

# NEWTON IN THE PANDEMIC

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GLASS

SHO

OPEN

On his way to school, Newton passed by a shop that sells all kinds of glasses. Some pieces of glass were spheres, some were cubes, and some were pyramids. Some pieces were shiny. Some were transparent. Some were colorful.



"What shape is this?" asked Newton. "Two of the sides are triangles, and the other three sides are rectangles."

"I call it a prism, I use it to create colorful lights from sunlight" the owner answers.

"How is that possible?"

"I don't know, I don't think anybody knows."



Newton bought a prism from the shop. He loved it so much that he carried it with him every day. Each day, when he passed by the glass shop, he said to himself: "I wish I had the time to sit down and find out where the colorful lights come from."

"But I have so many other things to do."



In winter, suddenly, many people in Newton's town got sick. They coughed, ran fevers, got chills, and felt very tired. The town's school closed. A note on the door read: "A plague is spreading from person to person; the best way to avoid getting sick is to keep social distance. This sickness will pass. Until then, school is closed. Everyone should stay home!"



Newton felt bored staying indoors every day. "I miss school, I miss my friends" he said to himself. "The good news is, I finally have the time to sit down and find out where the colorful lights come from! Where should I start?"

"Is the prism giving off colorful light by itself? I can test it in a completely dark room!" Newton closed all doors and windows in his room and covered them to keep the light out.

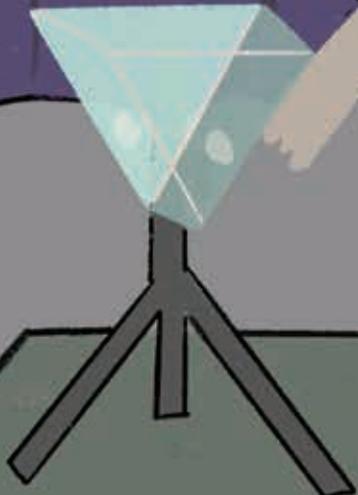
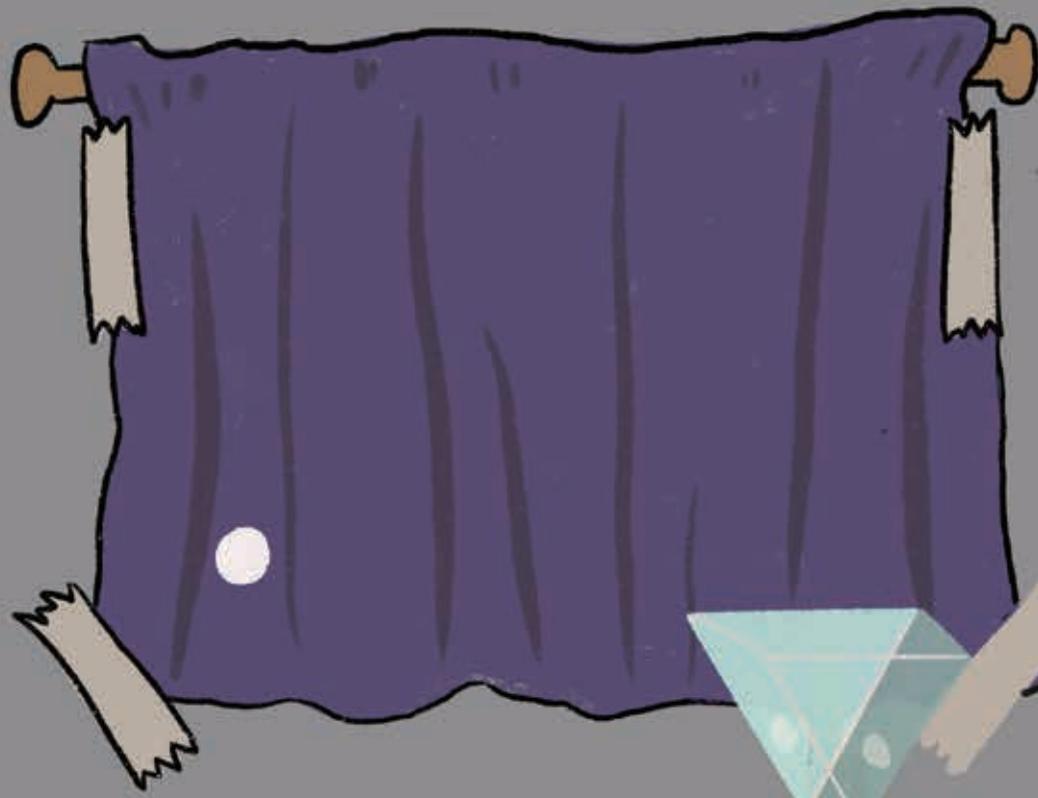
When it was completely dark, he could not see the prism. Newton knew one thing for sure now: the prism did not give off light on its own.



"The prism needs a light source. I need to make one thin beam of light to go directly through the prism!"  
But there is light everywhere! "How can I create one thin beam of light?"

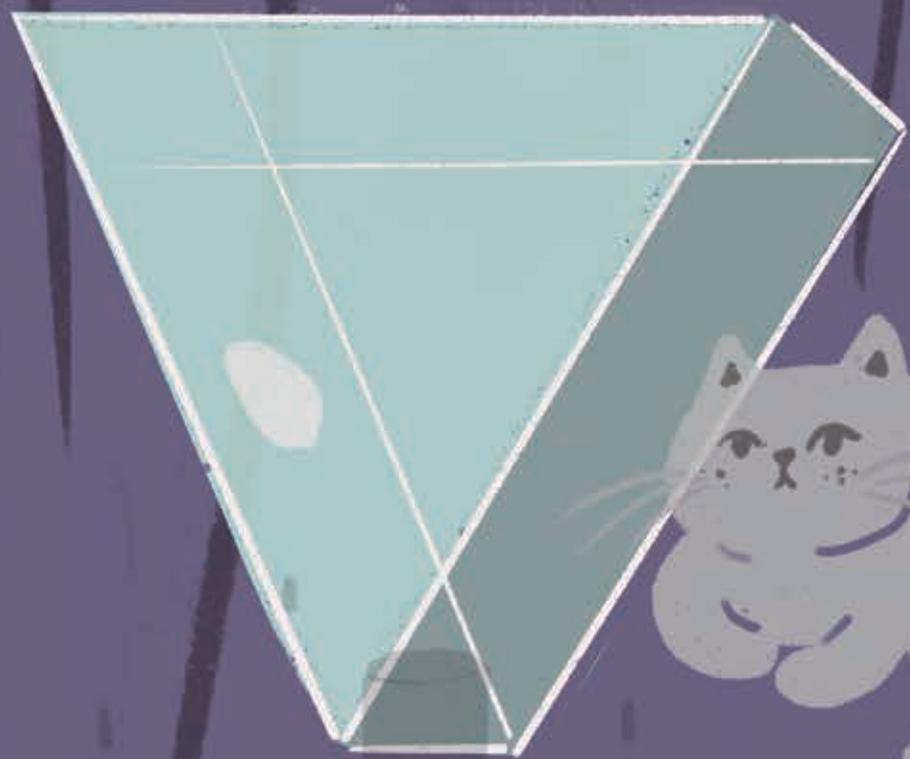


Newton shut the curtains on his window in the middle of a sunny day and punched a tiny hole in one curtain so a very thin beam of sunlight shone through. "This beam is bright and white. It's not colorful at all." he thought.



Newton placed the prism in front of the beam of light. The light went in at one direction and came out at a slightly different direction. A rainbow appeared on the wall opposite the window.

White light goes through a prism and becomes colorful! How is this possible?



Maybe it is because the hole in the curtain is too small? Or maybe it's too big? Newton punched different-sized holes in the curtain. Each beam of light cast a rainbow on the wall after it went through the prism.



"Maybe this happens because the surface of the prism is flawed? Maybe it's not flat, or it has dirt on it?" Newton thought. Newton let the beam of light pass through different areas of the prism's surface. The rainbow stayed the same.



"Maybe it has something to do with the wall? How can I change the wall's surface and its distance from the prism?" Newton thought. Newton placed a wood board on the wall and saw that the rainbow appeared on the board. Now, Newton knew for sure that the surface didn't matter.

He moved the board closer to the prism. The rainbow appeared on the board no matter how close the board moved to the prism. Newton knew another thing for sure now: the distance didn't matter.



Maybe it is because the prism adds colors to the white light, like magic? "If this is the case, I can put a second piece of prism in front of the rainbow to create an even more colorful rainbow!" "Oh, I wish I had another prism!" Newton said.



What will I see if I let through one color from the rainbow and shot this one-color beam to the second prism, then to the third prism, then to the fourth prism? Will the beam stay the same color, or will it keep adding more colors?

“So many questions! So few prisms!”



So far, I had only thought about how prism may add colors to white light, as if white were empty of colors. But.. what if all colors are already inside the white light? Who says the prism has to add more colors? Maybe the prism only splits the colors out from inside the white light!

I can test it out by adding different colored beams together. Will it become white? Or will it become even more colorful?

“To add different colored beams together, I definitely need more prisms!”





"I wish I had a second prism. I wish I had many prisms!" But the plague is still around, and the city is shut down. The school is shut down, and the glass shop is shut down. Newton cannot buy another piece of glass until the plague is gone. Newton waited for days, then weeks, then months... Newton waited for the plague to pass.



SCHOOL OPEN!  
MONDAY - FRIDAY

PAINT AND INK

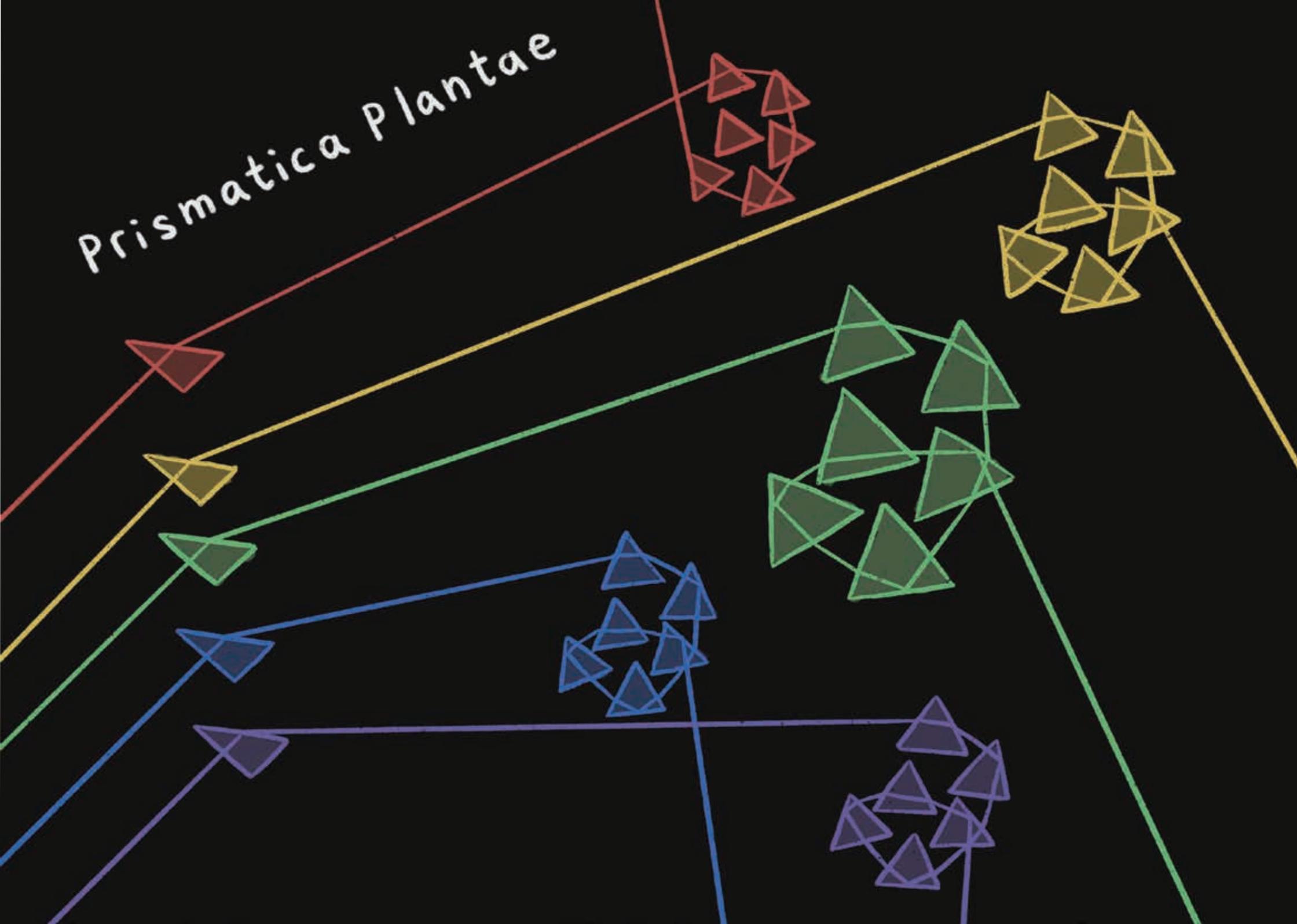
PIZZA

OPEN

OPEN

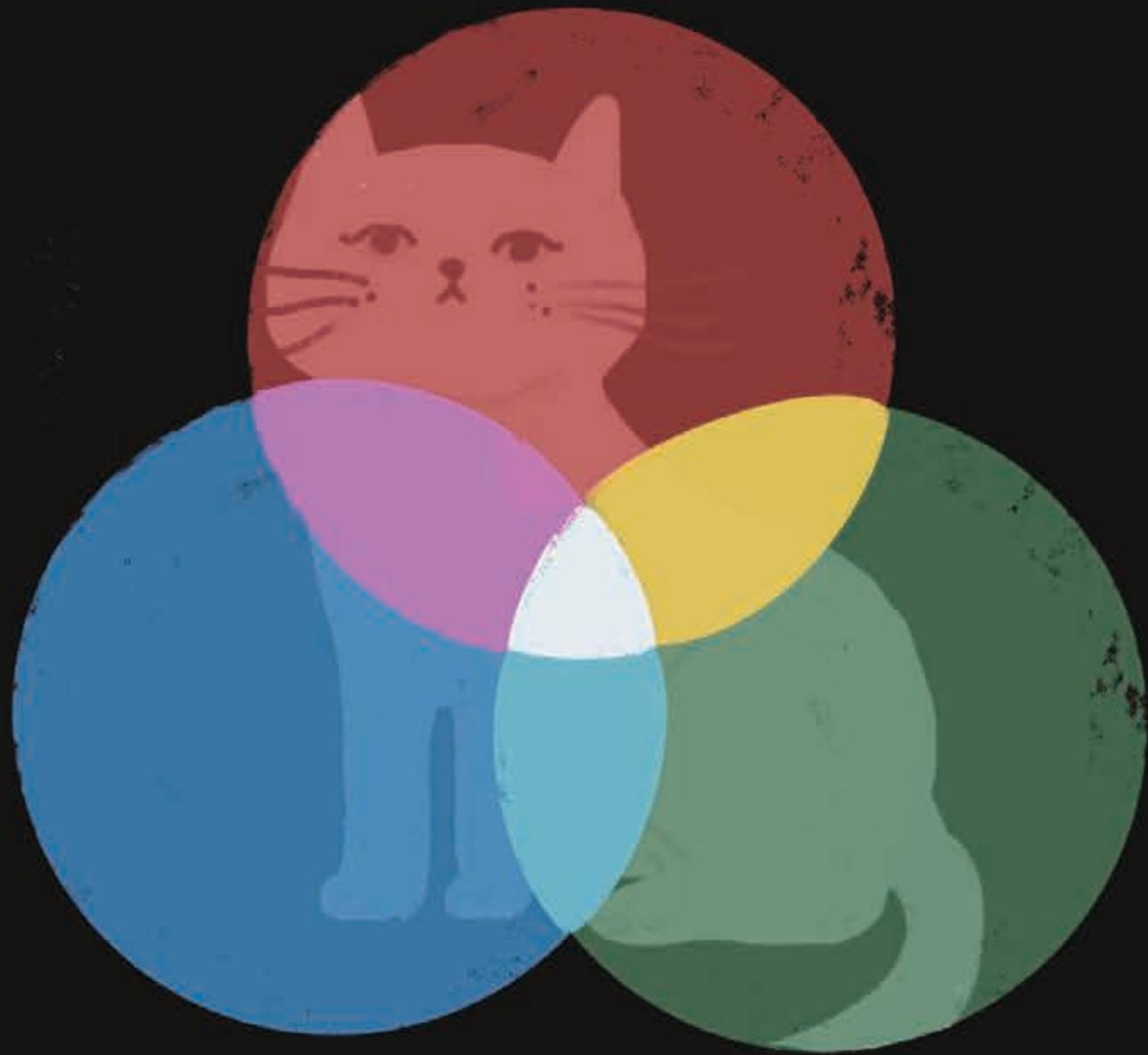
A year passed, it was summer again. People cheered as they heard the good news: "Patience pays off! The plague is gone! Stores are open! School will open soon!" Newton ran to the glass shop and bought a whole bag of prisms.

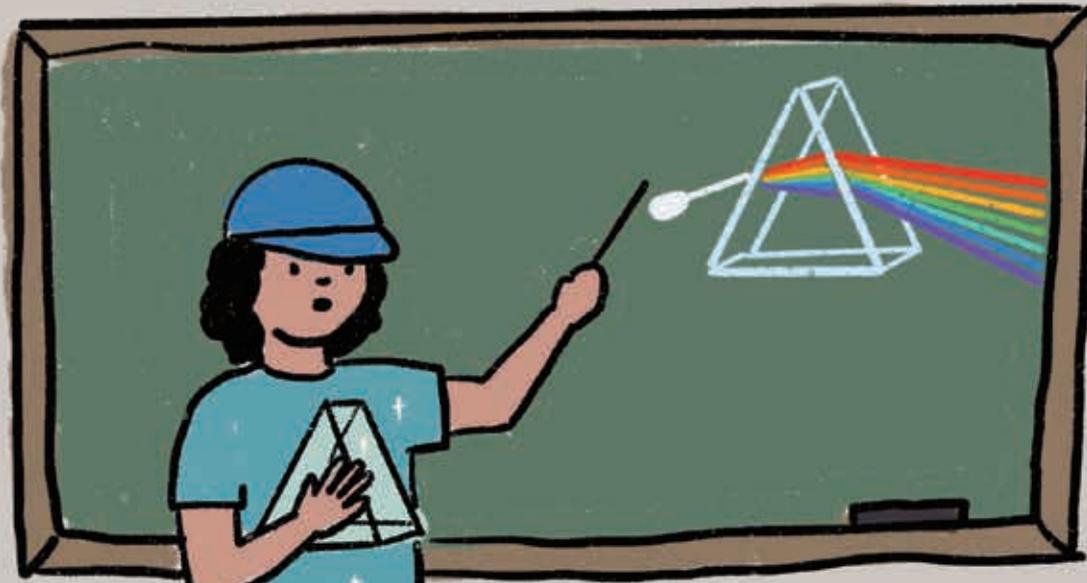
Prismatica plantae



Newton let through a **blue** beam from the rainbow, and cast the **blue** beam through the second prism, the light that came out of the second prism stays **blue**! He did it again with the **red** beam, the **green** beam and then the **purple** beam. "One color in, same color out". Newton know for sure now: Prisms don't add colors to light.

Newton moved on. He used three prisms to cast three **rainbows** on the wall. He turned the prisms to move the **rainbows** closer to each other. Finally, he combined **red**, **green**, and **blue** colors at one point on the wall. That spot became *white*.





"This proves my guess!" Newton was excited. The color white is actually not an empty color, it is a mix of many, many rainbows. The prism does not add colors, it splits colors from the sunlight! "School is opening soon, I cannot wait to share my discovery with my classmates!"

