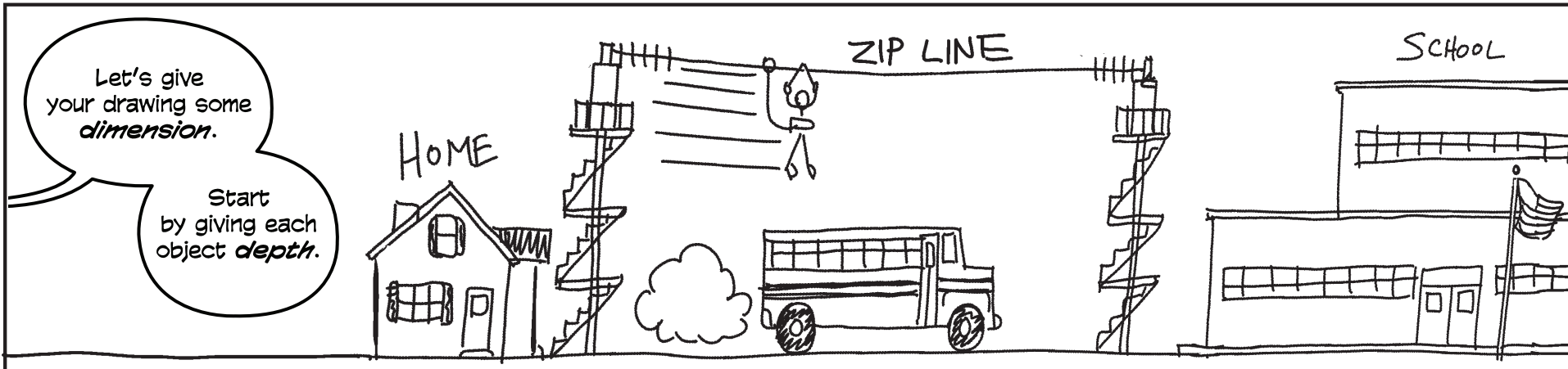
"Hold your *thumbs* up at eye level. From my viewpoint your thumbs are the same size. There is *no depth*! Your thumbs are *parallel* to the picture plane. We can illustrate that by drawing parallel lines above and below your hands."



"If we change the *viewpoint* to your *perspective*, the closer thumb is twice the size of the distant thumb. From your viewpoint there is *depth*! The *parallel lines* framing your hands now *converge* at a *vanishing point* on the *horizon line* creating the *illusion of distance*."

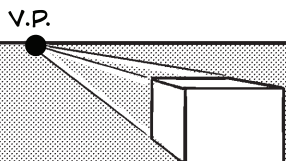




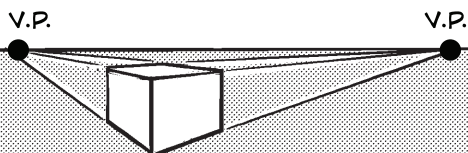


"We can change the angle of the view by adding vanishing points. Two is usually all we need."

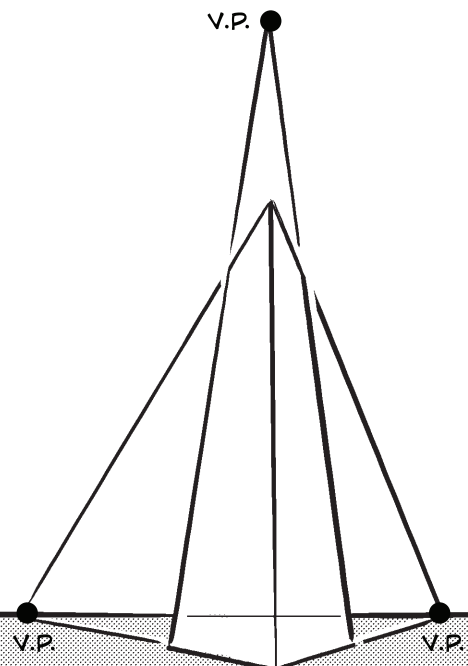
### ONE-POINT PERSPECTIVE



### TWO-POINT PERSPECTIVE

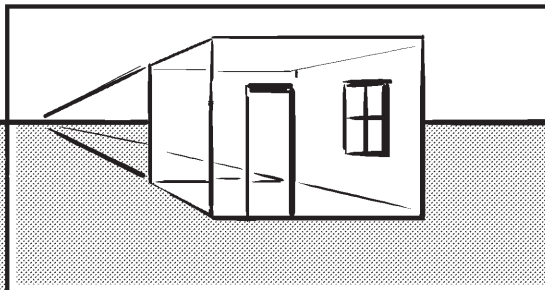


### THREE-POINT PERSPECTIVE

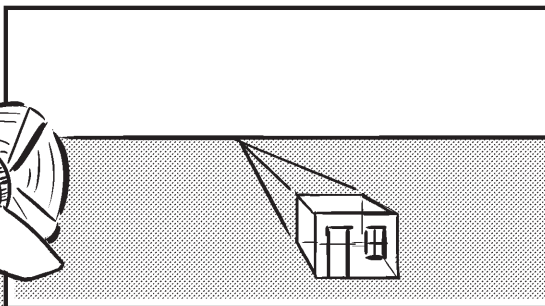
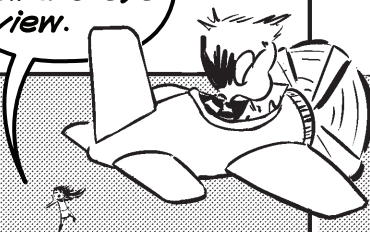


Look at how dramatic the effect is when we move the horizon line (the artist's view point). Like a movie director, you choose the shot that is best for your drawing.

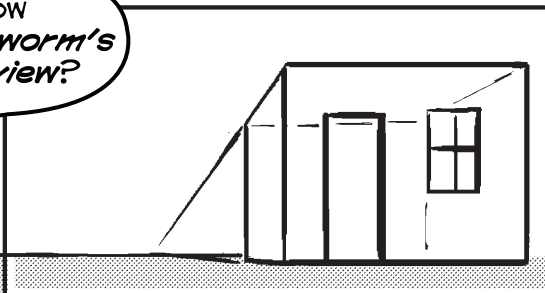
Give me a drawing from your eye level standing on the *ground*.



Now from a *bird's eye* view.



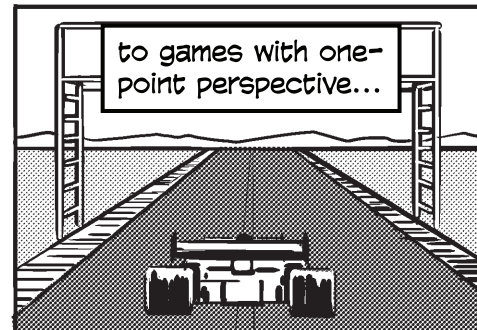
How about a *worm's eye* view?



Like art, video games also progressed from flat...



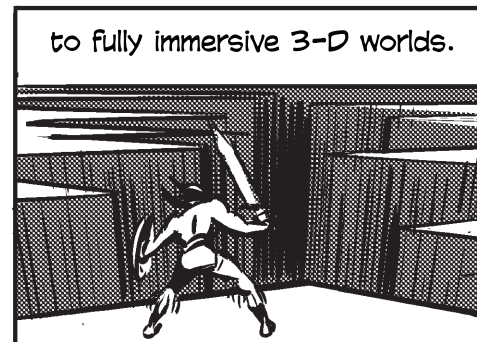
to games with one-point perspective...



to games with two-point perspective...



to fully immersive 3-D worlds.

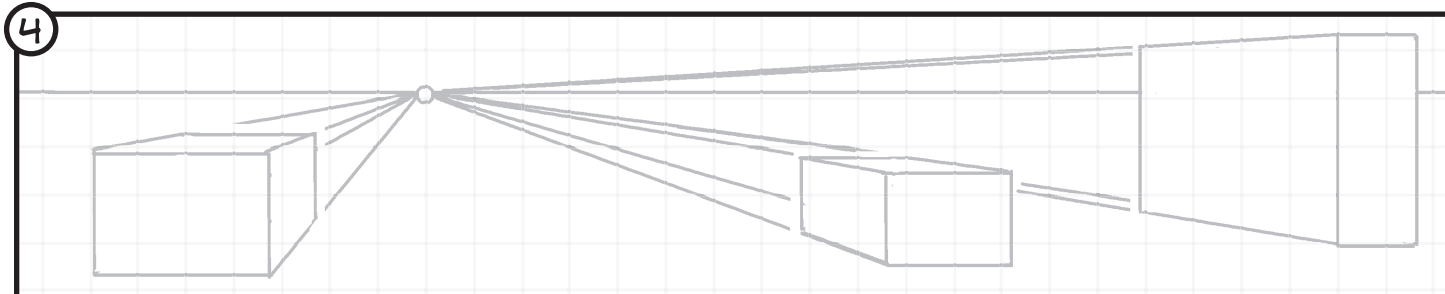
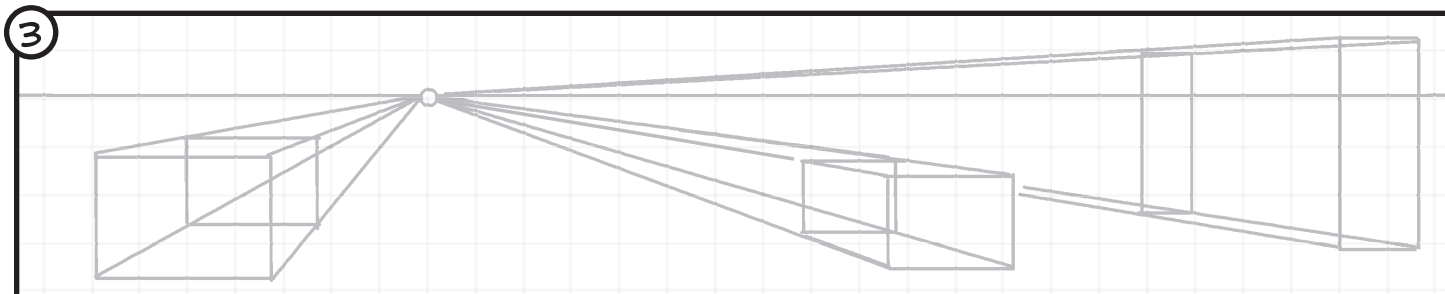
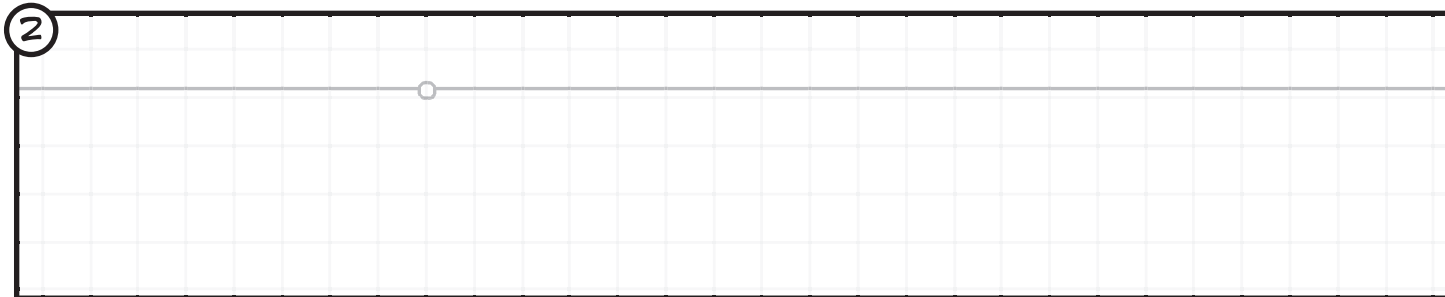
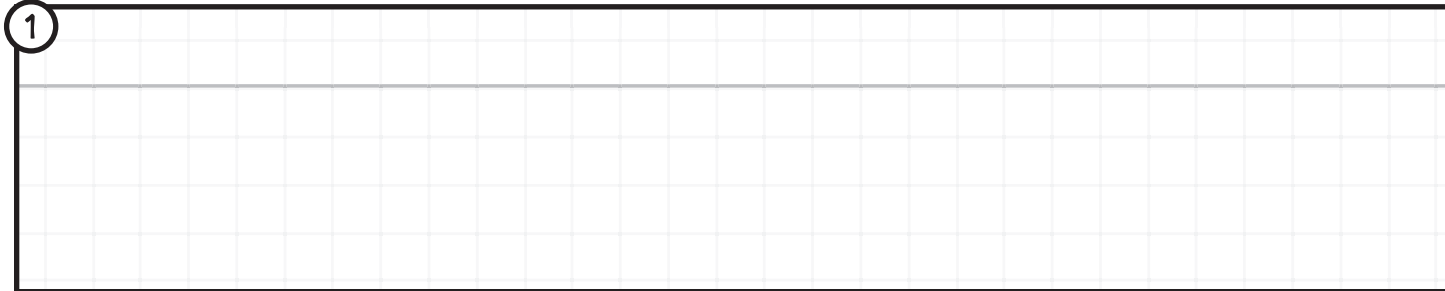




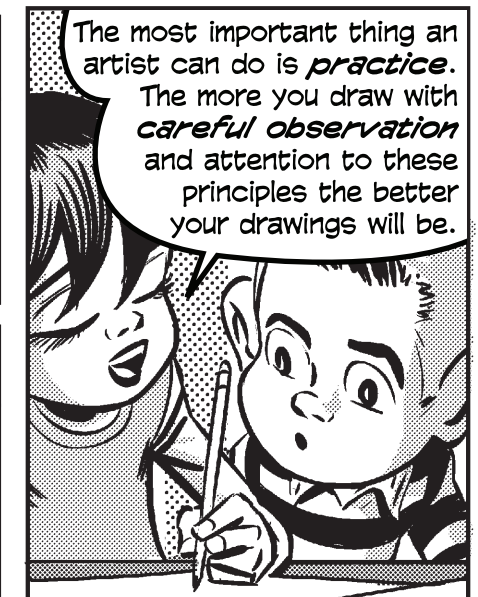
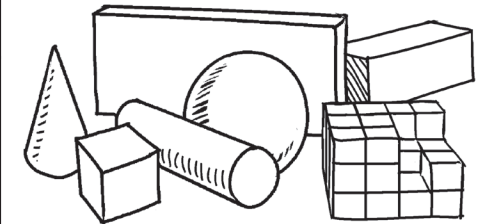


Are you ready to put your drawings into one-point perspective? Perspective drawing is one of the harder skills to master. Follow the steps below to get started. Trace the gray lines as guides for your first try.

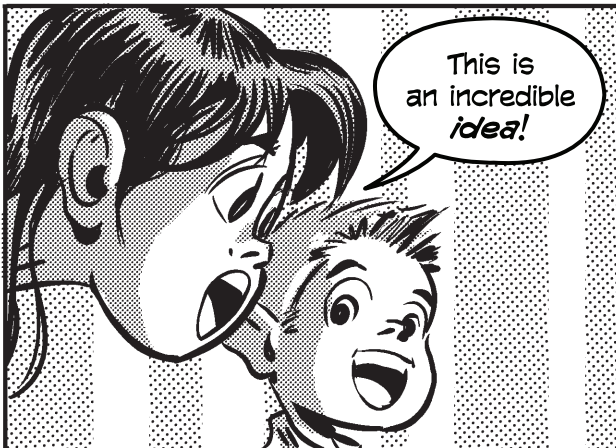
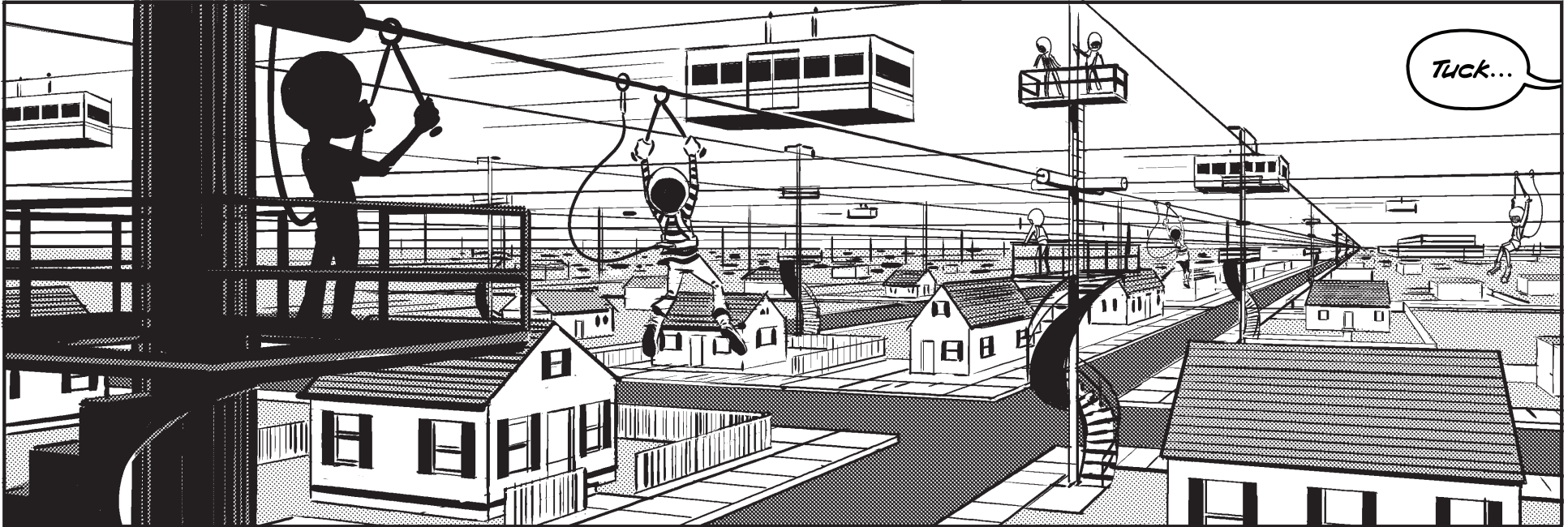
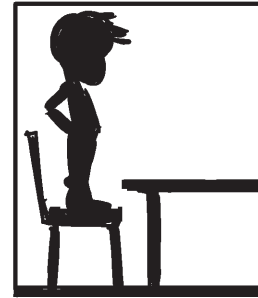
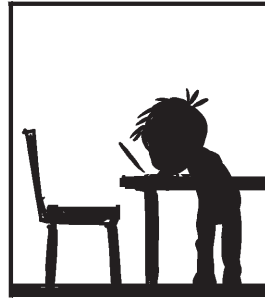
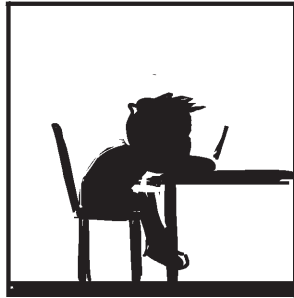
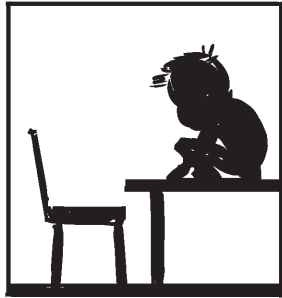
1. Draw a horizon line. This creates the viewers eye level.
2. Establish a vanishing point.
3. Draw various squares. From the corners of those squares draw lines back to the vanishing point.
4. Finish forms and erase interior lines that normally would not be seen.



"All objects can be broken down into simple geometric shapes: spheres, cubes, cones, cylinders, or a combination thereof. If you remember this rule and keep in mind how they relate to the horizon line (perspective) you will be able to draw anything."



The most important thing an artist can do is **practice**. The more you draw with **careful observation** and attention to these principles the better your drawings will be.



*The End!*



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