

# Hello!

- Let's do a technical check
  - How does your computer screen look? Can you see everything?
    - You can use “view option” if it needs adjusting
    - Is your camera on so we can all see you?
  - Can you mute yourself?
- Anyone new this week?
- What happened this week that was special?

# The Penrose Triangle and Other Optical Illusions

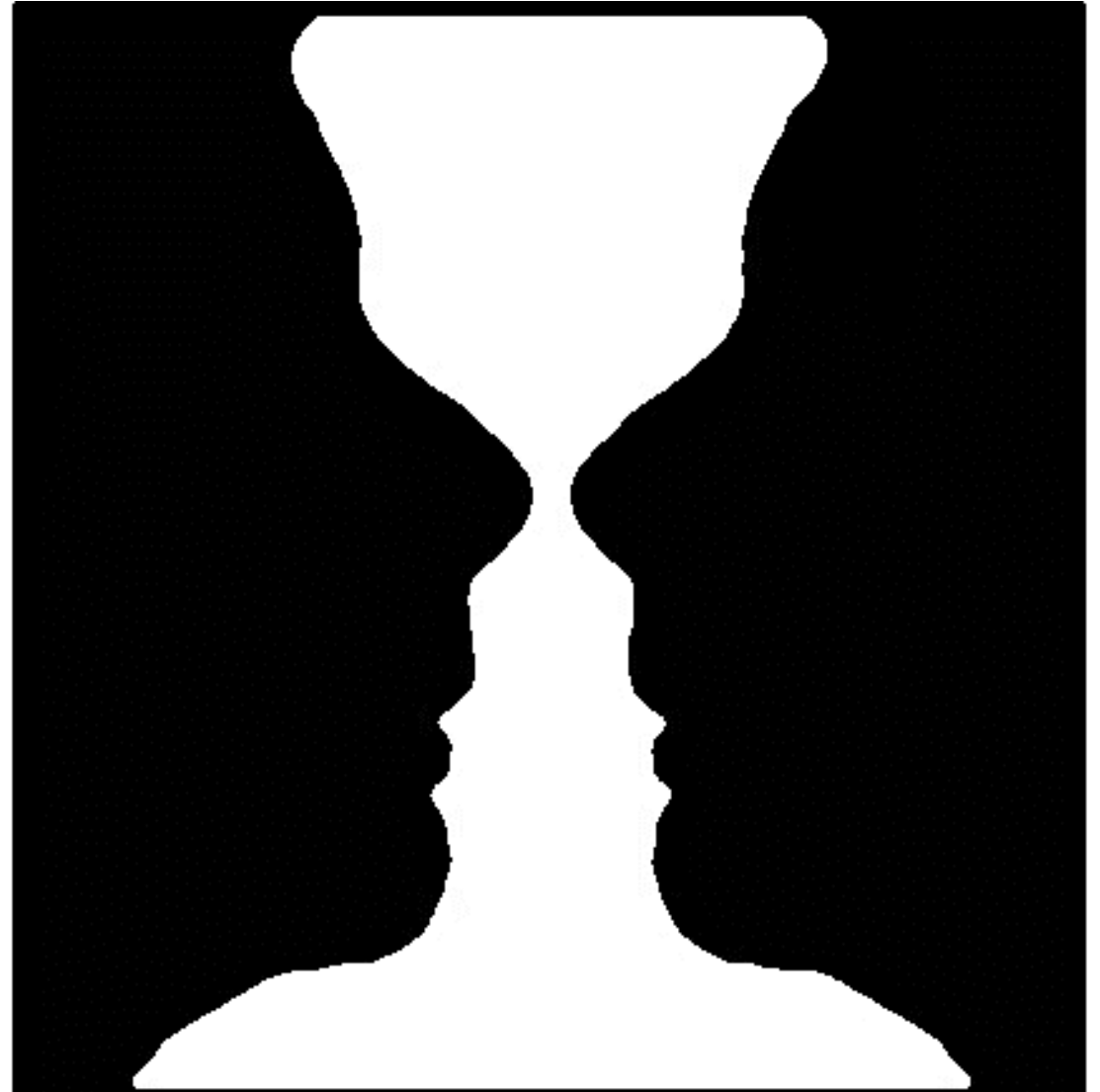
What is an optical illusion?

# What is an optical illusion?

- An optical illusion uses color, light, and patterns to create images or pictures that can be deceptive or misleading to our brains. ... Optical illusions occur because our brain is trying to interpret what we see and make sense of the world around us. Optical illusions simply trick our brains into seeing things which may or may not be real.<sup>1</sup>
- Sometimes, what you see is impossible! Let's look at some ....
  - What do you see?

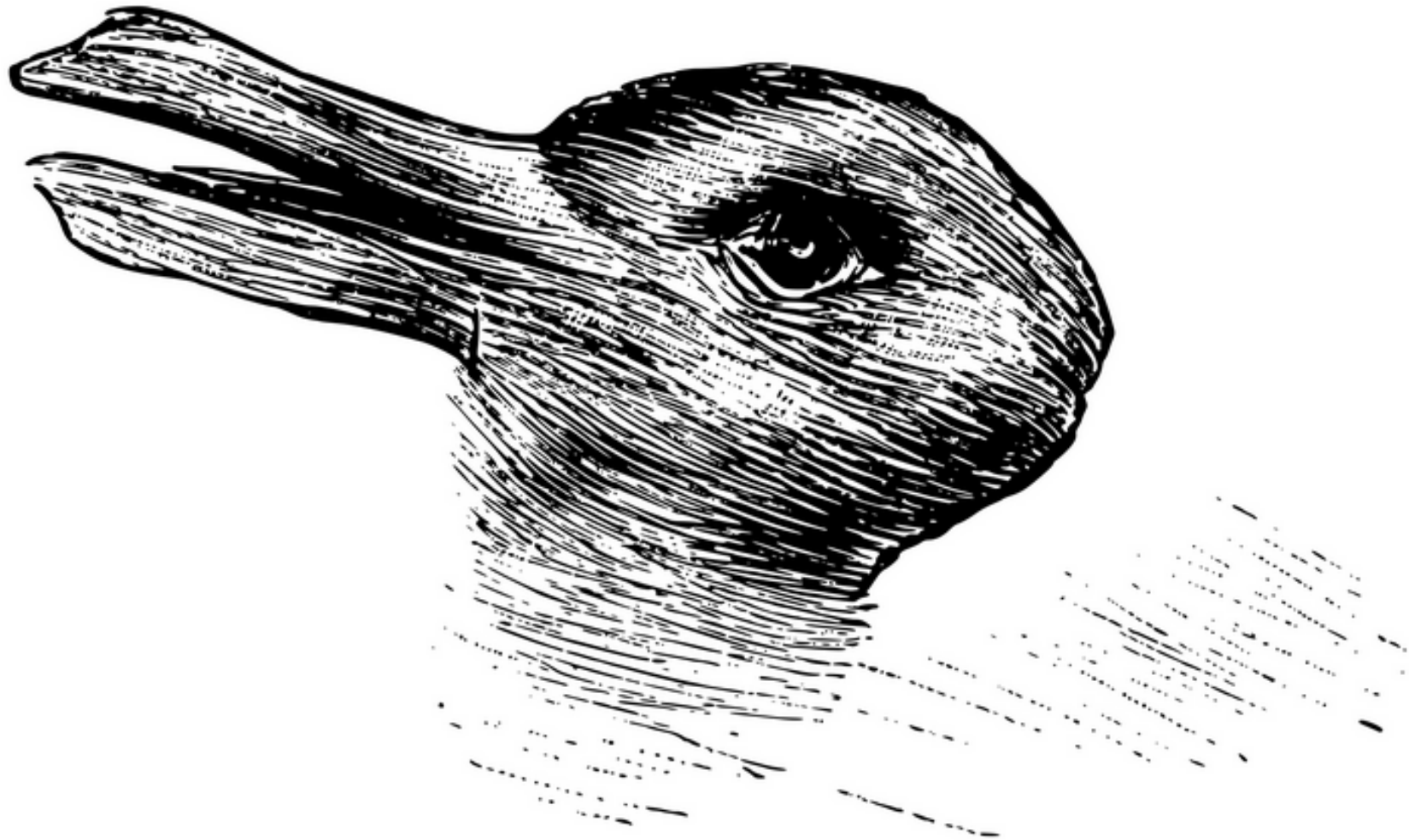
# Rubin vase

- This is an “ambiguous” optical illusion. It is called the Rubin vase.









**What do you  
see?**

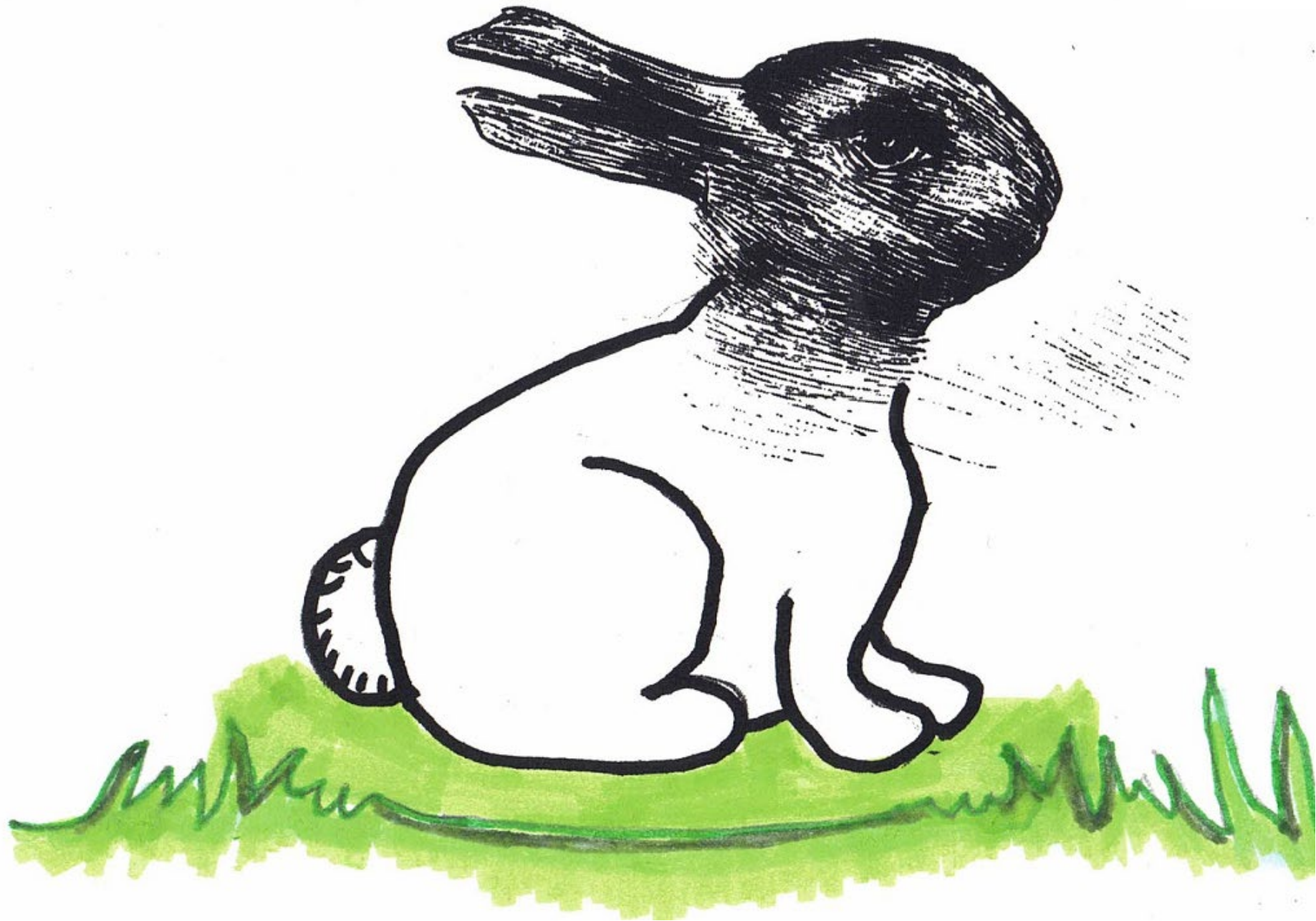
The Duck-Rabbit (courtesy of  
Wikimedia Commons) <sup>2</sup>

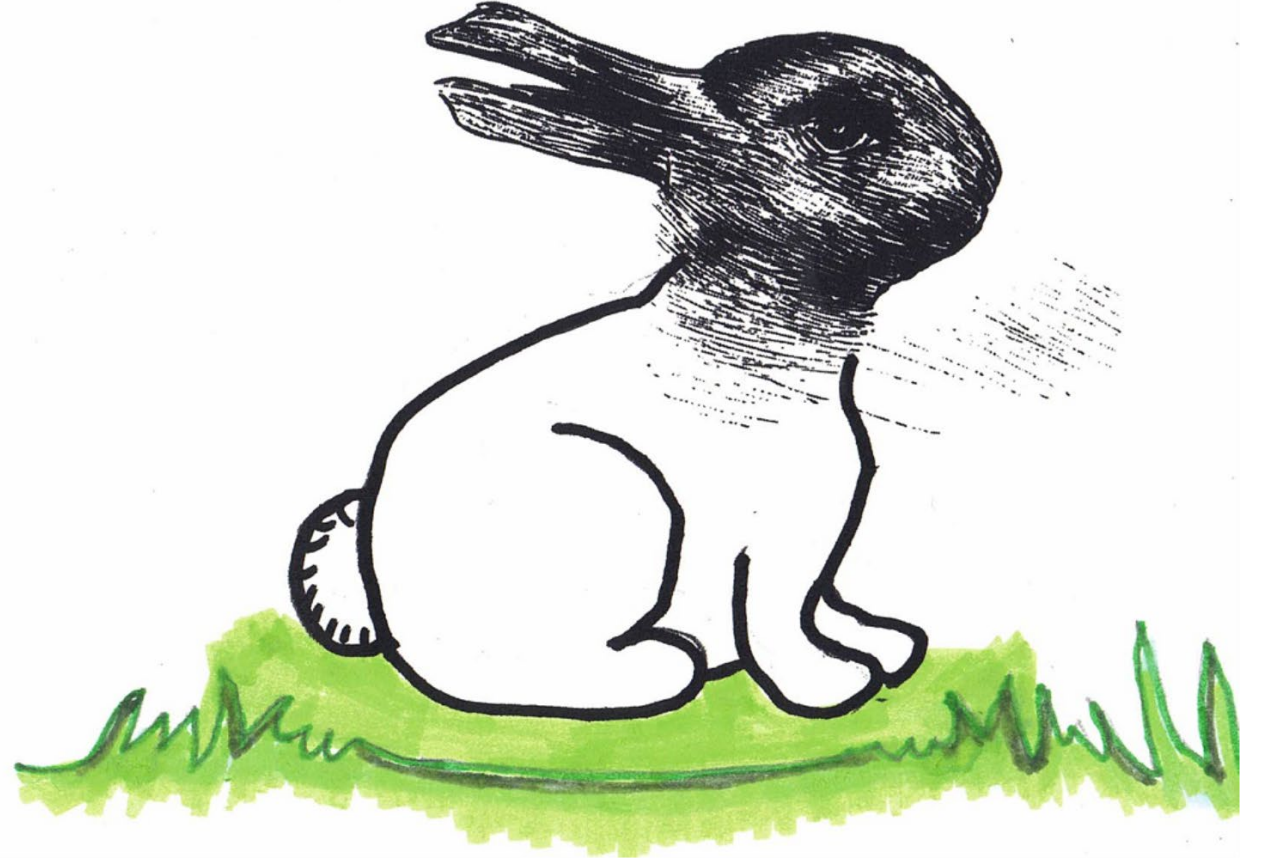
As a duck

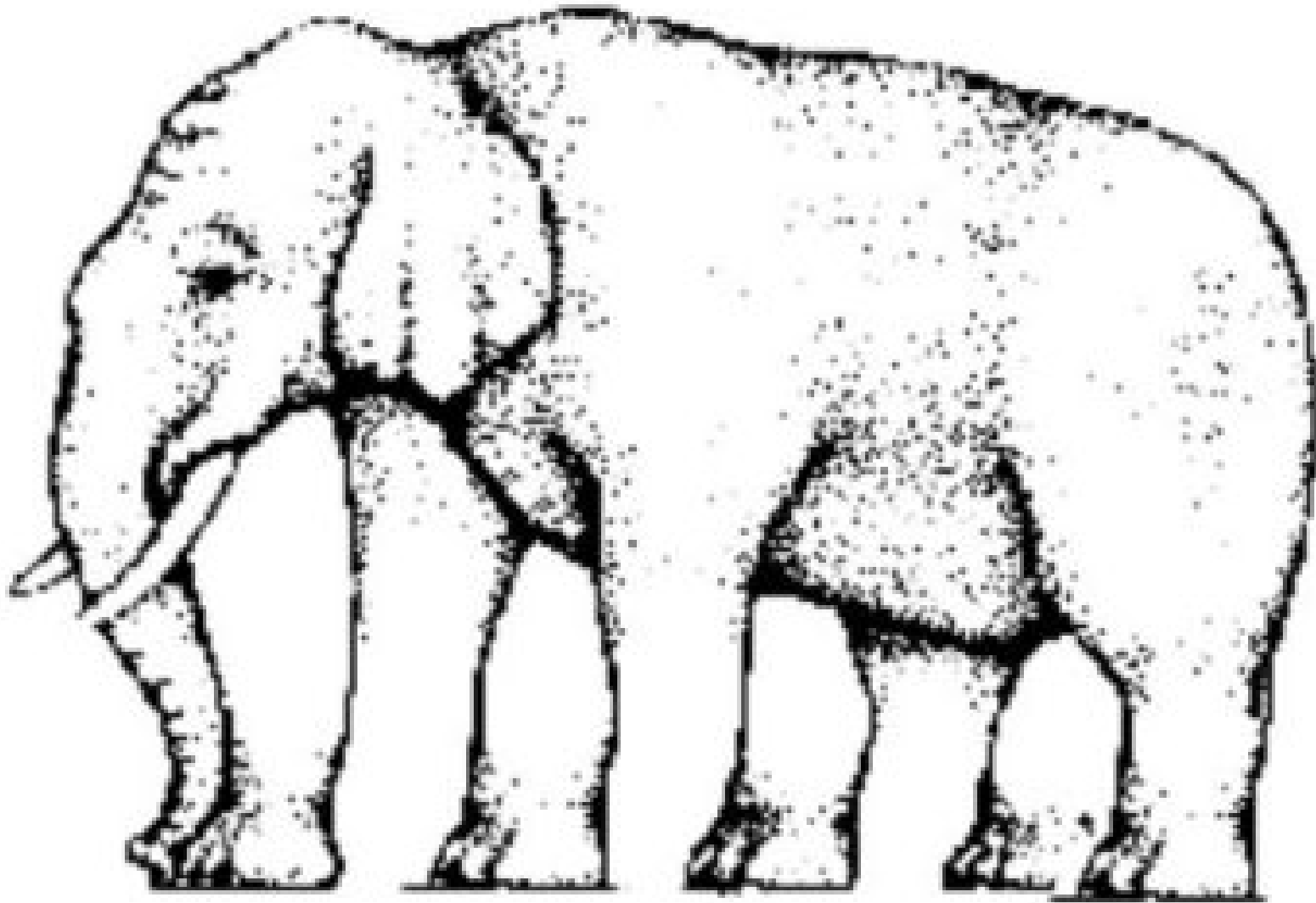




As a rabbit







**This one is tricky.  
How many legs  
does the elephant  
have?**

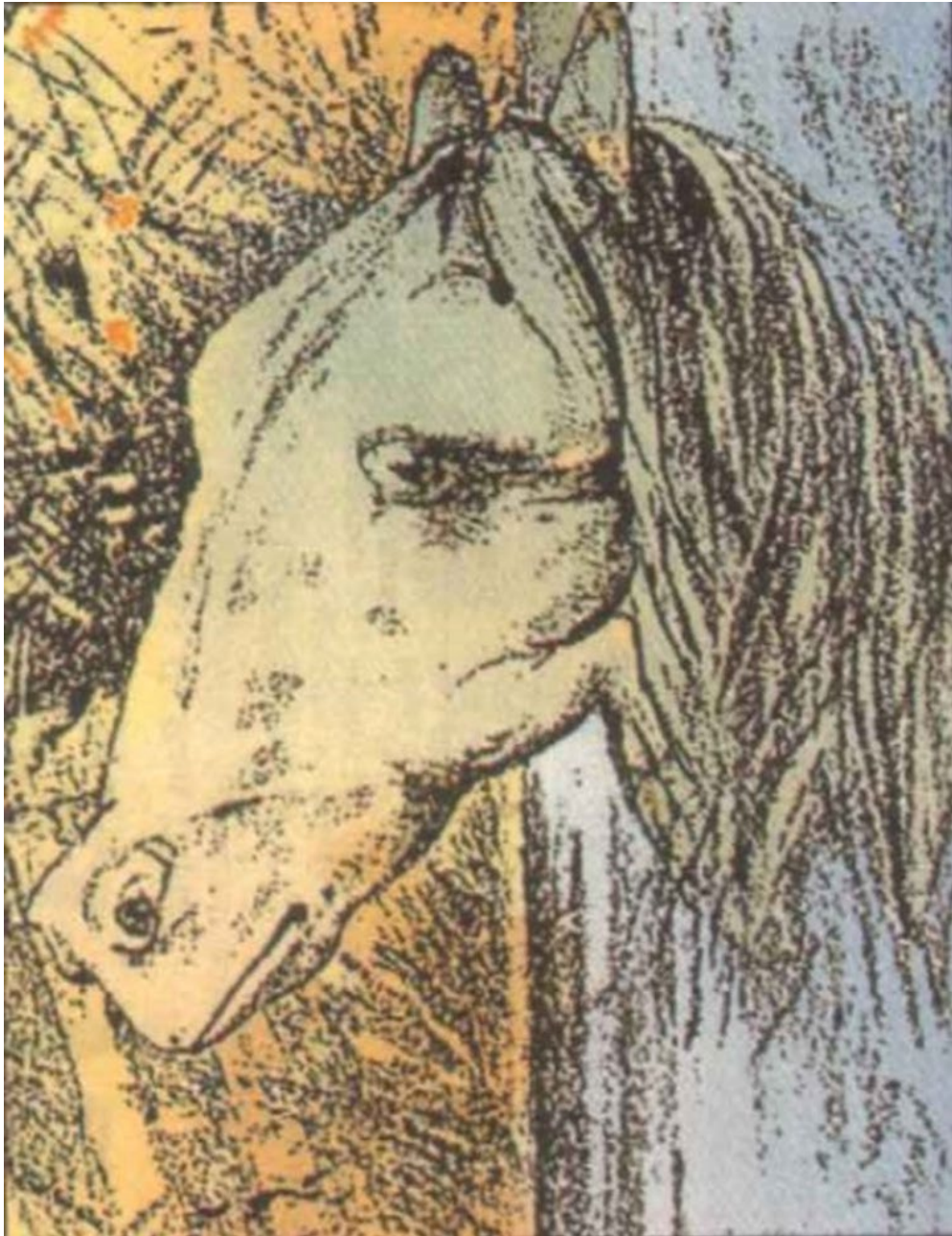
"L'egs-istical quandary" created by scientist  
Roger N Shepard published in his book *Mind  
Sights* in 1990, on page 79.<sup>3</sup>



**How did the  
photographer do  
this?**

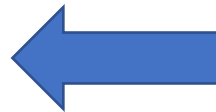
Photo<sup>4</sup>





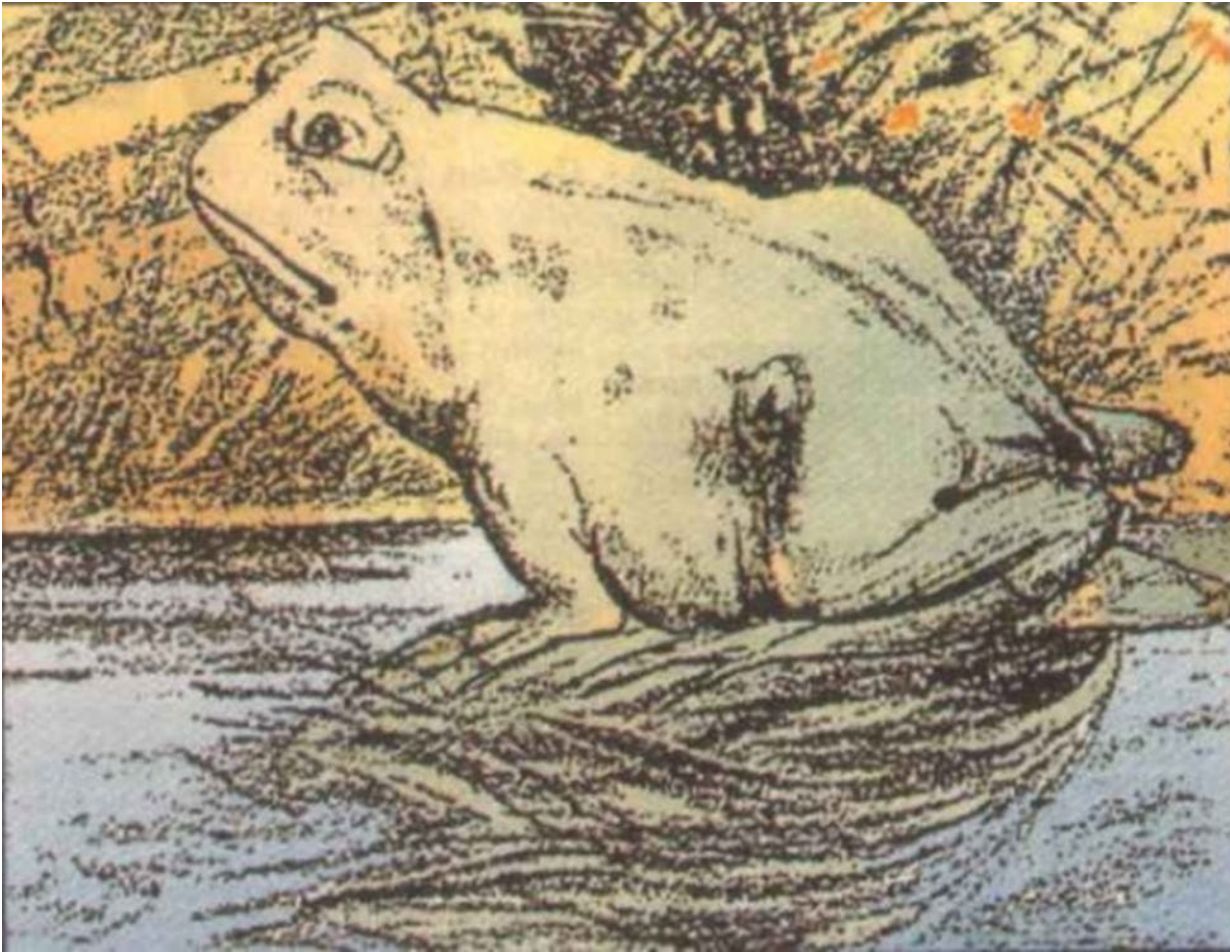
Our eyes and brain are looking for something we know, something real, but . . .

- Sometimes we get “stuck” on **our** way of looking at something.
- What is the first thing you see here?



Photo<sup>5</sup>





Did you see a frog or a horse?

# There is no right or wrong answer

- Having an open mind ...
- When we look at something, especially with other people, we do not really know how the other person sees. It might be different!
- We need to be patient and try to see and understand what the other person sees.

We can draw our own optical illusion; an impossible object call a **Penrose Triangle**.

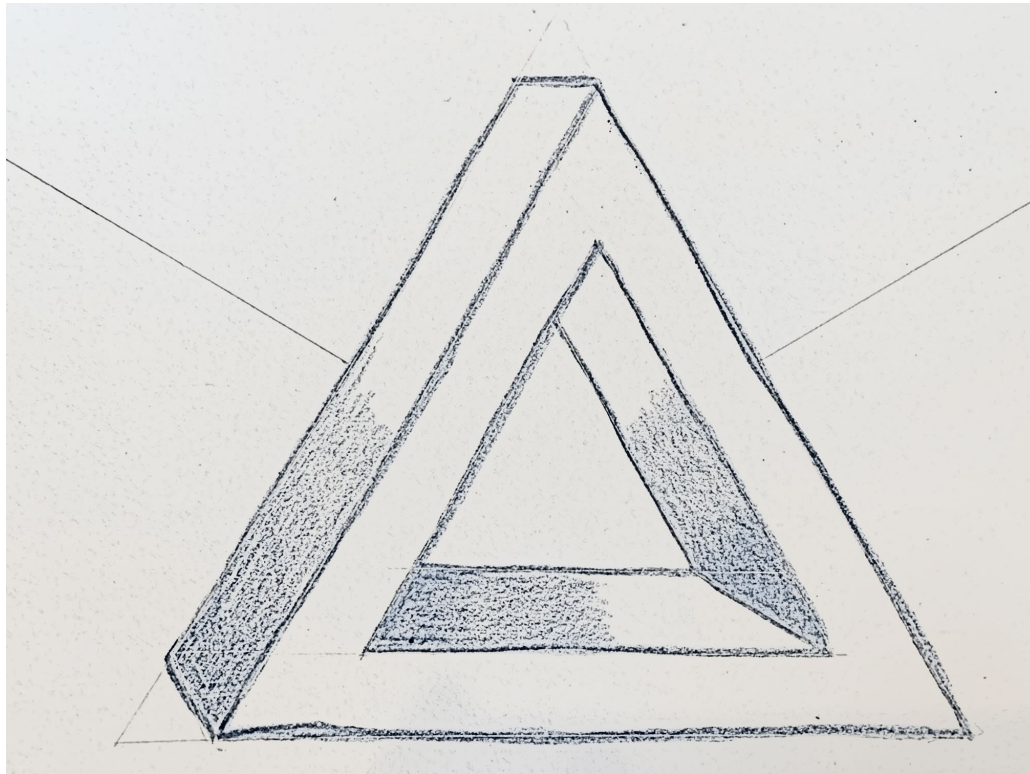
- You will need:
  - Piece of paper
  - Pencil
  - Colored pencil or crayon
  - Eraser
  - Straight edge



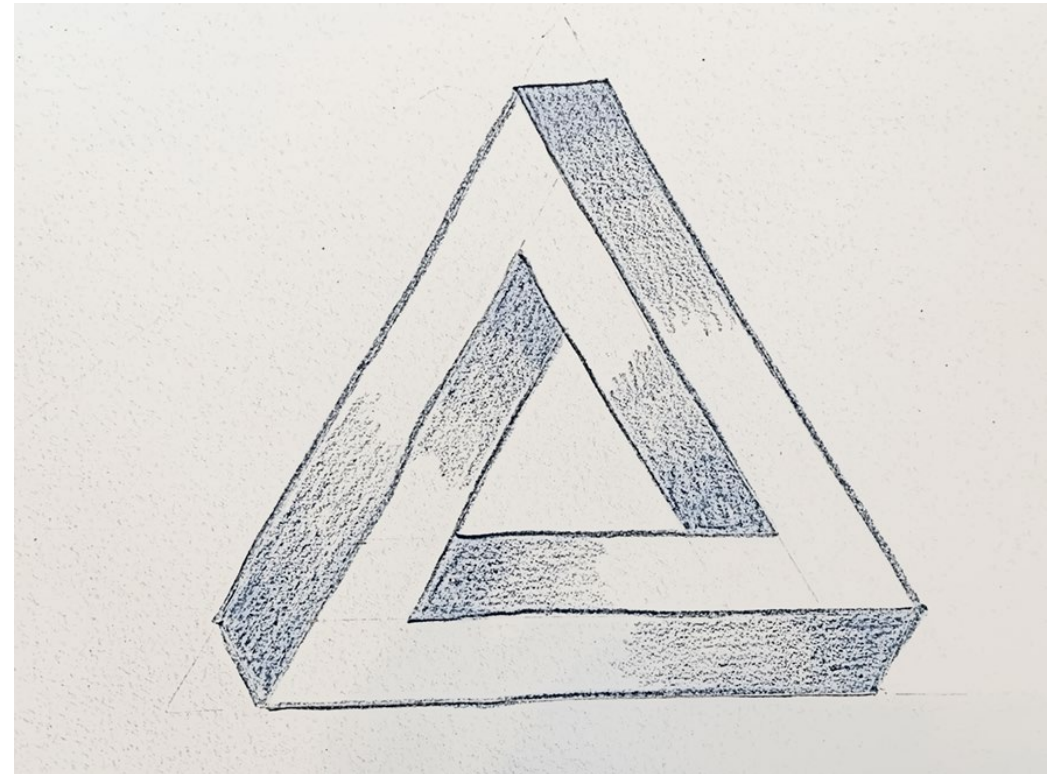


# Compare regular 3-D drawing to Penrose

**Paper drawing of 3-D Triangle**

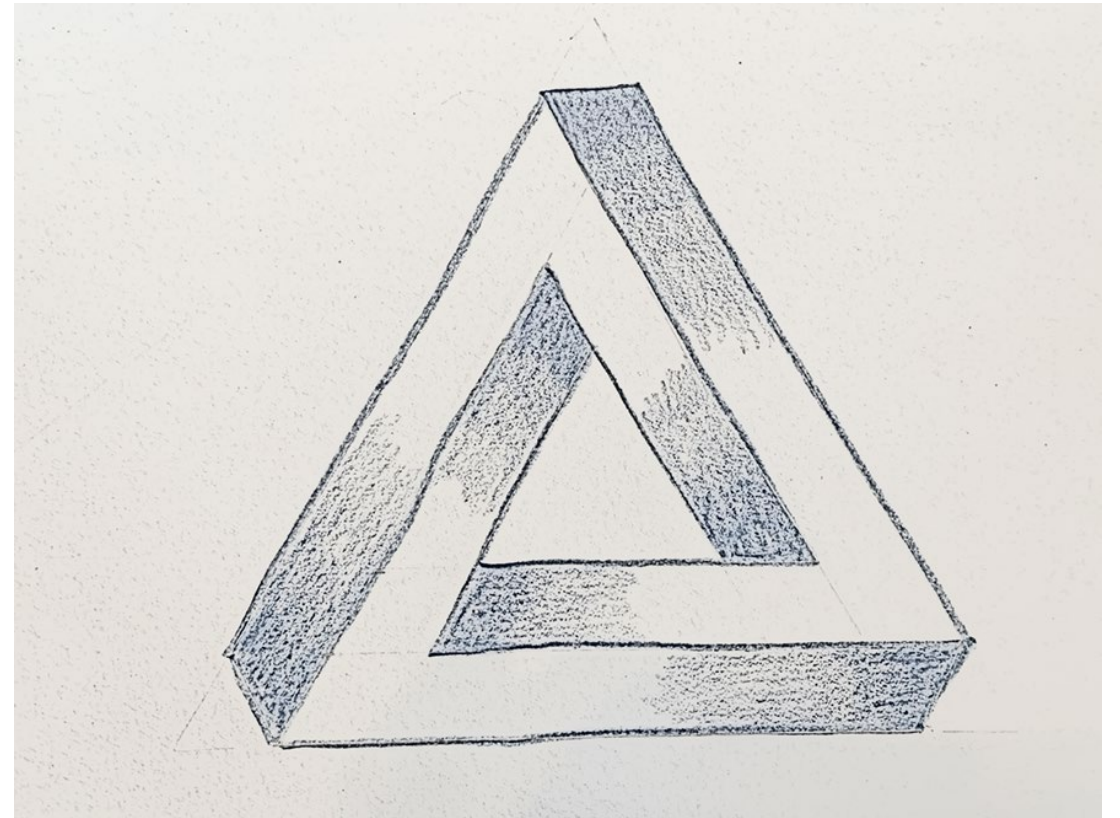


**Paper drawing of Penrose Triangle**



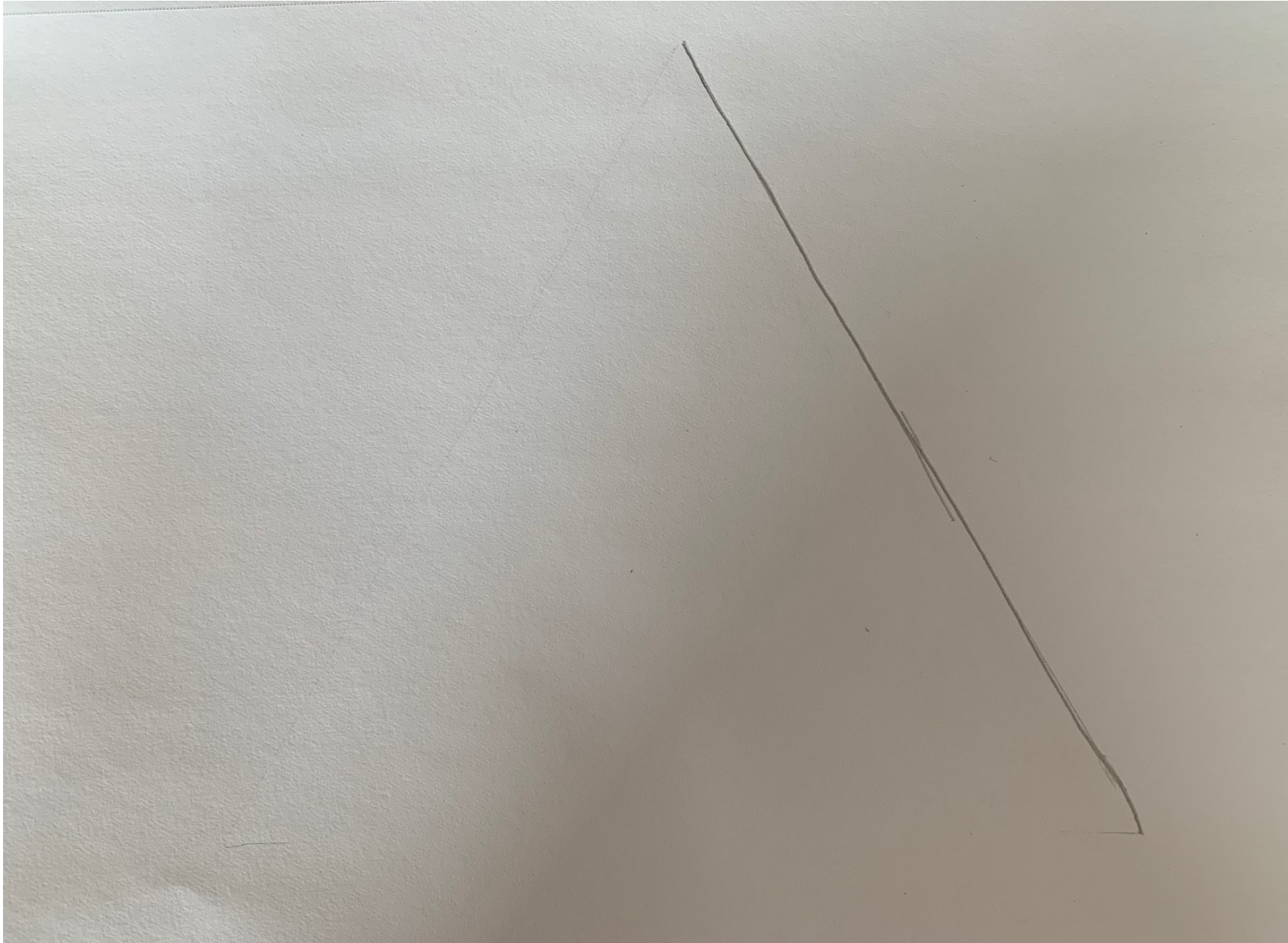
When we look at this drawing, it confuses our brain. It's impossible, but it can be drawn.

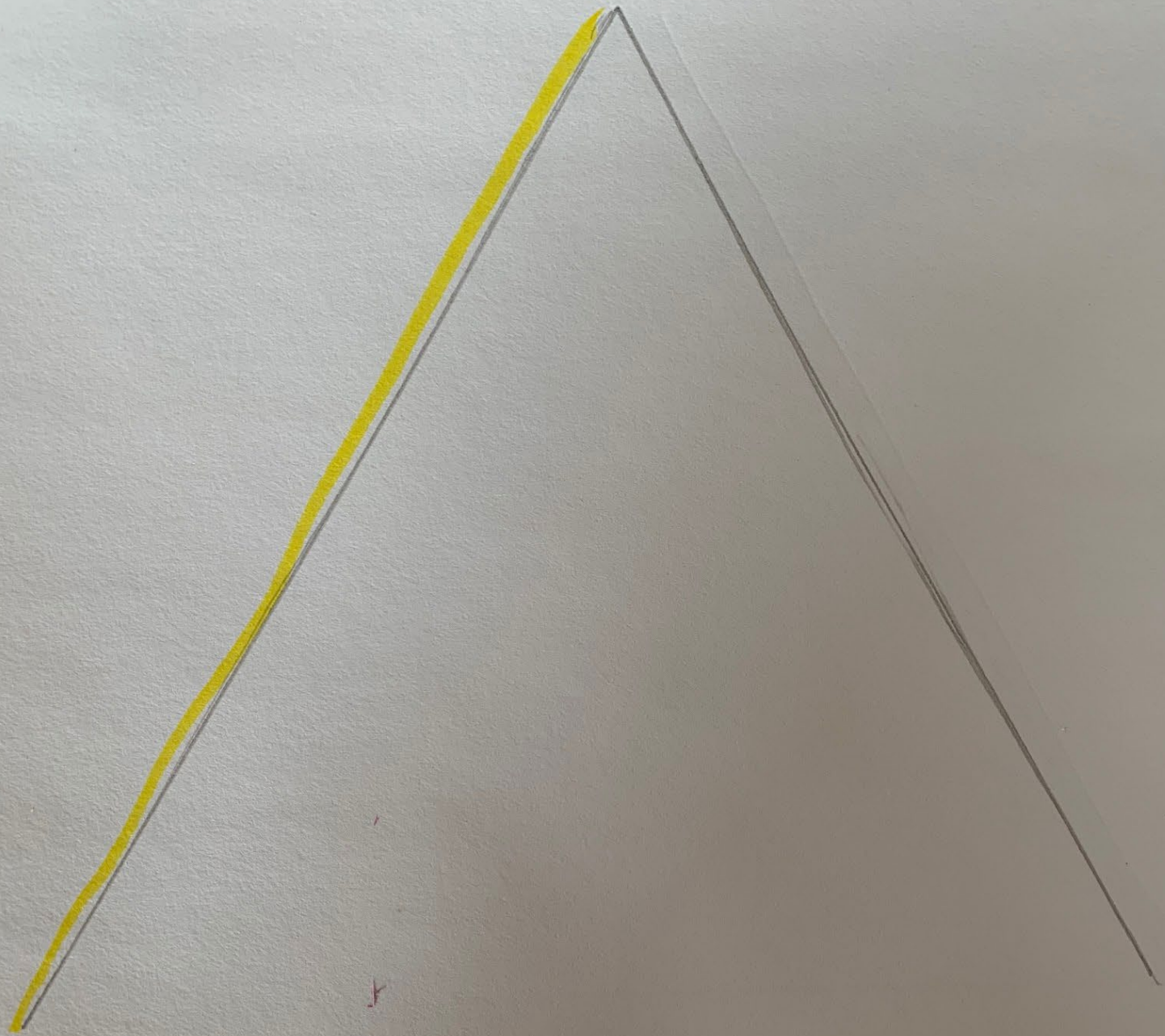
Our mind wants to see this as if it were a real triangle, but it is an optical illusion.



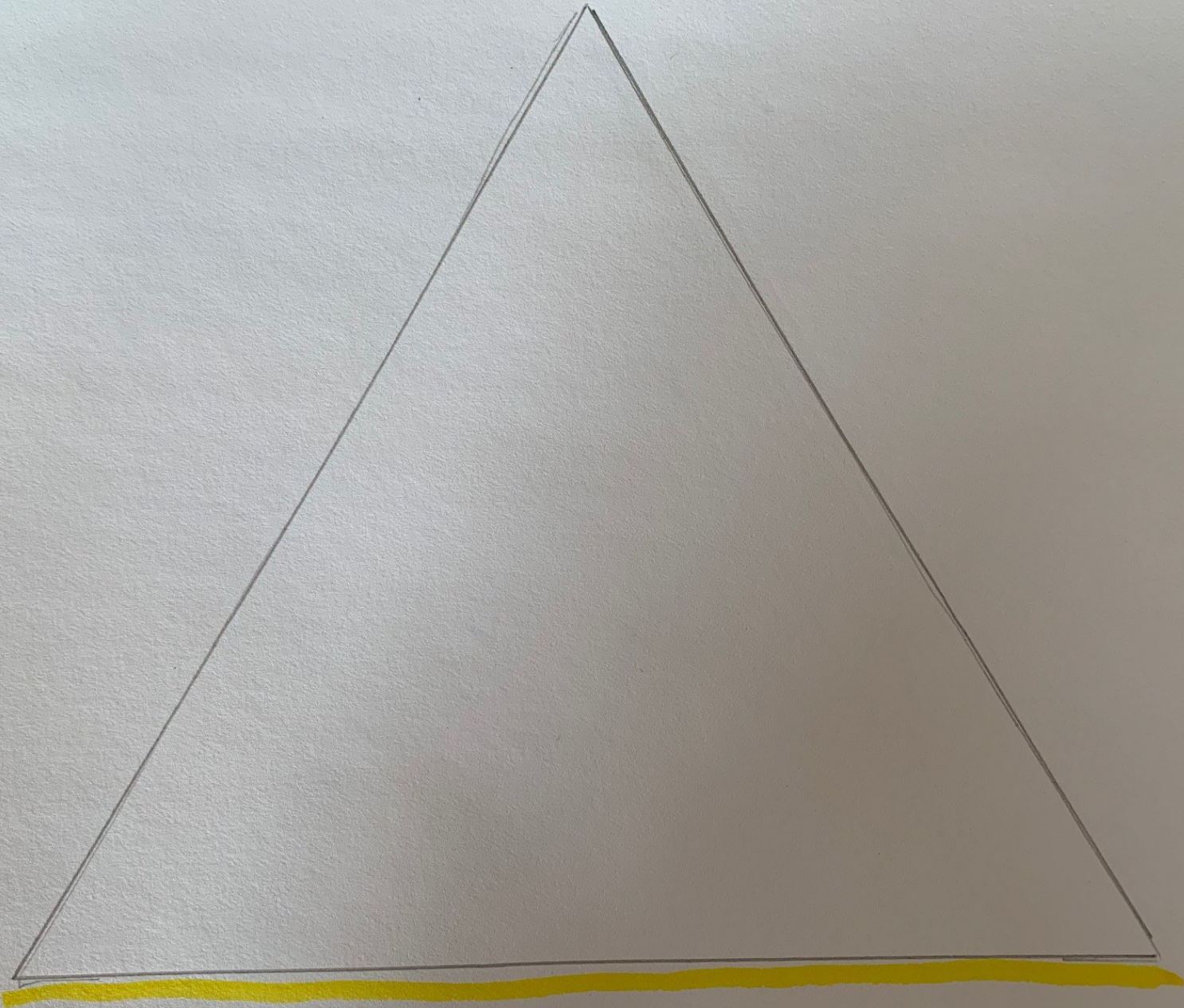


Making the triangle using 9 lines

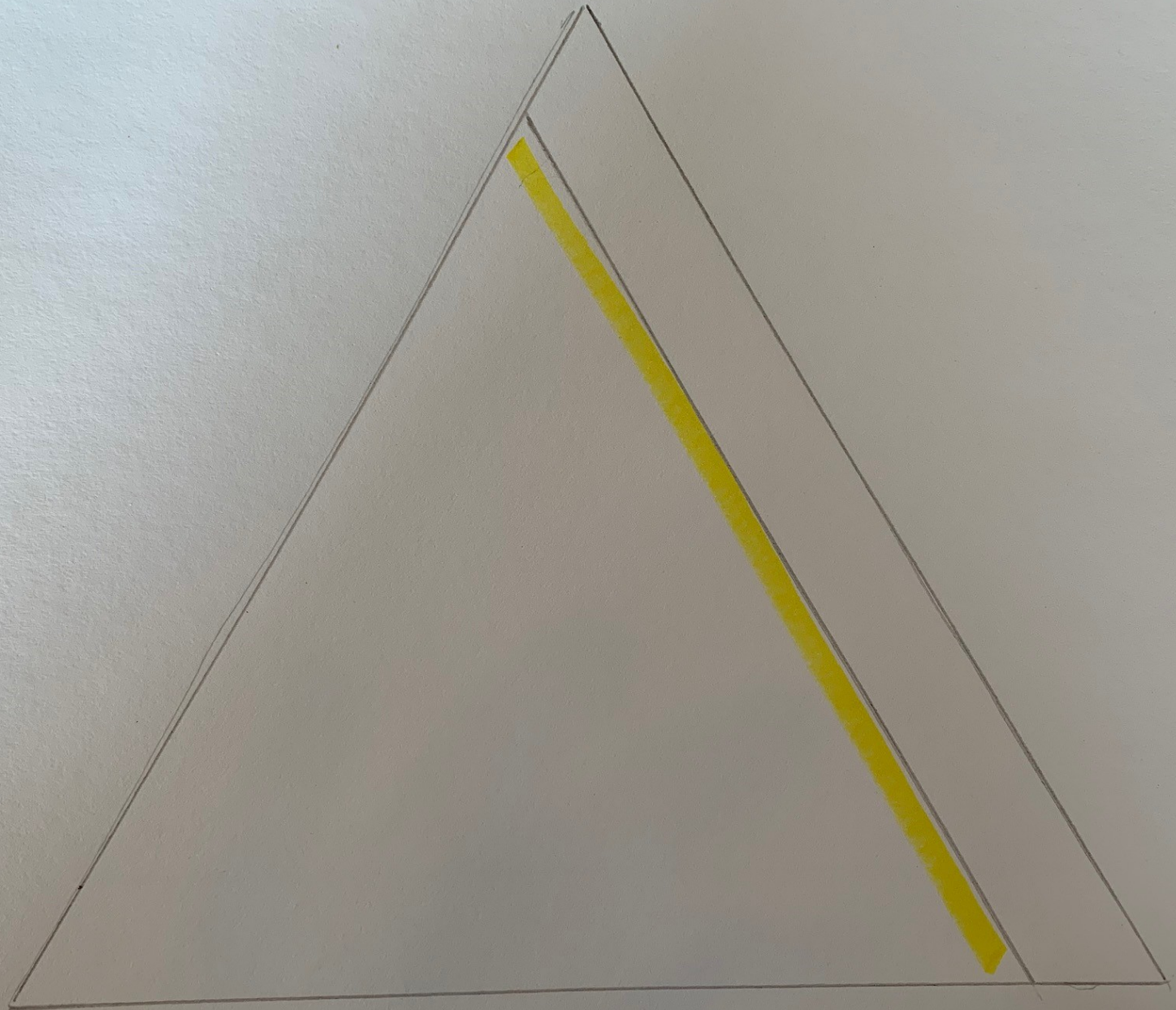




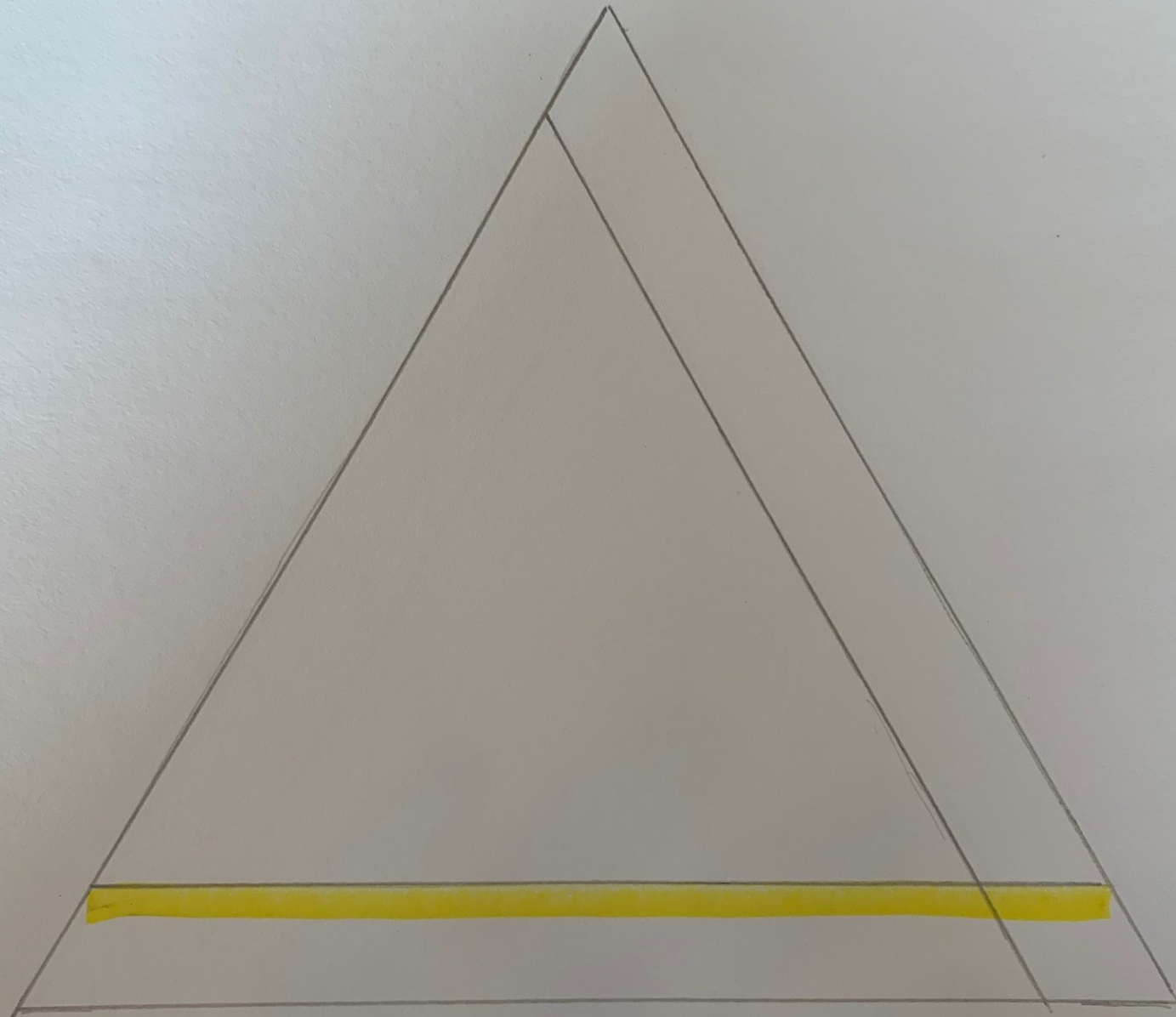


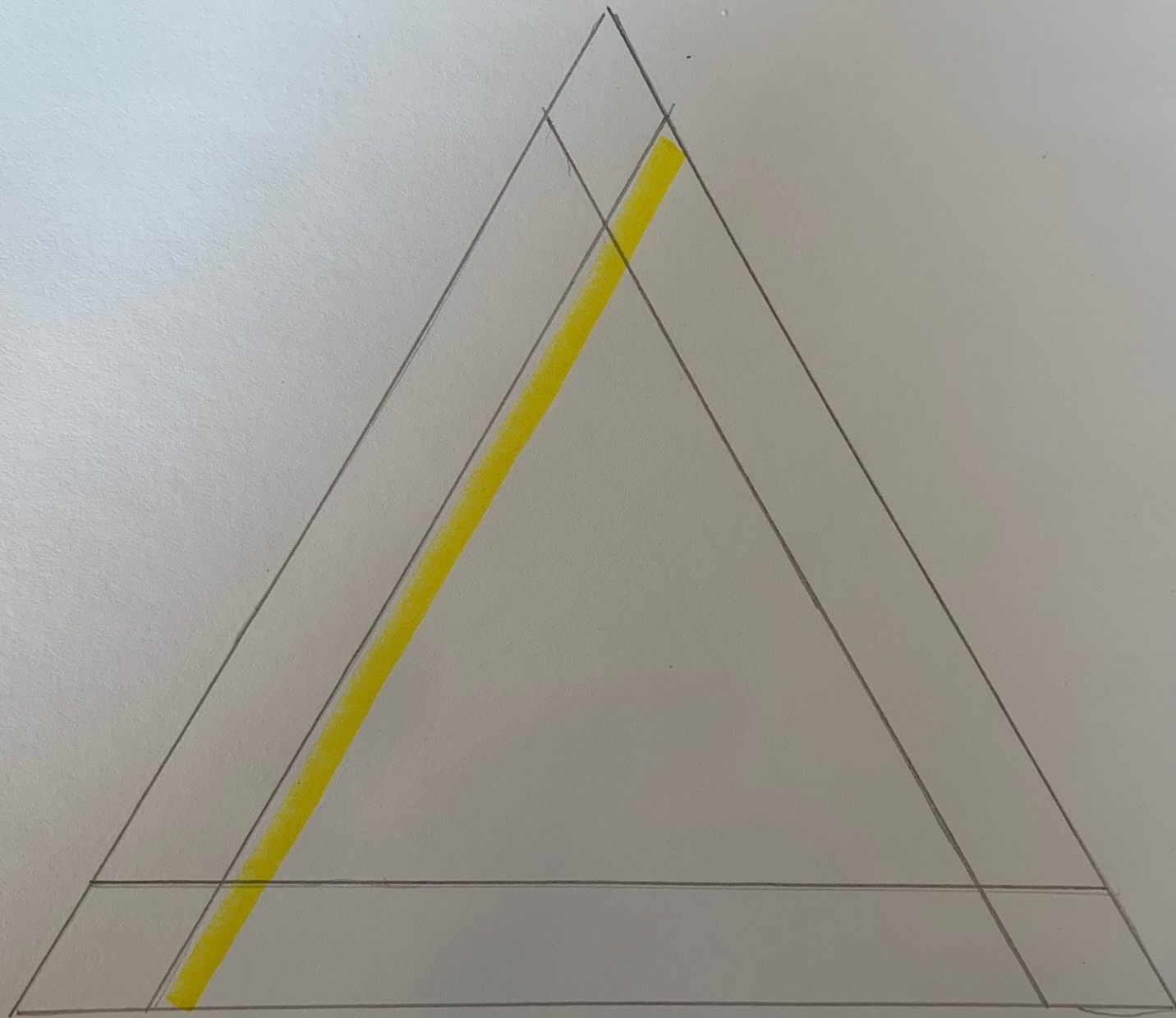




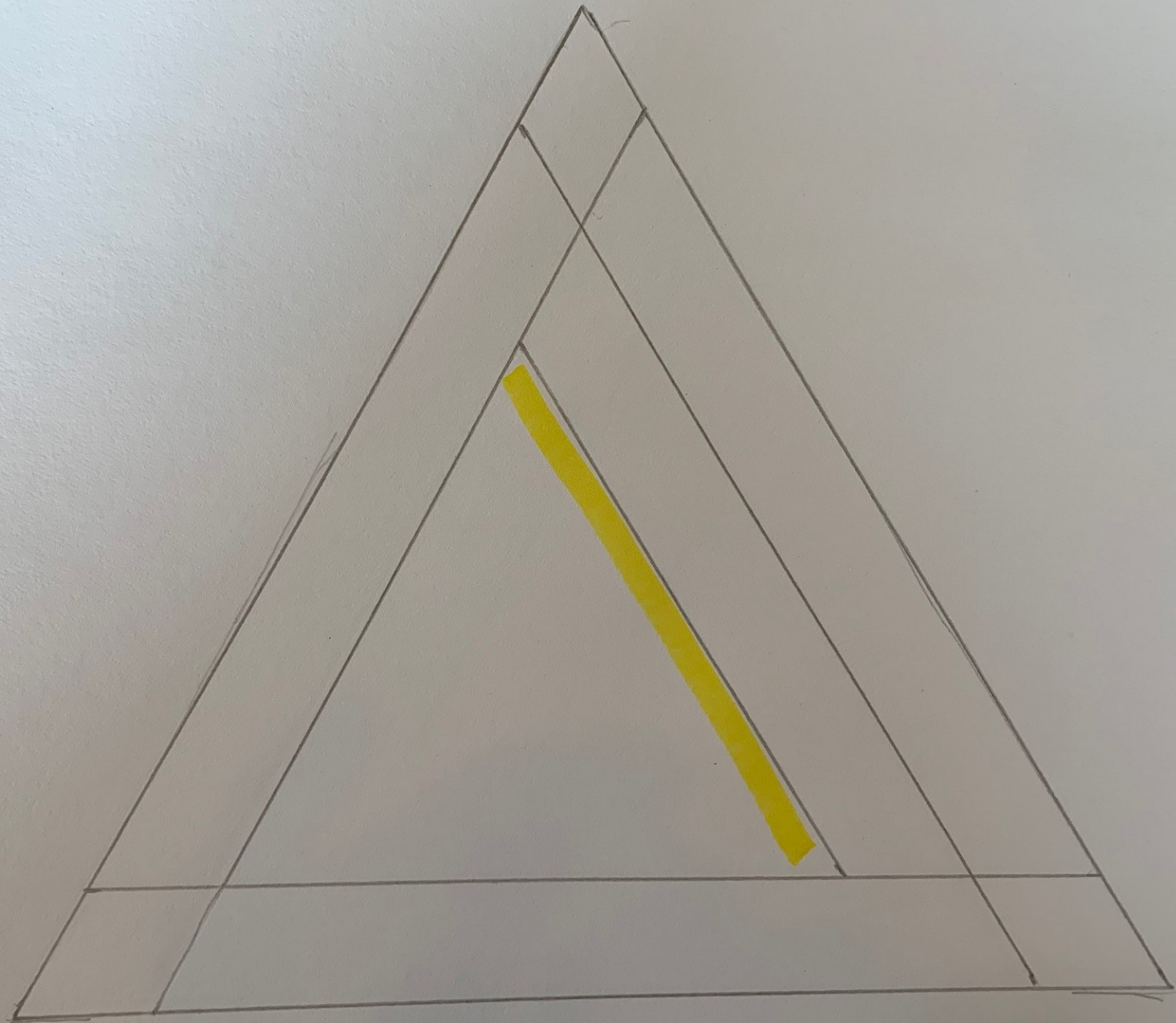




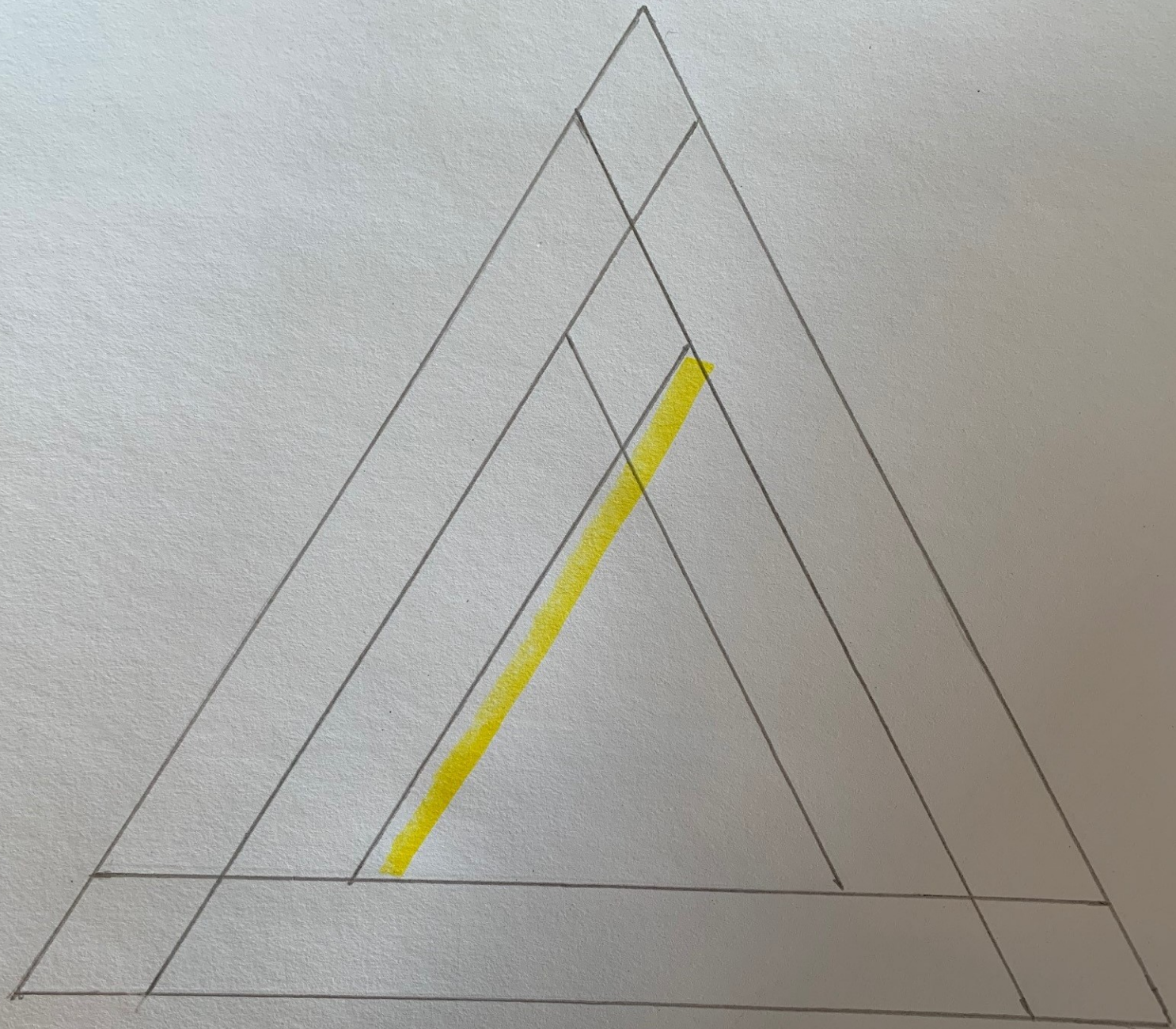




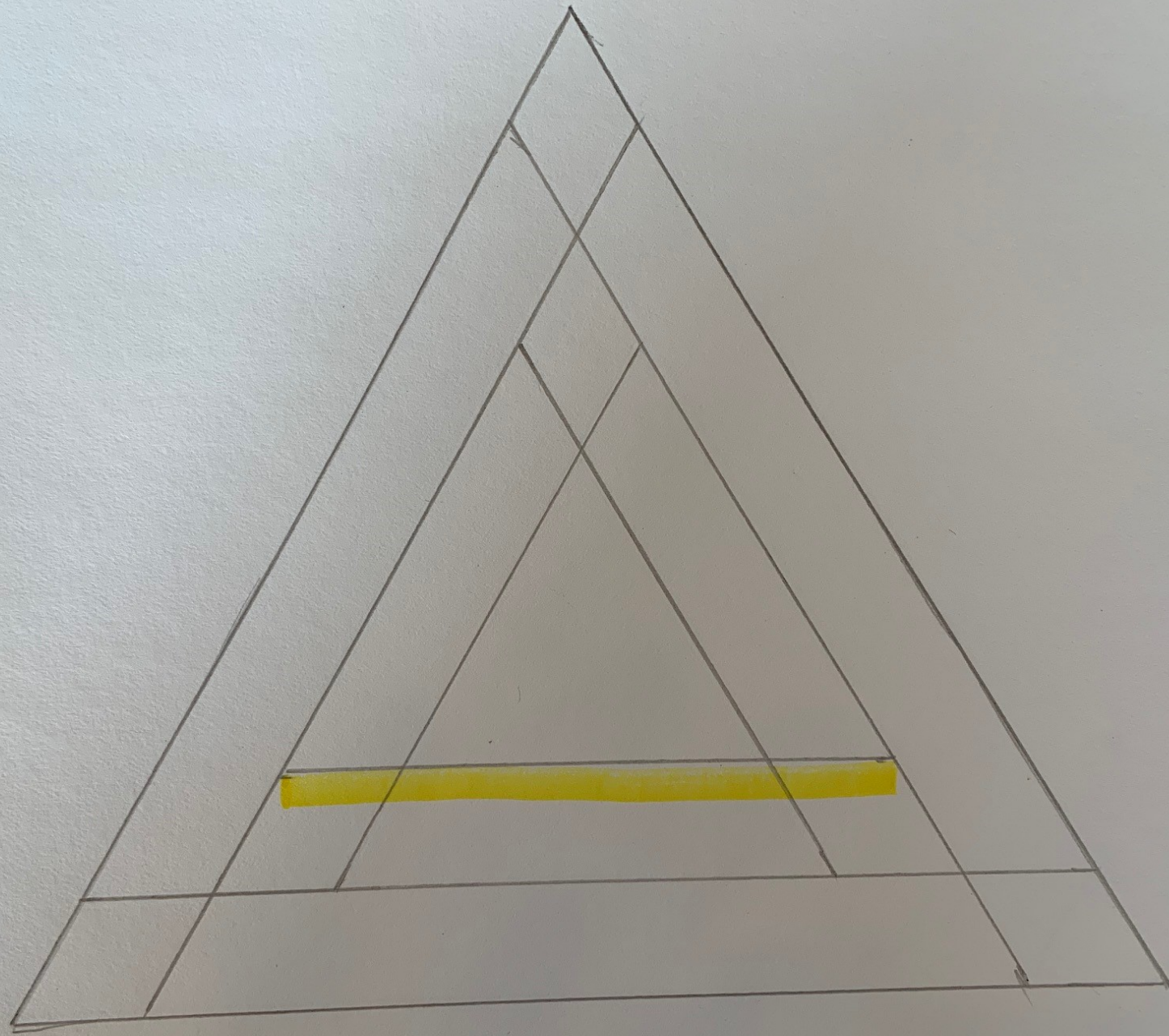




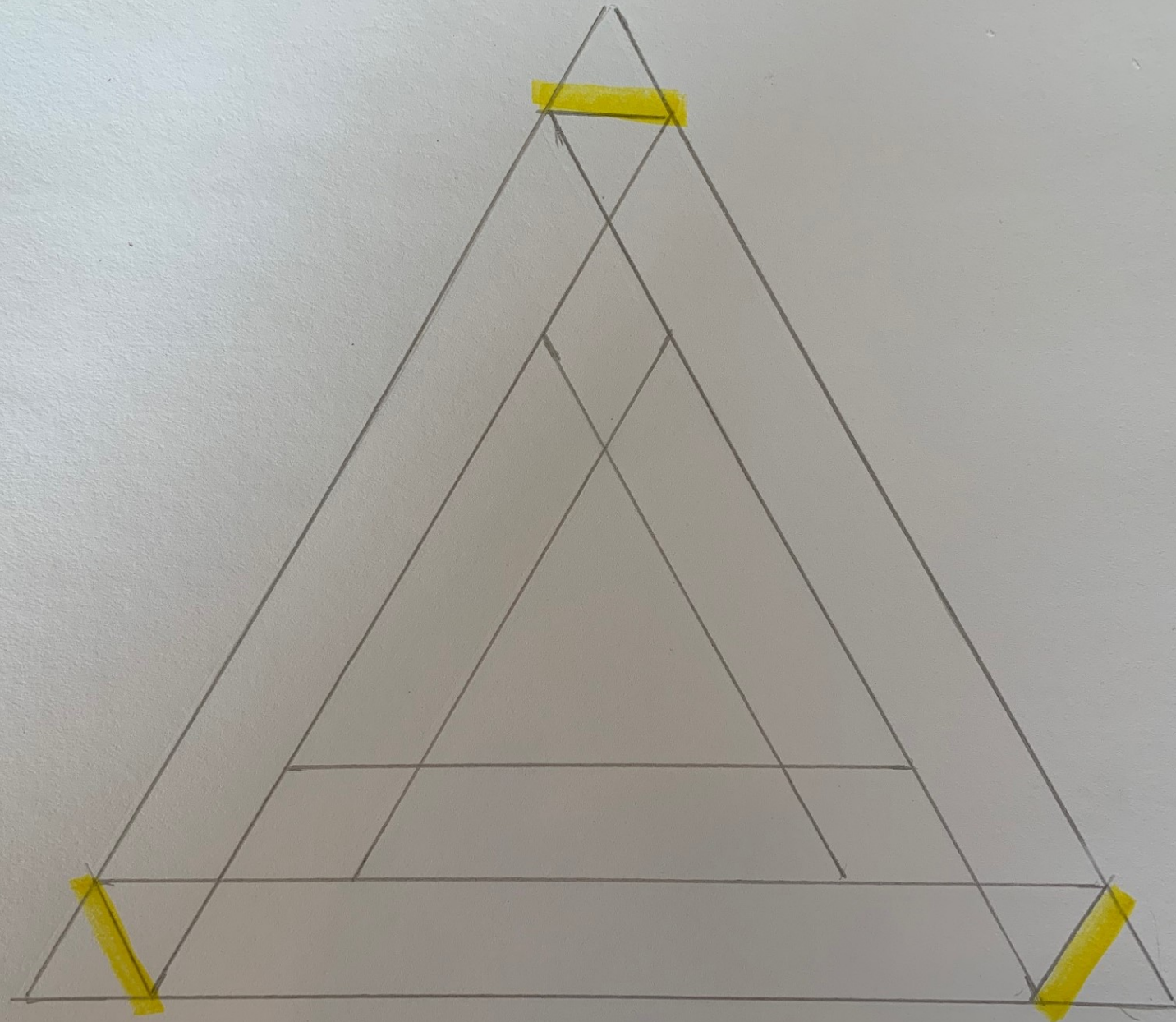




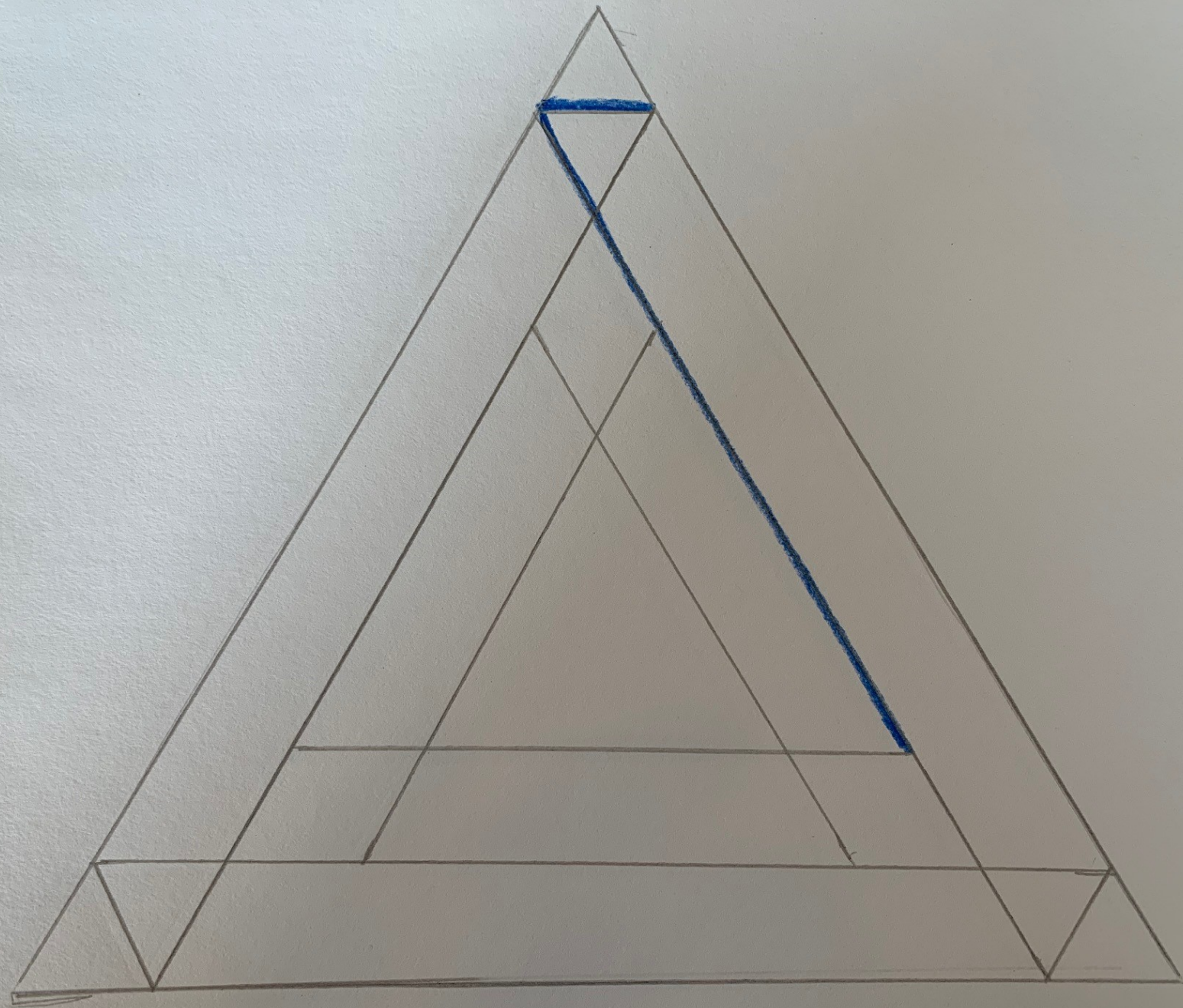




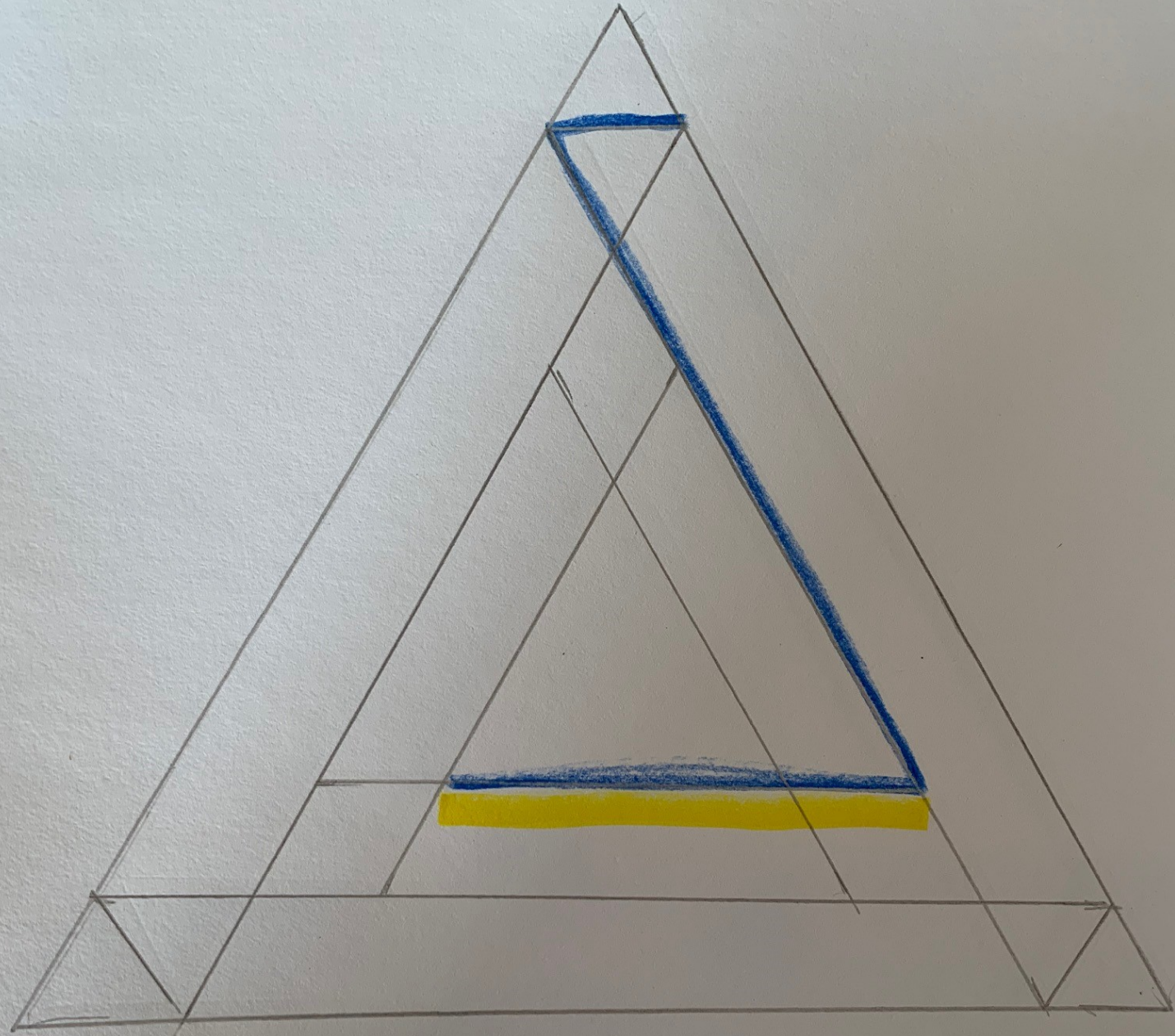




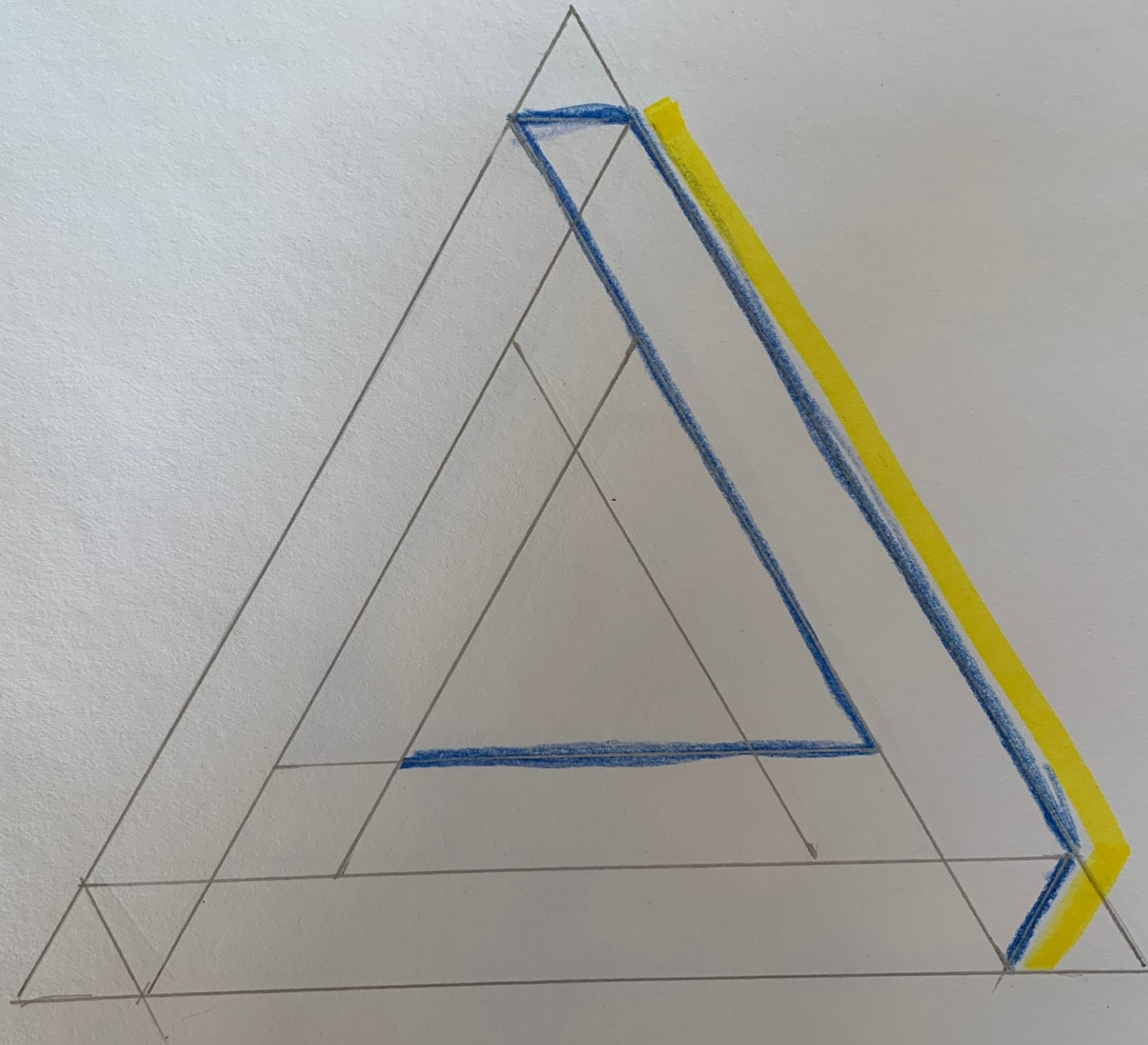




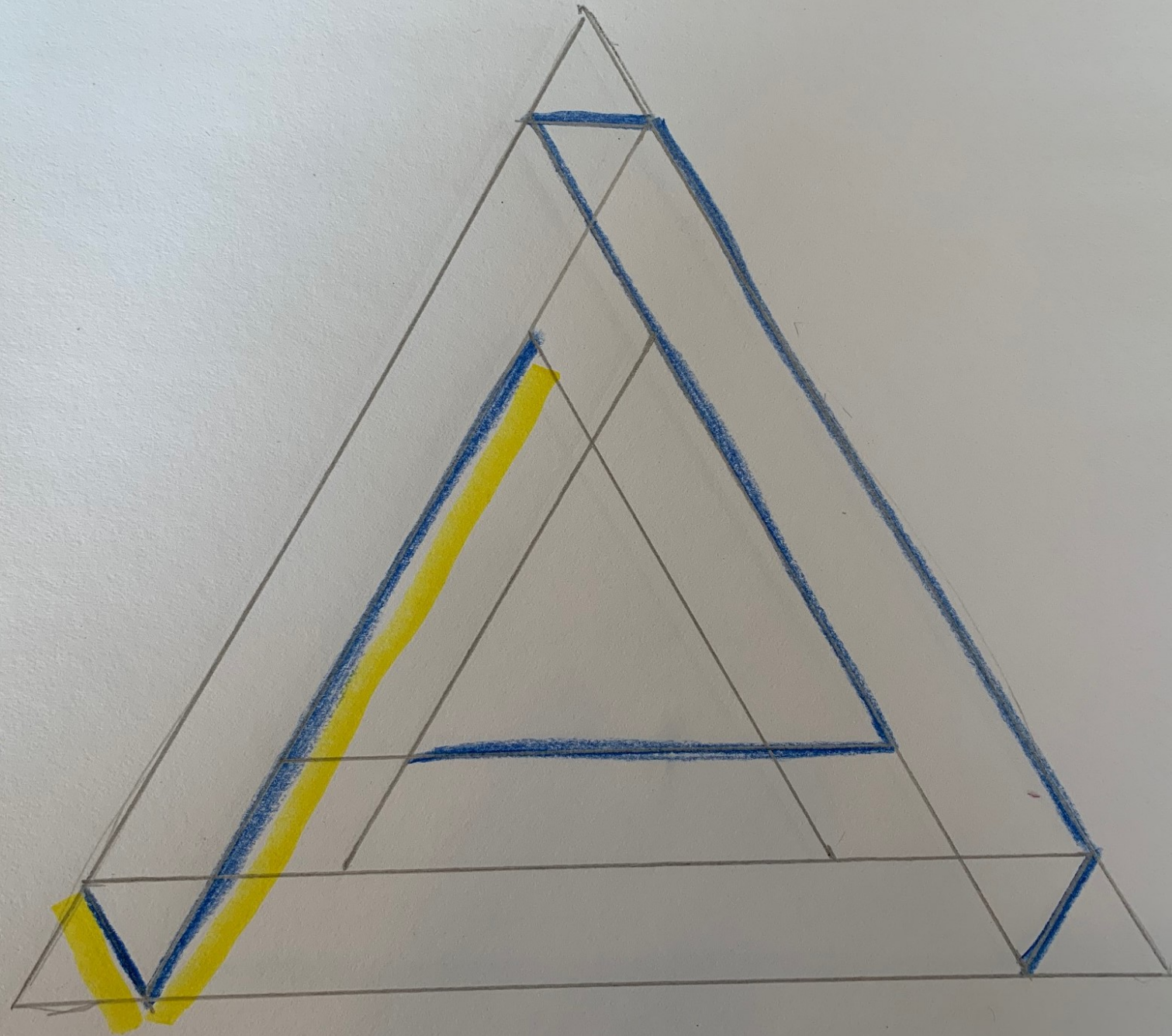




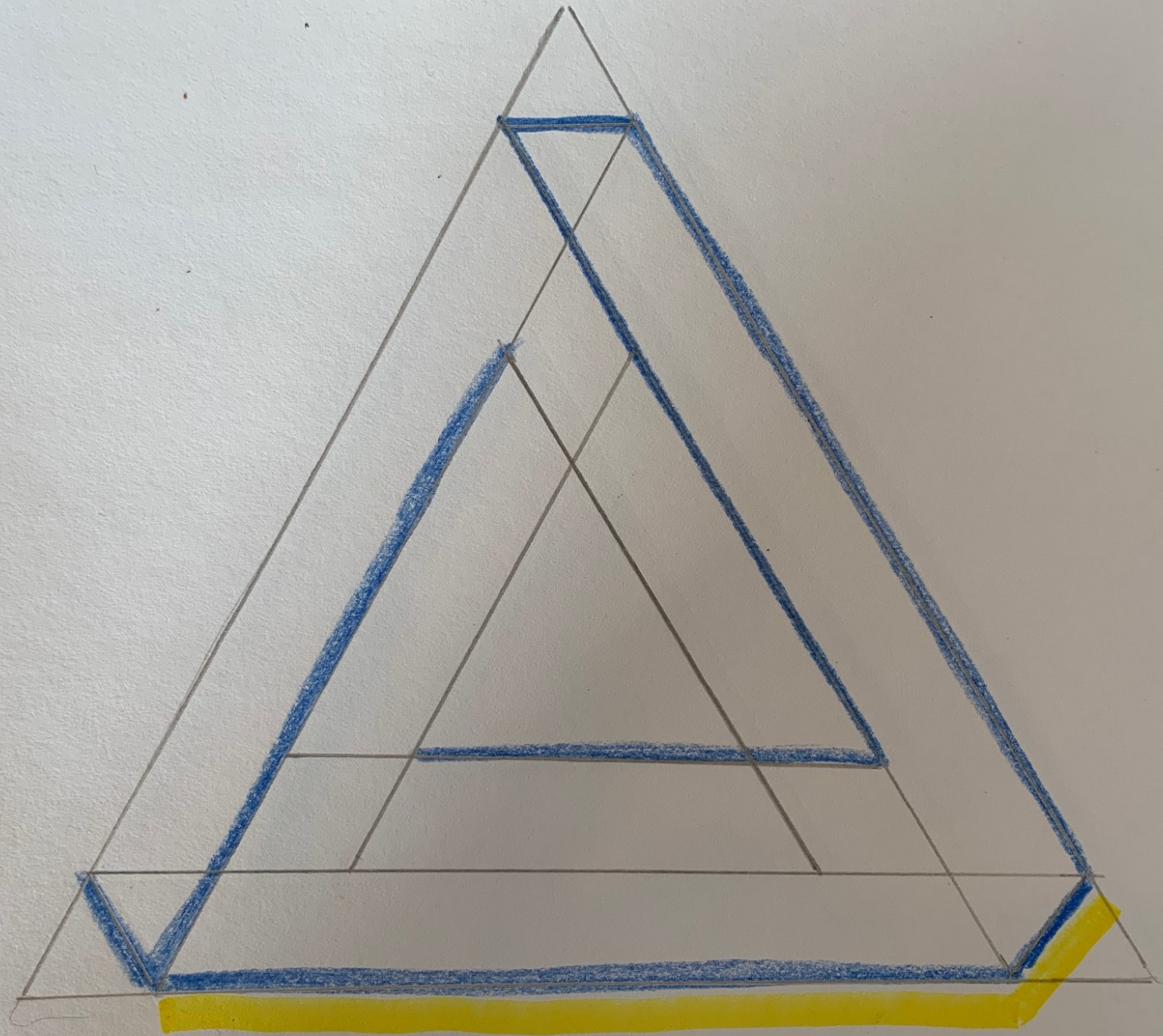




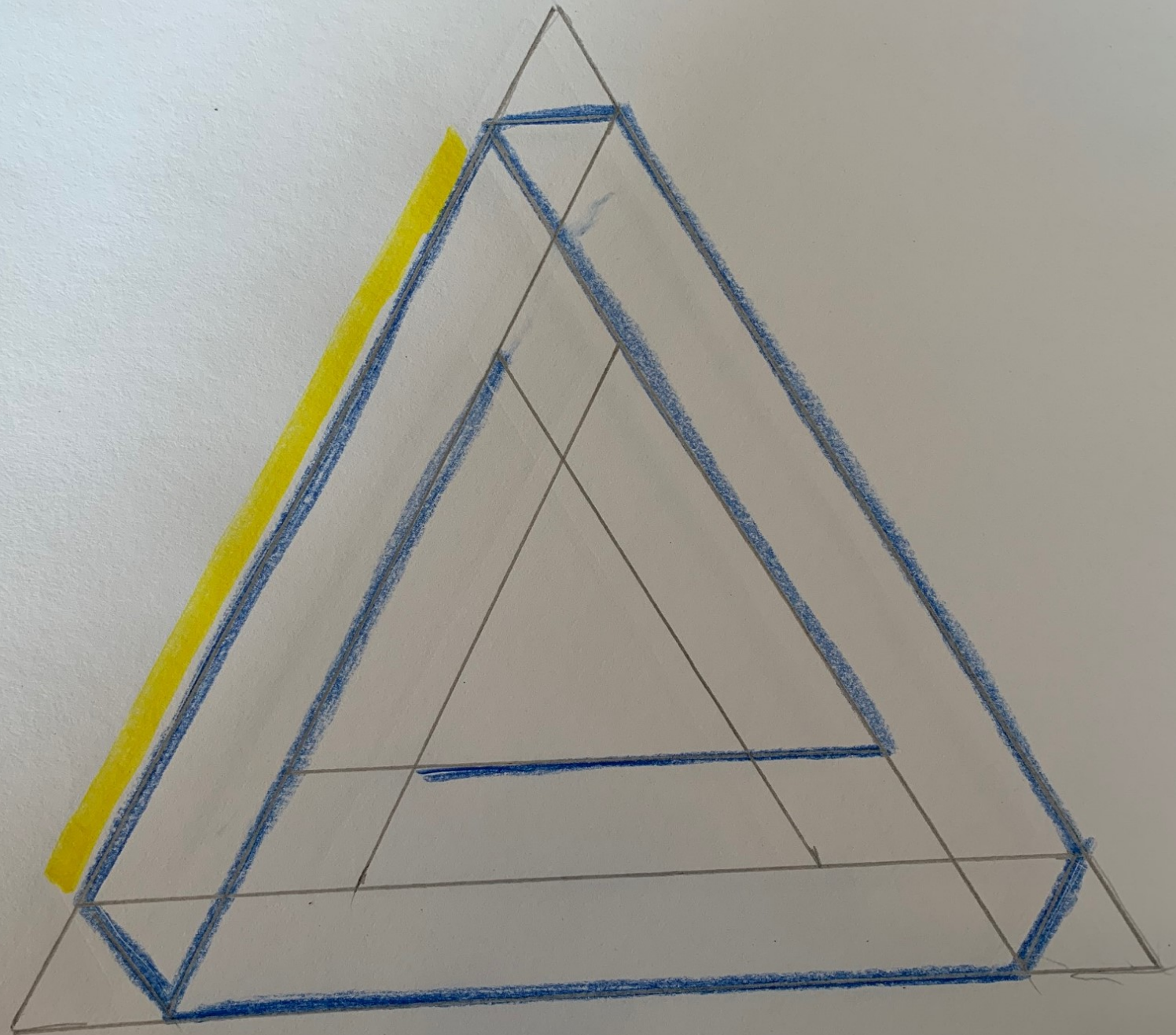




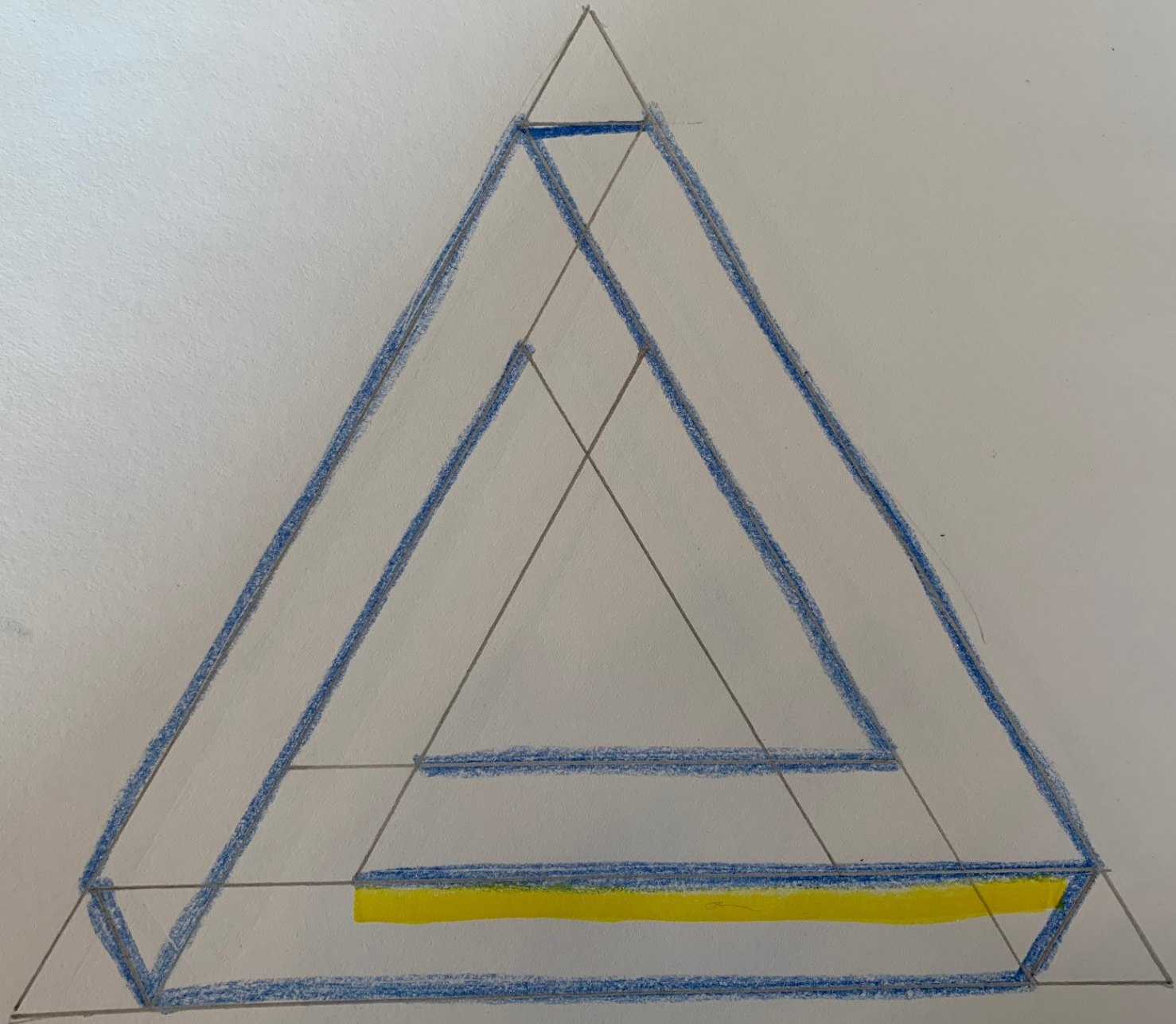




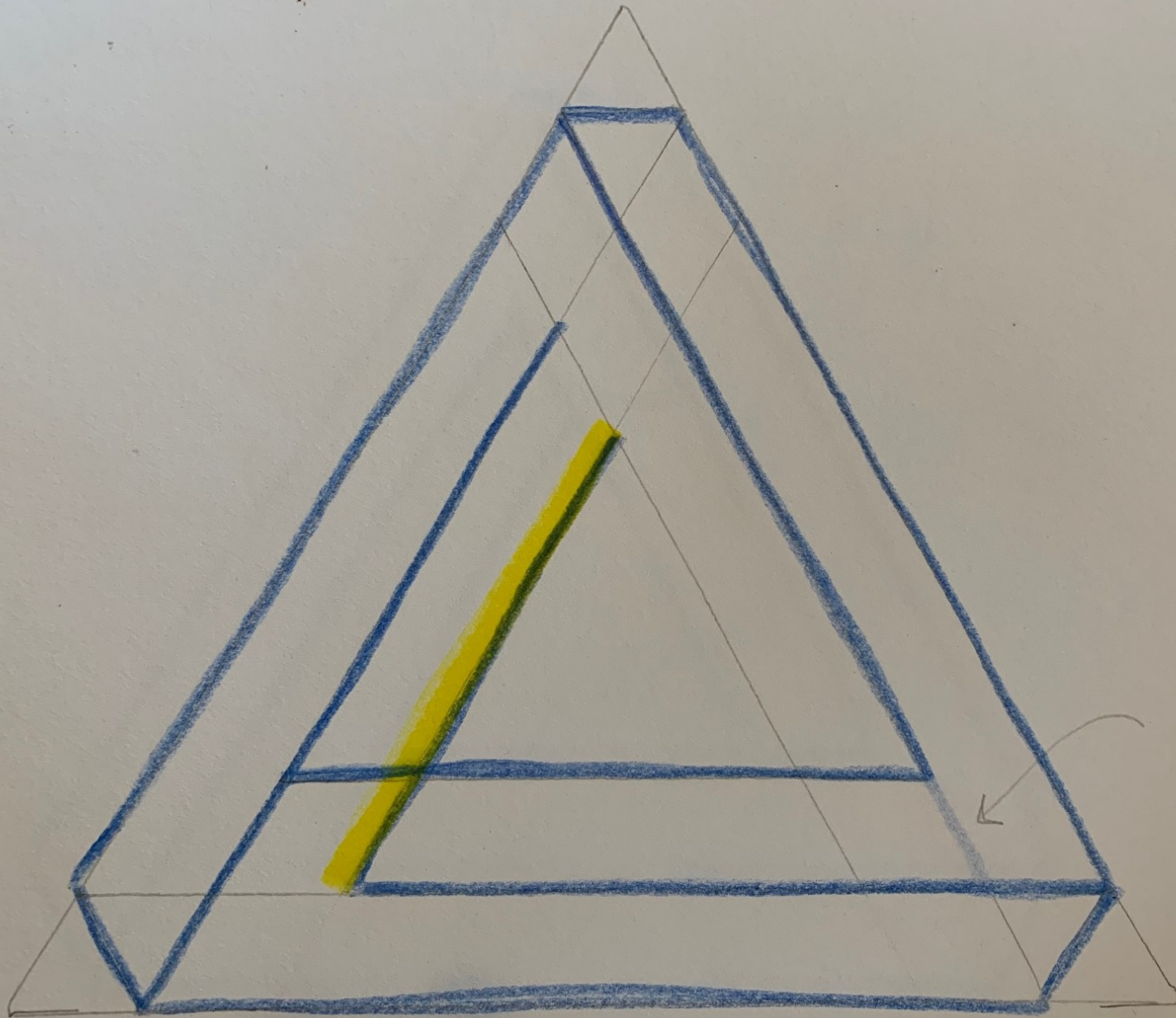








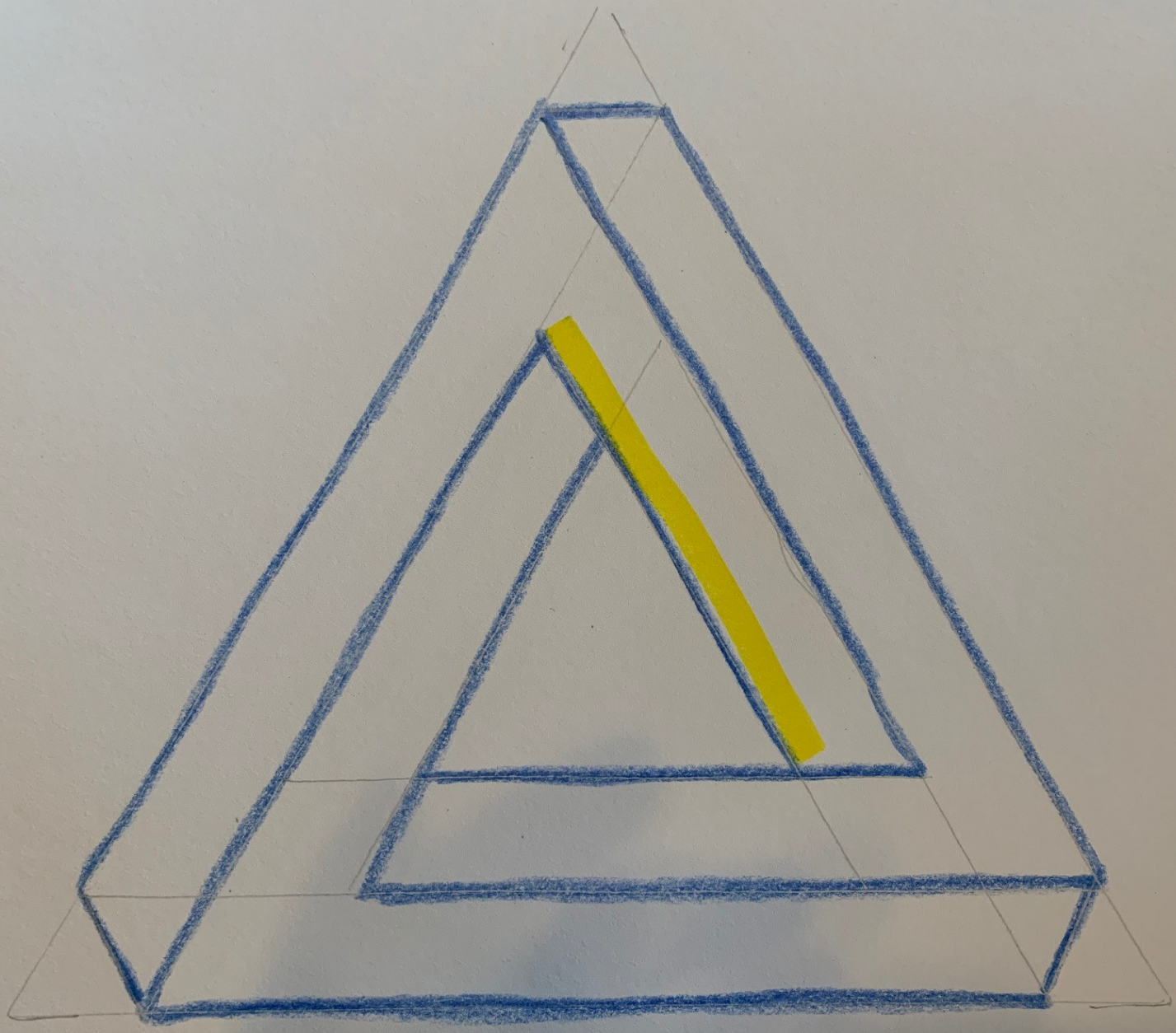




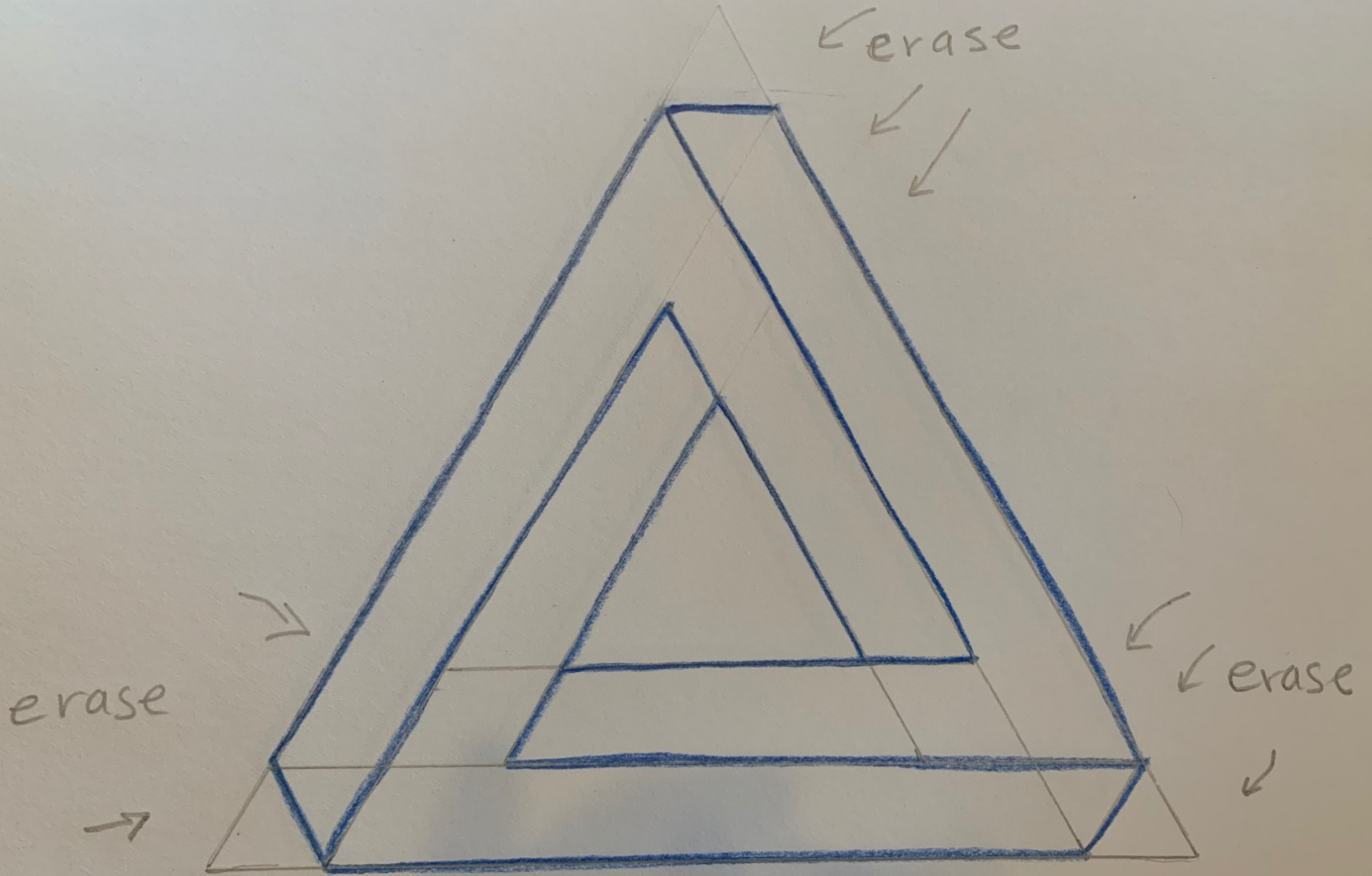
mistake





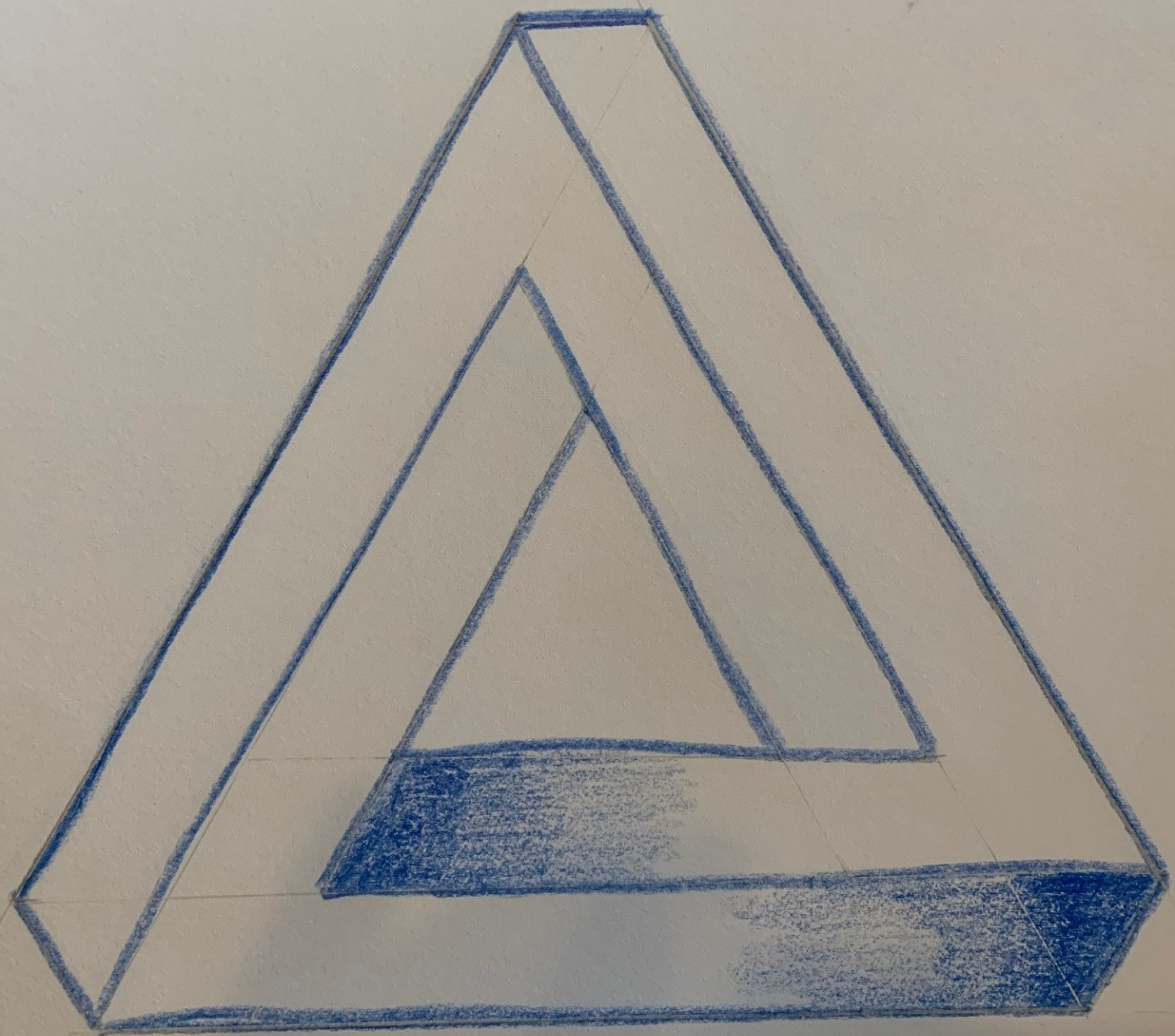




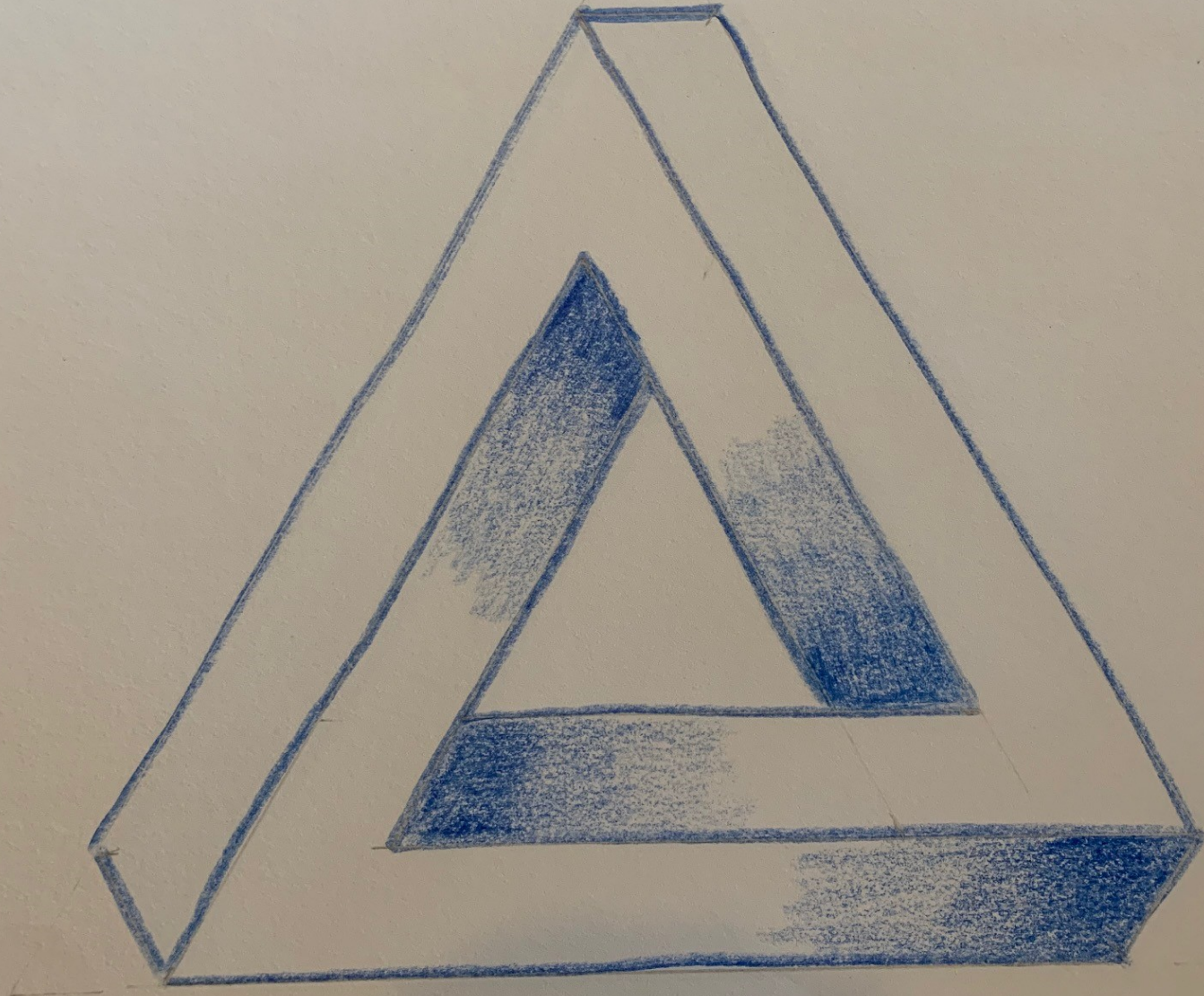


Erase all the lines that are not bold.

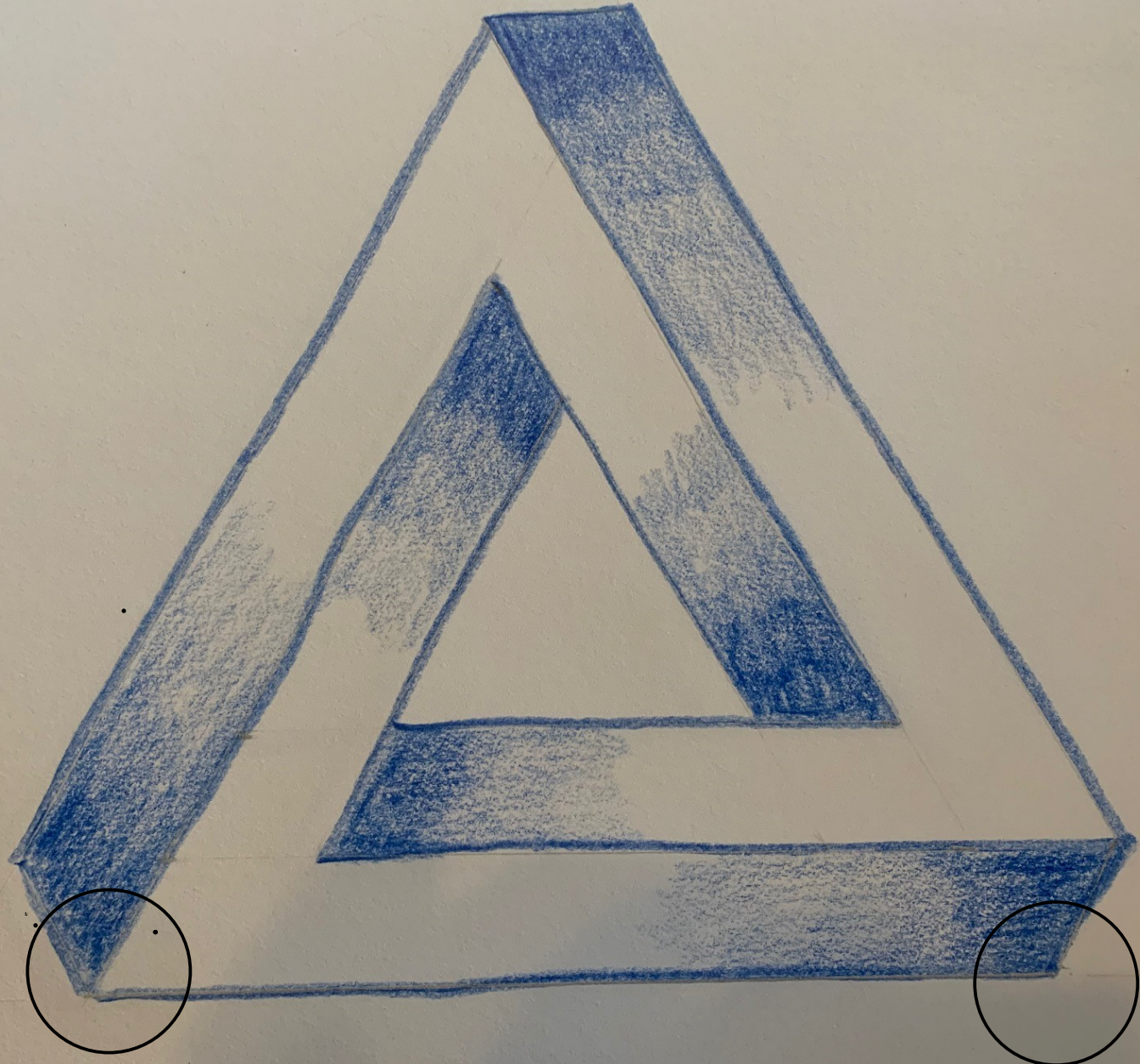




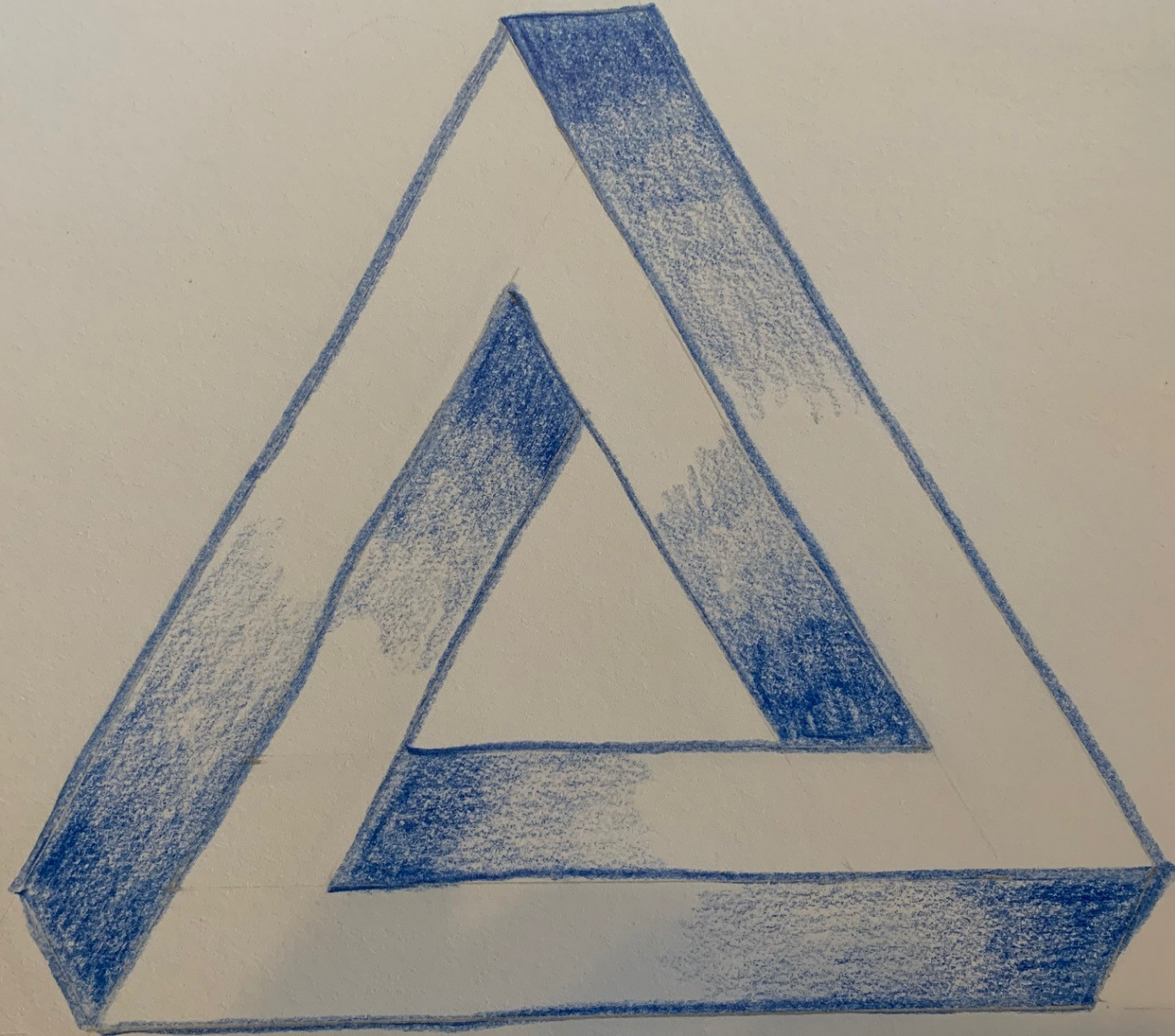












# Let's see your work

- Let's take turns holding up our drawings so we can all see! Hold it up to the camera.
- Can you think of any thing else in life, other than optical illusions, that people think about differently?
  - What is your favorite kind of book to read?
  - Who likes to eat eggplant?
  - What else can you think of?



# What cool things can you do with a Penrose Triangle?

- Here are some ideas:

# Jewelry



Photo<sup>6</sup>



# Wall art



Photo<sup>7</sup>

# Statue

Penrose Triangle Statue  
in Belgium built in 1997.<sup>8</sup>

**Just for fun** – watch the  
video of this “Impossible  
Triangle.”

<https://www.youtube.com/watch?v=fYeU-cdawZA>





# Who invented the Penrose Triangle

- 1934 It was first created by the Swedish artist **Oscar Reutersvärd**.
- 1958 popularized by psychiatrist Lionel Penrose and his son, prominent mathematician Roger Penrose.
- Later featured prominently in the works of artist M.C. Escher.

## References:

1. "What Is an Optical Illusion?" *Optics4Kids*, What Is Optics, <https://www.optics4kids.Org/>, <https://www.optics4kids.org/optical-illusions>.
2. Image Creator Unknown. "Duck Rabbit Illusion." *Wikipedia*, <https://commons.wikimedia.org/>, (n.d.) (Public domain) [https://commons.wikimedia.org/wiki/Category:Rabbit%E2%80%93duck\\_illusion#/media/File:Canard-lapin\\_retouch%C3%A9.jpg](https://commons.wikimedia.org/wiki/Category:Rabbit%E2%80%93duck_illusion#/media/File:Canard-lapin_retouch%C3%A9.jpg).
3. Shepard, Roger N. "Impossible Elephant Illusion." *Mind Sights*, Freeman, New York, NY, 1990, p. 79. NOTE: Shepard, Roger. "Impossible Elephant Illusion." was created by a scientist named Roger N Shepard, and first published in 1990 on page 79 of his book *Mind Sights*. He gave it the name "L'egs-istential quandary." It is based on a dream he had in 1974. When he woke up from the dream, he made a pencil sketch of the elephant, which he later turned into a pen and ink drawing for his 1990 collection of paradoxical images and illusions. Impossible Elephant: [https://optical-illusions.fandom.com/wiki/Impossible\\_Elephant](https://optical-illusions.fandom.com/wiki/Impossible_Elephant). Shepard's elephant is an example of an "impossible image" of the type "figure-ground illusion." That is, the artist intentionally confuses you between the figure and the background. The image has been widely distributed without attribution to Shepard. An anonymous user on 4Chan's /x/ board made the poster into a public domain image and it caught on as an optical illusion.
4. Tiffamemez\_Sauce. "Vanilla cloud ice cream cone illusion." *Imgflip LLC*, <https://imgflip.com>, <https://imgflip.com/i/53fm4x>.
5. Image Creator Unknown. "Almost Nobody Can Spot The Horse Hiding In This Ordinary Picture Of A Frog. Do You See It?" *Little Things*, <https://littlethings.com/>. 30 Dec. 2021. <https://littlethings.com/pets/frog-horse-optical-illusion>. Note: Image Credit: This image is believed to be in the public domain.



6. Image Creator Unknown. "Impossible Triangle Necklace." *Grailed*, <https://www.grailed.com/>. (n.d.)  
<https://www.grailed.com/listings/8145460-18k-gold-x-silver-x-vintage-silver-penrose-impossible-triangle-tri-ferg-pendant-necklace-20-22-thin-box-chain>.
7. EleventyOneStudio. "Reclaimed Wood Wall Art, Decor, Lath, Penrose Triangle Small, Geometric Pattern." *Etsy*, <https://www.etsy.com/nz/>, <https://www.etsy.com/nz/listing/250338500/reclaimed-wood-wall-art-decor-lath>.
8. ruudrebel. "'Impossible' triangle found in real life!" YouTube, uploaded by ruudrebel, 2 July 2013, <https://www.youtube.com/watch?v=fYeU-cdawZA>.

### **Helpful Resources:**

<https://www.wonderopolis.org/wonder/what-is-an-optical-illusion>

How to Draw The Impossible Triangle: Optical Illusion Narrated Step by Step

<https://www.youtube.com/watch?v=81z9EobjxDQ>

Tom McPherson Circle Line Art School <http://www.circlelineartschool.com>