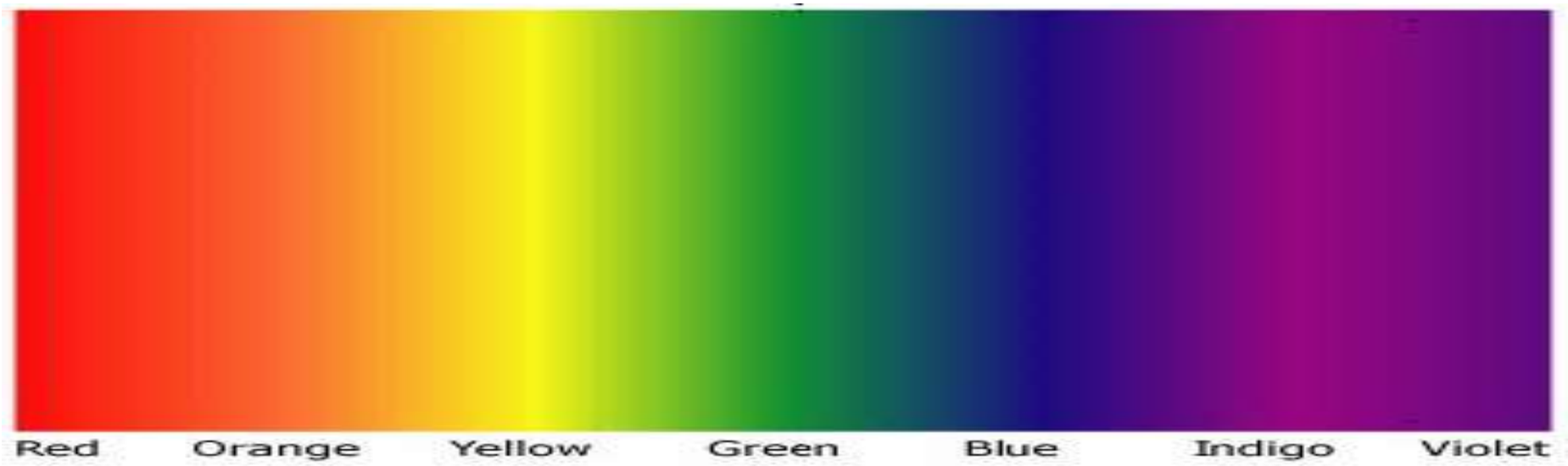
Leaders: Downloads are a work in progress. Please feel free to send your ideas and feedback to author Rich Maxwell. Marblekeeper@gmail.com

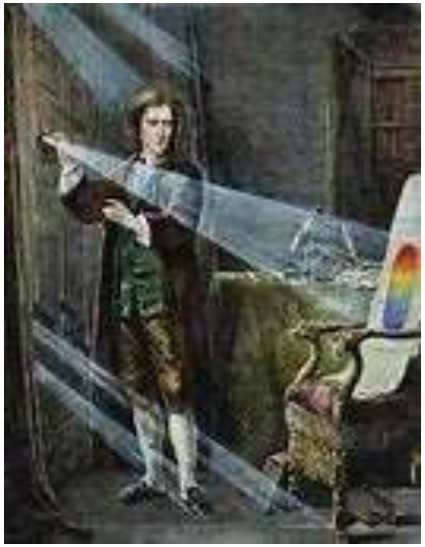
The Color List and Order of the Visible Light Spectrum and Rainbow

http://demonstrations.wolfram.com/NewtonsColorWheel/

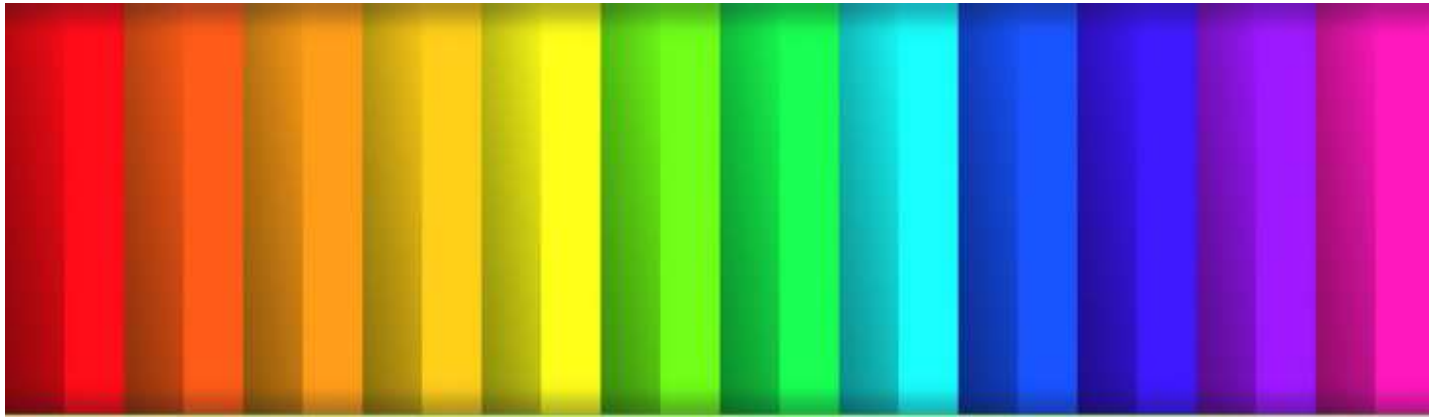
ROY G BIV: Red, Orange, Yellow, Green, Blue, Indigo, Violet.



Theme: "Thinking Like Isaac Newton"



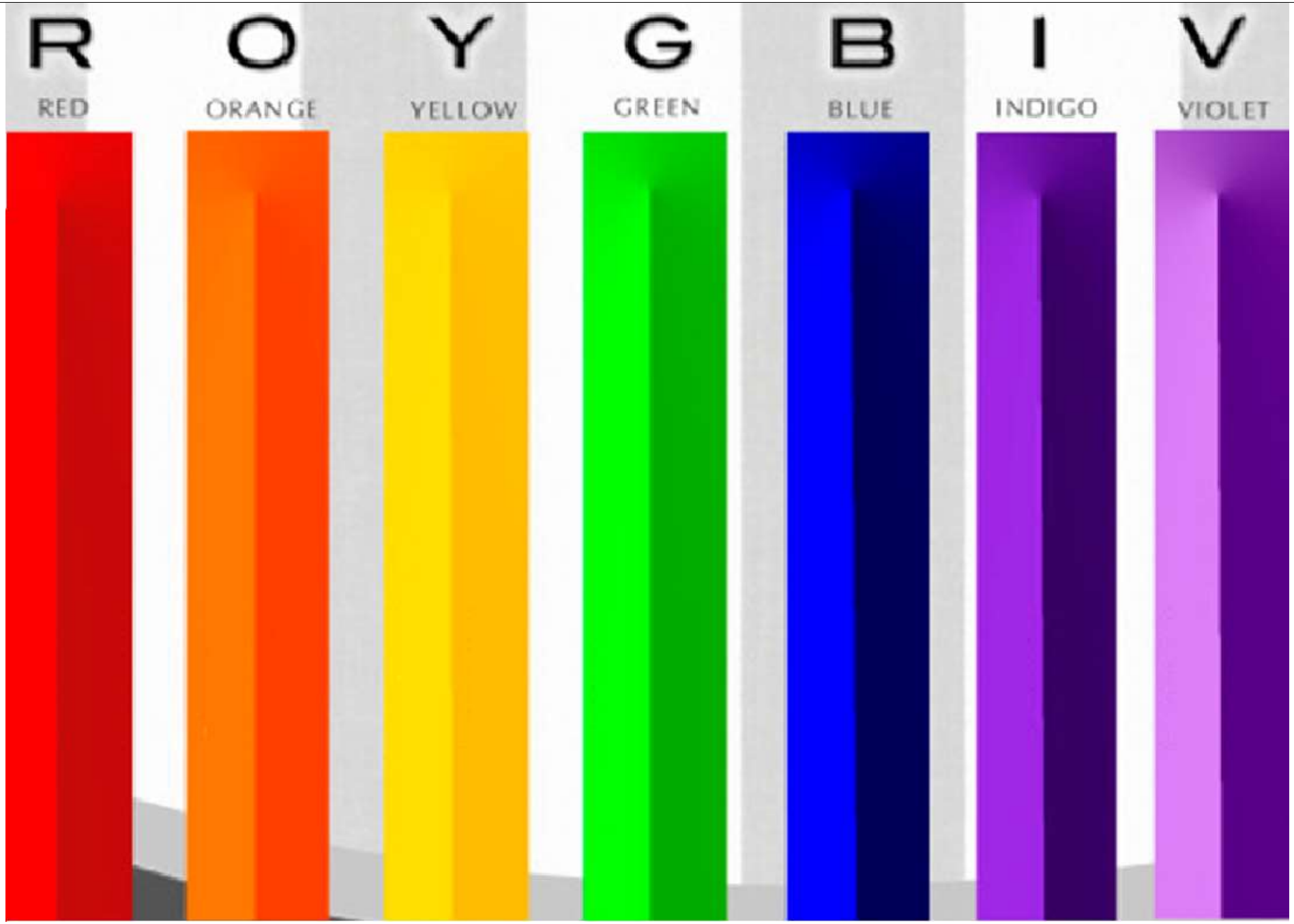
Be encouraged to think like Isaac Newton (1643–1727), one of the most brilliant scientists that ever lived. He invented a telescope like the Hubble Space Telescope that astronomers still use today. He is also known for figuring out how Gravity works; but he also discovered light is a mixture of all the colors of the rainbow.



The day Isaac newton discovered the rainbow, by Kathleen Krull

On that particular day in the early 1660s, Isaac was not yet Isaac Newton the greatest scientist ever. He was merely an unpopular, solitary, brilliant college student. That day Newton spent a rare few hours outside, at the annual market near his college. He bought a toy—a prism, a piece of glass cut according to precise angles. Though he had next to no money, the prism was so cool that he promptly bought another. Shortly afterward, the plague hit England hard, and the only way to avoid catching it was to avoid other people—not a problem for a guy like Newton. In 1666, at age 24, he was forced to leave college and retreat to his remote childhood home, Woolsthorpe Manor, with his prisms and other science toys. While other students might have goofed off, Newton sat still . . . and thought. Which of the many puzzles in nature could he solve while he was waiting out the plague? All was quiet except for the moaning of sheep. He lived in a time and place of no distractions—no Facebook, TV, cell phone, video games, newspapers, malls. The sparkling prisms caught his eye. What if he could understand the nature of color—something more accurate than what he was being taught in college? Ever since the ancient Greek Aristotle said so, scholars assumed that white light was one simple thing, uniform, solid. Color, therefore, was the product of white light mixed with black. Even those in Newton's day, like Robert Hooke, continued to insist that color was a mixture of light and darkness. Hooke had invented his own personal color scale, ranging from bright red, which he claimed was pure white light mixed with the tiniest amount of darkness, to soft blue and then black, which was darkness completely blocking out the light.1234567

Newton didn't see how Aristotle or Hooke could be right. After all, a white page with black writing did not appear in color when viewed from a distance and the black and white blended. It appeared as gray. So he set out to prove the experts wrong—one of his very favorite activities. The prism was the perfect tool for his experiment. Others, like Hooke, were using prisms too, admiring the colors they projected when sunlight fell on them. They believed that the prism itself was somehow coloring the light. In their experiments they had placed a screen close to one side of the prism and seen the spot of light come out the other side as a mixture of color.Newton suspected that more accurate results could be had by moving the prism farther away. In his lonely study upstairs, he positioned the prism at the far wall so that it was 22 feet from the window. He let a skinny beam of sunlight pass through the prism. He observed that the beam spread out into colored bands of light, which he called a spectrum. The white light had split into different colors. How? Newton kept thinking. His theory was that each color was a wave of light and that each wave had the ability to be refracted, or bent, by something. A refracting substance, such as a prism, could bend each wavelength of light by a different angle or amount. The shorter wavelengths—those toward the violet end of the spectrum—were being bent the most. The longer wavelengths—those toward the red end of the spectrum—were being bent the least. Therefore, all the colors already existed in white light, and the prism was simply fanning them out according to their ability to be bent. Color was a matter of wavelengths radiating in a range visible to the human e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