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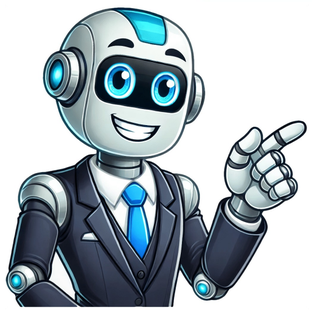

Good news: You don't need a prism to witness this spectral display. Mother Nature's got you covered with raindrops. Yes, raindrops in the air act like tiny prisms. Light passes through each water droplet, bending as it goes in and reflecting off the side before it exits. This sequenceentering, bending, and exitingis a process called refraction. The Angles and the Arcs: Understanding Optical Geometry To visualize how rainbows formed in the sky, think about the angles. Light entering a rain droplet bends at specific angles, depending on its color. Red light exits at an angle of 42 degrees, while violet is slightly smaller at 40 degrees. The different angles from multiple droplets form a complete circle of color in the sky our beloved rainbow. Ever noticed that most of the time, you see only part of the circle? That's because the ground gets in the way! The Double Rainbow A double rainbow is what happens when light inside the droplets reflects twice, meaning you get a second reflection. The secondary rainbow appears outside the primary bow and has its colors reversed. If you're lucky enough to see one, it means the water droplets are just the right size for that second show. What Does a Rainbow Symbolize? In various cultures, rainbows are symbols of hope, usually representing the promise of upcoming rain. So the next time you see a rainbow, it's not just a scientific marvel it's also a multicultural sign of good things to come! Rainbows are magical phenomena that occur in nature. So, what the heck IS a rainbow? Can you name the colors of the rainbow in order? Can you get to the end of a rainbow? Find fun, fascinating facts aboutrainbows!It takes both the sun and rain to make a rainbow! To put it plainly, rainbows are produced by sunlight entering water droplets, bouncing around each individual bead of water, and changing direction (refracting) to reflect off the back of the droplet to return back towardus.In raindrops, sunlight bounces back, or reflects, most strongly at a certain angle of 42 degrees.If you draw an imaginary line from your eyes to the rainbow, and then back to the sun, that angle will always be 42 degrees. However, the sun has to be behind you, not in front of you, because thelight gets refracted back in the general direction it camefrom!Light being refracted through a raindrop. Source: WikipediaThe Colors of aRainbowSince sunlight is made of different wavelengths of light, we see the white light broken into an array of colorstherainbow.The colors of the rainbow in order, are red, orange, yellow, green, blue, indigo, and violet. You can remember them with the acronym Roy GBiv!As you can see in the image above, the red light is the strongest color, and exiting the water drop at an angle of 42 degrees relative to the incoming sunlight. The violet light emerges at an angle of 40 degrees. Other colors of the rainbow leave a raindrop at angles somewhere inbetween.TypesofRainbowsThe more the light bounces around, reflecting and refracting, the more types ofrainbows thereare.On December 17, 2015,rainbow scientist Jean Ricardconcluded that there are 12 definitive types ofrainbows.Some of the most interesting types include thefollowing:Double rainbows: This happens when the light is reflected twice in the raindrop.The higher rainbow is fainter and the colors will bereversed!Circular rainbow: You can see the rainbow as a complete circle if youre in an airplaneor high in a skyscraper. Its only on the ground that you can only see the semi-circlebow.Twinned rainbows: Two rainbows appear to stem from the same pointboth presenting the typical ROYGBIVcolororderings.Monochrome rainbow: A rainbow that occurs when the sun is lower in the skysuch as at sunrise or sunsetand reflects more of one or two wavelengths than the others, making it appearmonochrome.Moonbow: A rainbow caused by the light of the Moon, rather than the Sun. These are typically quite dim and may even appear white in color. Learn more about Moonbows.Fogbows: A faint rainbow occurring within fog, usually over a body ofwater.The big debate is why rainbows are so different. In general, the scientists are divided between the fatty camp and the low-life camp. Most scientistshavesuggested that the size of the raindrops shape how they reflect light and what the rainbow will look like. Others have said that it depends where the raindrops aresince a low-lying haze of water will reflect at a different angle than a high shower ofdrops.A rare winter rainbow.What Ricardhas shown with his research is that while both factors are important, what matters mostis where the drops arehigh or low in the sky. Thats why you see rainbows change as the raindrops fall. They can fade, brighten, split into double or multiple bows, be full circles or lowarches.If rainbows that form are too low, the thickness of the air makes it impossible to see the shorter waves of lightthe purples and blues. The most low-lying droplets that are filtered through haze and smog finally filter out all but the long waves of red, producing a monochromerainbow.Monochrome rainbows are missing colors and may even besolid red. Source: WikipediaRainbows become rare in winter because water turns to ice or snow! Ice scatters lightinstead of refractingit.Can You Ever Get to the End of aRainbow?So, lets get to the real question. Nope, you cant! A rainbow is based on the orientation of the observer (you) and the light source (the sun). So, when you move, the rainbow will move,too.However, dont be discouraged. Heres the magic: Every rainbow is unique to only you!! Thats right. Even if someone is standing nearby, youre not seeing the same rainbow. A rainbow isnt something you can touch! Its an optical illusion! Every rainbow looks different and is in the eye of the beholder. Were sure theres a message heresomewhere!Wondering where to see a rainbow?Here arethe best places to look for a rainbows. The rainbow is one of the most beautiful, naturally occurring phenomenons in nature. Scientifically speaking, rainbows appear in the sky when sunlight enters raindrops, causing dispersion and refraction of the light. But rainbows symbolize so much more than just a scientific anomaly. Rainbows hold deep meaning and significance to the individuals who discover them. People who have suffered a great personal loss, for example, are often deeply and profoundly impacted when they spot a rainbow, especially on an important day or at the time when they need to know they havent been forgotten. And so, because the rainbow is an important symbol, it follows that each of the colors represented in the rainbow also holds important meaning and significance. Because of the rainbows importance across multiple religions and cultural beliefs, the rainbow is packed with symbolism. Lets take a look at each of the colors and what they mean. When listed, the colors of the rainbow appear in this order: RedOrangeYellowGreenBlueIndigoViolet Sometimes scientists simply refer to this list as ROYGBIV (pronouncedRoy G. Biv). Every rainbow you discover in the sky will have each of these colors represented in this order. But heres a fun fact: While we only list seven colors in the rainbow, the rainbow is actually made up ofover 1 million colors, most of which the human eye cannot see or comprehend. So the rainbow is as mysterious as it is profound. Heres a walkthrough of the seven colors of the rainbow and what each one represents. 1. Red Red is listed first because it is the first color in the rainbows arc. It also has the longest wavelength of any of the colors represented. It is a color packed with vibrancy and strong emotion. For Christians, red symbolizes energy and wisdom. For Buddhists and Hindus, red corresponds with the Muladhara chakra, which is grounding. But even without religious significance, red is a powerful color with strong emotion.It is a heavily pigmented color which naturally links it to strong feelings and emotions. Red is never used to illustrate weakness or subtlety. Instead, it is used in nearly every country and culture to designate danger or to issue a warning. Red always captures our attention and tells us something important is happening. Throughout famous literature, red is used to represent passion, hostility, and war. When it comes to roses, for example, red represents the strongest form of love. It is also the color used to represent evil and the devil. In Japan and China, red is the most revered color of the rainbow, which is why brides in China have traditionally worn red. The red of the rainbow represents the following: enthusiasmpassionsecurityvitality 2. Orange The second color of the rainbow, orange is a warm, vibrant color. It is typically a happy color that makes people feel friendly and comfortable. A mix of the colors on either side of it (red and yellow), orange feeds off of both. For instance, the happiness of yellow and the vitality of red combine to make the color orange. According to the chakra system, orange in this context represents the energy often associated with creativity, sexuality, and fertility. In addition to the chakra system, orange represents creativity and the ability to relax and enjoy life. But its important to understand that not all oranges are created equal. Burnt orangerepresents tension and aggression. Dark orangerepresents ambition. Golden orangerepresents self-control. Peachy orangerepresents good manners. Typically speaking, the lighter shades of orange are most associated with positive feelings and emotions. The orange of the rainbow represents the following: endurancperseverancestrength Yellow is the happiest color in the rainbow. This color of sunshine represents energy and warmth. It is often associated with happiness, clear thinking, and communication. Often, yellow is linked with inspiration. If youre looking to start a new creative project or endeavor, put something yellow where you can easily see and appreciate it. Yellow occurs naturally throughout our world in the form of egg yolks, sunflowers, lemons, and bees. It is often used to illustrate a happy face. The most luminous color in the rainbow, yellow is known to capture our attention more easily than any other color. (Perhaps this is why the most common highlighter color is yellow!) Bottom line: Its hard to miss something that is yellow. Note: Use yellow sparingly. Too much yellow can actually send the opposite message. Too much yellow causes people to feel judgmental and critical. The yellow of the rainbow represents the following: awarenesscheerfulnessenergyorderliness 4. Green Located in the middle of the rainbow, green is the color of life. Here in the West, it is also a color symbolizing wealth, which is why our money is green. It is a refreshing color that symbolizes growth and renewal. But green is also a bit of a dichotomy. On one hand, green represents life and growth; on the other hand, it represents envy. (Ever heard the phrasegreen with envy?) Maybe theres a finer line between wealth and envy than we realize. Because so much of our plant life is green, this color is often linked to nature and living naturally. Recycling and using natural products is sometimes referred to as green living. When people decide to start replacing synthetic products with more natural products, it is said they aregoing green. Interestingly, the human eye is capable of distinguishing more variations of the color green than any color in the rainbow. The green of the rainbow represents the following: 5. Blue The color of the sky and the ocean, blue represents peace, relaxation, and stability. This is no surprise. When people want to relax, they often seek out water. Even just changing out the wallpaper on a computer background to an ocean scene can be beneficial in this regard. Because blue is the color of the heavens, it is often associated with divinity and is used to illustrate trust and loyalty. It is a stabilizing color, but its also sometimes used to illustrate melancholy (thus the Mondayblues). TheBluesis a famous music genre that originated in the deep south and is characterized by mellow sounds. Blue is a well-loved color with many healing and comforting properties. Note: Too much blue can make people feel rigid. Blue is a good color to include in moderation. The blue of the rainbow represents the following: calmcommunicationknowledgepeace 6. Indigo Indigo is the most disputed color in the rainbow. For years, scientists and weather hobbyists have argued whether indigo belongs on the list at all since its hard to distinguish.Is indigo truly deserving of its own place, or are people simply seeing blue and violet? Along the same lines, people have long tried to answer this question: Is indigo blue or purple?The answer:its both.(Although, if you want to get more specific, indigo is three-quarters blue and one-quarter purple.) A mix of purple and blue, indigo is the color of the midnight sky. Because of this, indigo encourages individuals to think more deeply about life and has strong connections to spiritualism and inward thinking. It also represents mystery. Like other colors in the rainbow, its important not to go overboard with indigo. Too much indigo results in a person feeling intolerant, judgmental, and avoidant. Too much inward thinking can result in frustration or angst. Used in moderation, however, indigo can be very useful. The indigo of the rainbow represents the following: awarenessintuitionspiritual attainmentwisdom 7. Violet Violet is one of the most loved colors of the rainbow.And with good reason. Whereas red has the longest wavelength in the rainbow, violet has the shortest. Located on the opposite end of the rainbow from red, violet is the most subtle color of all. But do not mistakesubtletyforweakness.Violet has its own unique superpowers. People who are around the color violet report feeling more empathetic and kind, for example. Violet is also associated with individuality and selflessness. Created from red and blue, violet is a lighter shade of the color purple and therefore shares some of the same meaning. The violet of the rainbow represents the following: creativityimaginationluxurymysteryroyalty We cannot talk about the significance of the colors of the rainbow without mentioning the Bible. It is believed that the rainbow is a sign from the Almighty that we are not forgotten. It is mentioned in the story of Noahs Ark; after God appeared before Noah following the flood, there was a beautiful rainbow in the sky signifying His Glory and Power as well as His Covenant. In the Bible, the rainbow is mentioned in The Book of Genesis, The Book of Revelation, and also The Book of Ezekiel: In Genesis, it is described as a sign of Gods Mercy as well as the pact/covenant He made with Noah that such a flood would not be sent again.In Revelation, Apostle John compares the rainbow colors to the glory or power of God.In Ezekiel 1:26-28, the colors of the rainbow are compared to the glory of God. Noah teaches mankind the seven basic rules to adhere to, conforming to the seven colors of the rainbow: Thou shall not worship idolsThou shall not blaspheme Thou shall not murderThou shall not have immoral relationshipsThou shall not stealThou shall respect all living creaturesThou shall set up courts of law These are termed as Noahide Laws, and the seven colors of the rainbow remind us of our obligation to them. Another important term related to the colors of the rainbow is angel colors. Devout Christians use these to focus on their prayers to the Lord. Like the seven rainbow colors, there are seven angel colors. Some gifted people with sight do not just see the refracted light in the rainbow colors but another metaphysical system which they believe to be angels sent to Earth to guide us. These are actually similar to the concept of chakra and aura colors, which we have talked about before. The seven angel colors include: Blue: Angel Michael (Power/Protection)Yellow: Angel Jophiel (Thoughts/Wisdom)Pink: Angel Chamuel (Love/Relationships)White: Angel Gabriel (Purity/Harmony)Green: Angel Raphael (Healing/Prosperity)Red: Angel Uriel (Wise Service/Energy)Purple: Angel Zadkiel (Mercy/Transformation) The rainbow truly is a beautiful, mysterious, and magical phenomenon. Nothing in nature quite excites or energizes us like spotting a full bow (or double bow!) across the sky. And knowing how much significance each color holds makes it all the more fascinating. Next time you see a rainbow, stop and take it in. Let its beauty and creativity fill you with peace and joy. It has been said that no two people see a rainbow exactly the same way. So the rainbow you view in the sky is truly unique to you! About Rainbow Shops in New York Experience fashion excellence firsthand at our conveniently located store at 308 W 125th St, New York, NY. Immerse yourself in a world where quality meets affordability, and style meets diversity. Come find your new outfit! Discover Style and Affordability Explore a wide array of fashionable clothing and accessories at Rainbow Shops in New York, NY. Find exceptional value in our curated collections for women, plus size and shoes, ensuring everyone enjoys top-tier style without breaking the bank. Size Inclusivity We proudly promote size inclusivity, offering a rich variety of sizes ranging from 0-24 and XS-4X. Our diverse fashion range ensures every woman finds something that suits her unique style perfectly. Fresh Styles Daily Dive into a refreshing fashion experience with new and trendy styles added daily, keeping your wardrobe vibrant and up-to-date. A rainbow is a multicolored arc in the sky which appears when sunlight hits water droplets. How does it get its colors? Why is it curved? And what is at the end of the rainbow?Sun + rain = rainbowiStockphoto.com/constantinoprisSolar maximum 2025: A colorful aurora yearLow Sun and Water DropletsA rainbow can only form under the following conditions:The Sun must be above the horizon and not be obscured by clouds, mountains, or other obstacles.The Sun has to be quite low in the sky. If you are at the same elevation as your horizon, the Sun's altitude must be below 42 to create a rainbow that can be seen from your perspective.Solar altitude tableThe air opposite the Sun, as seen from your position, must be filled with a large number of water droplets.Rainbows always appear in the sky opposite to the Sun. So, if you have your back to the Sun, the rainbow will arch across the sky in front of you.Rainbows can also appear at nightHow Do Rainbows Form?A rainbow is an optical phenomenon which involves three processes: reflection, dispersion, and refraction.ReflectionWater droplets can act like little mirrors. When a ray of sunlight strikes one of these tiny spheres of water, most of the light bounces off its rear wall and is reflected back. During a rain shower, the air is full of water droplets acting together like a reflective curtain made of millions of minuscule mirrors casting the sunlight back at you.DispersionReflection, dispersion, and refraction inside a water droplet.But sunlight is whiteso, if the water droplets reflect the sunlight, how does the rainbow gets its colors? This is where the second process comes into play: dispersion of light.Pure sunlight may appear white to us, but it consists of all visible colors. As soon as a ray of sunlight enters a water droplet, it is split up into its components, causing its colors to fan out and become visible as a spectrum of colors. This happens both when the ray enters the droplet and when it leaves the droplet again.RefractionAs the ray of light enters and leaves the water droplet, its direction is also changed slightly in a process called refraction. Each color is refracted in a marginally different direction, creating the impression of a fan of colors. For example, in relation to the direction of the incoming ray of light, the red light component leaves the droplet at a slightly larger angle than the orange component.The Colors of the RainbowThis means each water droplet reflects all of the colors of the sunlight back to you. However, because it reflects and refracts each color at a slightly different angle, only one color from each droplet reaches your eyes. For example, you can only see the red light from droplets that are higher in the sky, and only the orange light from the droplets that are a little lower.This is how the top two stripes of the rainbowred and orangeform. Further below, the droplets form an even sharper angle between you and the Sun, so they throw the yellow, green, blue, indigo, and violet components of the sunlight back at you, creating the remaining stripes of the rainbow.Memorize the Color SequenceIf you are having trouble remembering the order of the rainbow colors, simply memorize the name Roy G. Biv. This imaginary first, middle, and last name is an acronym made up of the initial letter of each color, in the order they appear in a rainbow. From top to bottom, they are: red, orange, yellow, green, blue, indigo, and violet.Take Spectacular Aurora PhotosHow to take breathtaking photos of the aurora.Published: Feb 14, 2025Why Is a Rainbow Curved?Technically, a rainbow is the upper half of a circle of light, which centers on the antisolar point, the point directly opposite the Sun, as seen from your perspective. The lower half of the circle, however, is usually not visible since the water droplets hit the ground before it can form. You may be able to see a circular rainbow if you have a high vantage point and the terrain sharply drops off in the direction of the rainbow, allowing the rain to fall down farther and reflect the sunlight from a lower angle. It is also possible to see a circular rainbow from an airplane.The shape of a rainbow is a result of the refractive index of water. This causes the sunlight to be reflected off rain droplets within a limited range of angles that lie between 0 and 42. Most of the light is cast back at you in an angular range from 40 for violet light to 42 for red light. This is why the circle of light always has an angular distance of 40-42 from the antisolar point, meaning a rainbow always appears 40-42 away from the point opposite the Sun, as seen from your perspective.What Is a Double Rainbow?Double rainbow in Finland.iStockphoto.com/petejauSometimes you can see a fainter, second rainbow appear above a rainbow. This happens when sunlight is reflected twice inside each water droplet and directed back to you.The second rainbow is not as bright as the primary rainbow, because some of the sunlight passes through the droplet, while most of it is reflected. This means more light goes astray when a ray of sunlight is reflected twice, leaving less light to be reflected back to you. The double reflection process also results in an inversion of the colors of the secondary rainbow. Here, the violet stripe is at the top while the red stripe appears at the bottom (click on the image to see this detail).The angular distance between the second rainbow and the antisolar point is 50-53, so the two rainbows are always about 10 apart.Why Is the Area Below the Rainbow Brighter?While most of the sunlight is concentrated at an angle of 40-42, some of it is also reflected in the range of 0-39. Crucially, the angle also determines the extent to which the sunlight is dispersed and refracted. For example, a ray of light that is reflected at 0right back where it came fromis not dispersed or refracted at all.For this reason, we experience it as white light. The same is the case for light that is reflected at higher angles, although to a slightly lesser extent. This is why the area below the main rainbow looks comparatively bright, as shown in the images.Alexander's BandAlexander's band.iStockphoto.com/PitmireThe physical properties of the water droplet prevent the sunlight from being reflected at angles above 42. For example, it is impossible for a horizontal beam of light to be reflected at an angle of 90 and sent straight down toward the ground. While this maximum reflective angle is a little different for each wavelength (color), ranging from 40 for violet light to 42 for red light, none of the sunlight can be redirected at angles exceeding 42.Because of this, water droplets that are more than 42 away from the antisolar point, as seen from your perspective, will not reflect any sunlight back at you. This is why the sky above the primary rainbow looks a great deal darker than the sky below it (see image).About 10 above the main rainbow, the doubly reflected sunlight of the second rainbow reaches your eyes, so the sky above that is a little brighter again, creating the impression of a dark band of sky sandwiched between the two rainbows. This phenomenon is called Alexander's band.Is There a Pot of Gold at the End of the Rainbow?According to an Irish legend, a pot of gold can be found at a rainbow's end. We probably all agree this is highly unlikely, but did you know it is possible to actually disprove that claim? In fact, you have probably been at the end of the rainbow many times without noticing!To check the veracity of the pot-of-gold-legend, you need to go to the location where a rainbow touches the ground. This may seem like an impossible feat, given that a rainbow is, in a way, an optical illusion. As tangible and real a bright rainbow may appear, it is formed by countless small reflections of sunlight that are only visible from a certain perspective. This makes it impossible to actually approach a rainbow. If you move toward it, the rainbow will recede at an equal pace; a person who stands at the end of the rainbow you see will see a different, equally unapproachable rainbow farther back, if the weather conditions permit.But in this realization also lies a chance to empirically disprove the Irish legend. If you can see another person at the end of your rainbow, you can stand at the end of another person's rainbow, or at least of a rainbow that is visible from a different perspective. So, you have probably been there, at the end of the rainbow, even if that particular rainbow was invisible to you at the time.So. Did you find that pot of gold?Topics: Atmospheric Phenomena, Sun Store Locator Order Tracking Account Rainbow at Suuroy, Faroese Islands. Photo by Erik Christensen. A rainbow isnt really a thing and it doesnt exist in a particular place. It is an optical phenomenon that appears when sunlight and atmospheric conditions are just rightand the viewers position is just right to see it. A rainbow requires water droplets to be floating in the air. Thats why we see them right after it rains. The Sun must be behind you and the clouds cleared away from the Sun for the rainbow to appear. Why is a rainbow a bowor arc? A full rainbow is actually a complete circle, but from the ground we see only part of it. From an airplane, in the right conditions, one can see an entire circular rainbow. From a flying plane, you might see a full-circle rainbow. Credit: NOAA. What happens in the water droplets? The sunlight shines on a water droplet. As the light passes into the droplet, the light bends, or refracts, a little, because light travels slower in water than in air (because water is denser). Then the light bounces off the back of the water droplet and goes back the way it came, bending again as it speeds up when it exits the water droplet. Light enters a water droplet, bending as it slows down a bit going from air to denser water. The light reflects off the inside of the droplet, separating into its component wavelengthsor colors. When it exits the droplet, it makes a rainbow. Why the colors? Sunlight is made up of many wavelengthsor colorsof light. Some of those wavelengths get bent more than others when the light enters the water droplet. Violet (the shortest wavelength of visible light) bends the most, red (the longest wavelength of visible light) bends the least. So when the light exits the water droplet, it is separated into all its wavelengths. The light reflecting back to you, the observer with the Sunlight coming from behind you, from the water droplets will appear separated into all the colors of the rainbow! Violet will be on the bottom and red on the top. What makes a double rainbow? A secondary rainbow appears if the sunlight is reflected twice inside the water droplets. Secondary rainbows are fainter, and the order of the color is reversed, with red on the bottom. Credit: Leonardo Weiss via Wikimedia Commons. Sometimes you can see another, fainter secondary rainbow above the primary rainbow. The primary rainbow is caused from one reflection inside the water droplet. The secondary rainbow is caused by a second reflection inside the droplet, and this re-reflected light exits the drop at a different angle (50 instead of 42 for the red primary bow). This is why the secondary rainbow appears above the primary rainbow. The secondary rainbow will have the order of the colors reversed, too, with red on the bottom and violet on the top. A rainbow is a multicolored arc made by light striking water droplets. The most familiar type rainbow is produced when sunlight strikes raindrops in front of a viewer at a precise angle (42 degrees). Rainbows can also be viewed around fog, sea spray, or waterfalls. A rainbow is an optical illusionit does not actually exist in a specific spot in the sky. The appearance of a rainbow depends on where you're standing and where the sun (or other source of light) is shining. The sun or other source of light is usually behind the person seeing the rainbow. In fact, the center of a primary rainbow is the antisolar point, the imaginary point exactly opposite the sun. Rainbows are the result of the refraction and reflection of light. Both refraction and reflection are phenomena that involve a change in a wave's direction. A refracted wave may appear "bent," while a reflected wave might seem to "bounce back" from a surface or other wavefront. Light entering a water droplet is refracted. It is then reflected by the back of the droplet. As this reflected light leaves the droplet, it is refracted again, at multiple angles. The radius of a rainbow is determined by the water droplets' refractive index. A refractive index is the measure of how much a ray of light refracts (bends) as it passes from one medium to anotherfrom air to water, for example. A droplet with a high refractive index will help produce a rainbow with a smaller radius. Saltwater has a higher refractive index than freshwater, for instance, so rainbows formed by sea spray will be smaller than rainbows formed by rain. Rainbows are actually full circles. The antisolar point is the center of the circle. Viewers in aircraft can sometimes see these circular rainbows. Viewers on the ground can only see the light reflected by raindrops above the horizon. Because each person's horizon is a little different, no one actually sees a full rainbow from the ground. In fact, no one sees the same rainboweach person has a different antisolar point, each person has a different horizon. Someone who appears below or near the "end" of a rainbow to one viewer will see another rainbow, extending from his or her own horizon. Colors A rainbow shows up as a spectrum of light: a band of familiar colors that include red, orange, yellow, green, blue, and violet. The name "Roy G. Biv" is an easy way to remember the colors of the rainbow, and the order in which they appear: red, orange, yellow, green, blue, indigo, and violet. (Many scientists, however, think "indigo" is too close to blue to be truly distinguishable.) White light is how our eyes perceive all the colors of the rainbow mixed together. Sunlight appears white.When sunlight hits a rain droplet, some of the light is reflected. The electromagnetic spectrum is made of light with many different wavelengths, and each is reflected at a different angle. Thus, spectrum is separated, producing a rainbow. Red has the longest wavelength of visible light, about 650 nanometers. It usually appears on the outer part of a rainbow's arch. Violet has the shortest wavelength (about 400 nanometers) and it usually appears on the inner arch of the rainbow. At their edges, the colors of a rainbow actually overlap. This produces a sheen of "white" light, making the inside of a rainbow much brighter than the outside. Visible light is only part of a rainbow. Infrared radiation exists just beyond visible red light, while ultravioletis just beyond violet. There are also radio waves (beyond infrared), x-rays (beyond ultraviolet), and gamma radiation (beyond x-rays). Scientists use an instrument called a spectrometer to study these invisible parts of the rainbow. Rainbow VariationsGlowThe atmosphere opposite a rainbow, facing the sun, is often glowing. This glow appears when rain or drizzle is falling between the viewer and the sun. The glow is formed by light passing through raindrops, not reflected by them. Some scientists call this glow a zero-order glow. Double RainbowSometimes, a viewer may see a "double rainbow." In this phenomenon, a faint, secondary rainbow appears above the primary one. Double rainbows are caused by light being reflected twice inside the raindrop. As a result of this second reflection, the spectrum of the secondary rainbow is reversed: red is on the inner section of the arch, while violet is on the outside. Higher-Order RainbowsLight can be reflected from many angles inside the raindrop. A rainbow's "order" is its reflective number. (Primary rainbows are first-order rainbows, while secondary rainbows are second-order rainbows.) Higher-order rainbows appear to viewers facing both toward and away from the sun. A tertiary rainbow, for example, appears to a viewer facing the sun. Tertiary rainbows are third-order rainbowsthe third reflection of light. Their spectrum is the same as the primary rainbow. Tertiary rainbows are difficult to see for three main reasons. First, the viewer is looking toward the sunthe center of a tertiary rainbow is not the antisolar point, it's the sun itself. Second, tertiary rainbows are much, much fainter than primary or secondary rainbows. Finally, tertiary rainbows are much, much broader than primary and secondary rainbows. Quaternary rainbows are fourth-order rainbows, and also appear to viewers facing the sun. They are even fainter and broader than tertiary rainbows. Beyond quaternary rainbows, higher-order rainbows are named by their reflective number, or order. In the lab, scientists have detected a 200th-order rainbow.Twinned RainbowA twinned rainbow is two distinct rainbows produced from a single endpoint. Twinned rainbows are the result of light hitting an air mass with different sizes and shapes of water dropletsusually a raincloud with different sizes and shapes of raindrops. Supernumerary RainbowA supernumerary rainbow is a thin, pastel-colored arc usually appearing below the inner arch of a rainbow. Supernumeraries are the result of the complex interaction of light rays in an air mass with small, similarly sized water droplets. In supernumerary formation, reflected rays interact in ways called constructive and destructive interference. Light is either reinforced (constructive interference) or canceled out (destructive interference). Interference is responsible for the lighter hues and narrower bands of supernumeraries. Reflection RainbowA reflection rainbow appears above a body of water. A primary rainbow is reflected by the water, and the reflected light produces a reflection rainbow. Reflection rainbows do not mirror the primary rainbowthey often appear to stretch above it. Reflected RainbowA reflected rainbow appears directly on the surface of a body of water. A reflected rainbow is created by rays of light reflected by the water surface, after the rays have have passed through water droplets. Reflected rainbows to not appear to form a circle with a primary rainbow, although their endpoints seem to meet in an almond-shaped formation. Red RainbowA red rainbow, also called a monochrome rainbow, usually appears at sunrise or sunset. During this time, sunlight travels further in the atmosphere, and shorter wavelengths (blue and violet) have been scattered. Only the long-wavelength red colors are visible in this rainbow. FogbowA fogbow is formed in much the same way as a primary rainbow. Light in a fogbow is refracted and reflected by fog (water droplets suspended in air). A fogbow seen in the clouds is called a cloudbow. Because the water droplets in fog are much smaller than raindrops, fogbows have much fainter colors than rainbows. In fact, some fogbows have few detectable colors at all and appear mostly white, with a reddish tinge on their outer edge and a bluish tinge on their inner edge. MoonbowA moonbow, also called a lunar rainbow, is a rainbow produced by light reflected by the moon. The moon itself does not emit light, of course. Moonlight is reflected sunlight, as well as some starlight and "Earthlight." Because moonlight is so much fainter than sunlight, moonbows are dimmer than rainbows. Rainbows in Myth Rainbows are part of the myths of many cultures around the world. Rainbows are often portrayed as bridges between people and supernatural beings. In Norse mythology, for instance, a rainbow called the Bifrost connects Earth with Asgard, where the gods live. In the ancient beliefs of Japan and Gabon, rainbows were the bridges that human ancestors took to descend to the planet. The shape of a rainbow also resembles the bow of an archer. Hindu culture teaches that the god Indra uses his rainbow bow to shoot arrows of lightning. Rainbows are usually positive symbols in myths and legends. In the Epic of Gilgamesh and, later, the Christian Bible, the rainbow is a symbol from a deity (the goddess Ishtar and the Hebrew God) to never again destroy Earth with floods. Sometimes, however, rainbows are negative symbols. In parts of Burma, for instance, rainbows are considered demons that threaten children. Tribes throughout the Amazon Basin associate rainbows with disease. Perhaps the most famous piece of mythology surrounding rainbows is the Irish legend of the pot of gold at the end of a rainbow. The gold is guarded by a tricky leprechaun, butbecause no one sees the same rainbow and rainbows don't "end" (they're circles)no one ever finds the gold or the magical creature. Rainbow Flags Rainbow flags usually appear as stripes (bands) of at least five different colors. Rainbow flags have long represented groups championing diversity, respect, and inclusiveness. The Wiphala is a type of rainbow flag. It is a symbol of communities indigenous to the Andes, stretching from modern-day Ecuador to Chile. A Wiphala has been an official flag of Bolivia since 2009, when the nation elected its first indigenous president, Evo Morales. The Wiphala features a diagonal patchwork design with squares in different rainbow colors. Different arrangements of patchwork squares represent different Andean communities. The Buddhist flag, designed in the 19th century, is flown by Buddhists around the world. It is a vertical arrangement of six bands, each representing a different aspect of Buddhism, from kindness to moderation, blessings to wisdom. The Jewish Autonomous Oblast, a community on Russia's border with China, is represented by a seven-banded rainbow flag. The seven bands symbolize the seven branches of a menorah. The most familiar rainbow flag may be the banner representing the movement supporting civil rights for members of the lesbian, gay, bisexual, and transgender (LGBT) community. The different colors of the "LGBT pride" flag represent the diverse community itself, as well as different aspects associated with each color. Orange, for example, symbolizes health and healing, while green symbolizes nature.

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