

How could science be different? In broaching such a sweeping question, we must consider which aspects would necessarily play out the same versus those which could or should have changed. This would present us with a series of intellectual forks in the road, developmental points of departure from the science of today. Where those detours might occur and how drastically they would change the course of science would, like any hypothetical exercise, depend on the different assumptions made.

Still, with every assumption imposed we risk straying from the simple truths of nature, often requiring further corrective assumptions and creative mathematical fixes to realign with observational evidence. This can lead to a proliferation of increasingly complicated and fantastical toy models of reality which haven't any hope of verification, an endless sea of speculation in which physics has been treading water for some time. So, rather than attempting to mark-up the existing map of science with some alternate assumptions, a more prudent path may be to draw a new map assumption-free and then see what minimal science would necessarily emerge from simple logic alone. This should provide some interesting contrast with major assumptions of the current scientific status quo which were less than logical, if not downright counterproductive to progress.

If nature truly operates in the simplest and most logical way, then our alternative science should be the very model of simplicity and logic itself – a streamlined intellectual enterprise that would make even Spock smile. Most of all, it should agree with everything we empirically know to be true about reality from the quantum to the cosmic and everything in between. So let's boldly go where science could have gone before, but preferably wearing something other than red shirts – synonymous with dying a quick death in Star Trek.

### **Nothing But Neutrality**

To reimagine science from scratch, it's only logical we wipe the slate completely clean and establish an existential frame of reference by defining what "nothing" versus "something" means. This requires us to erase any notions of space, time and quantum structure as being fundamental as these too are assumptions of pre-existence – of some where, some time and some thing already in place. We should also dispense with creationist ideas of some sudden intervention, divine or otherwise, inexplicably causing reality to be. However, as we know physical reality exists, at least to our conscious awareness, logic dictates that what we consider as something versus nothing to be just different descriptions of the same neutral state of possibility, one as neutrality of form and the other as neutrality of state. This is in contrast to the prevailing physicalist view of science that nothing is the absence of something, as if reality were a light switch to be turned on or off. The problem is that this presumes someone is home – a philosophical sticking point between science and religion for ages. It is therefore upon the foundation of *neutrality* that reality would seem most logically built and the science with which to understand it be tailored.

This introduces the concept of  $0$  (*zero*) as our first mathematical principle, not as a number representing no quantity but rather as the quality of neutrality which is always conserved. As such, the *conservation of neutrality* becomes our first law of science. The idea of *probability* likewise emerges to capture all possible expressions of neutrality between formlessness and form. Note that the notion of infinity normally associated with probability is not actually required thus far in our “new math” as it implies a sequential progression, a linear concept which does not (yet) factor into our dimensionless and timeless paradigm.

## Geometric Least Action

Having established neutrality as our ground rule for existence, how would neutrality express itself into physical reality in the simplest way? To put it another way, what would reality’s *least action* be? As the simplest possible physical expression is a zero-dimensional *point*, this would be its first possible form and therefore establish *geometry* as the fundamental language of reality and the singular quality of  $1$  (*one*).

However, for point geometry as an inherently specific and non-neutral expression to retain overall neutrality, it would need to manifest as a polarized pair of equal and opposite points relative to a neutral origin. This would define the polarized quality of  $2$  (*two*), the concepts of *positive* and *negative* and thus the mathematical operations of *addition* and *subtraction*. It would also introduce the geometric principle of *symmetry* and the geometry of the *line* in a positional frame of reference of *one-dimensional space* – what we currently represent as the real number line from  $+1$  to  $-1$ , though with a broader qualitative meaning as that of *neutrality through polarity*. As polarity also imparts a positive and negative bidirectionality to space relative to a fixed origin, this in turn creates the notion of forward and backward sequence or *time* – of future and past relative to a neutral present – and the concept of  $3$  (*three*) as the triad of positive, negative and neutral.

The next logical step in our neutral geometric progression from a one-dimensional real number line spanning  $+1$  to  $-1$  would be all possible orientations of that line relative to the origin. This defines the geometry of the *circle* in *two-dimensional space*, specifically a *unit circle* of radius  $1$  centered about the origin. This introduces a second dimension perpendicular to the real number line which therefore represents potentials not yet manifest into linear reality, what are dismissively referred to as “imaginary” numbers and, together with the reals, as “complex” numbers. This characterizes *complex numbers* as the circular geometry of *imaginary* numbers only becoming *real* where circle intersects line, necessarily doing so through the defining identity  $i^2 = -1$  of imaginary numbers whereby *rotation* counterclockwise or clockwise is equivalent to *multiplication* or *division* by *powers* of  $i$ . As each multiple of  $i$  corresponds to a quarter rotation around the unit circle, the idea of *cycle* and the *base-4 cycle* in particular enter into our mathematical lexicon.

## It's All About The Base

Despite the geometric simplicity of the base-4 cycle with only two ways of partitioning itself, in half or in quarters, it offers reality little creative freedom in terms of versatility. With only four points of possibility in the context of complex numbers (1, -1, i and -i), only two of which can be physically real (1 and -1), base-4 would only allow the property of polarity to be expressed such as the phenomena of vibration, positive/negative charge and matter/anti-matter. But what finer base structure would be the most logical choice in terms versatility and size to account for the much greater complexity found in nature?

First, that base must be divisible by 4 in order to retain the base-4 properties of the complex unit circle upon which our model of reality is thus far built. As such, base-8 and base-12 would be the next viable options, base-8 being factorable three ways (in half, quarters and eighths) and base-12 five ways (in half, thirds, quarters, sixths and twelfths). The next larger, more versatile alternative would be base-24 with six factors but at the cost of much greater size and complexity. As such, *base-12* would seem to be the most logical and efficient choice, as summarized below.

<u>size</u>	<u>factors</u>	<u>factorability/size</u>
base-8	2,4,8	3/8 = 38%
<b>base-12</b>	<b>2,3,4,6,12</b>	<b>5/12 = 42%</b>
base-24	2,3,4,6,8,12	6/24 = 25%

Nature provides plenty of evidence of this preferred base-12 structure: in the hexagonal crystalline structure of ice, six-fold radial symmetry of snowflakes and hexagonal structure of honeycombs; the carbon atom critical to life having six protons and six electrons (and six neutrons in the stable carbon-12 isotope, the most versatile of all elements); photosynthesis which converts six molecules each of carbon dioxide and water into six of oxygen for the air we breathe; the twelve elementary fermion particles of subatomic matter occurring as two groups of six by type (quarks and leptons), four groups of three by charge and three generations of four by mass. Not to mention beer and doughnuts which naturally occur by the dozen, arguably the universe's strongest evidence for the superiority of base-12.

Note that base-10, the current standard for science, doesn't pass the litmus test of logic as it isn't a multiple of base-4 and thus doesn't conform to the foundational structure of complex numbers. Nor is base-10 particularly versatile for its size with only three ways of dividing itself, in half, fifths or tenths (for a factorability/size ratio of 3/10 or 30%), versus five ways with base-12 (42%). The less factorable a base into clean whole number ratios, the greater the incidence of irrational numbers and the more complicated mathematical computations become. Although counting in base-10 requires barely lifting a finger, its use as the default for science has almost certainly been detrimental to progress by obscuring the simple geometric ratios, relationships and symmetries of nature. But convincing base-10 advocates to switch to base-12 at this point would be like talking to the hand.

Regardless, science's inevitable progression towards base-12 is chronicled in its technology sent into space to explore the universe. From the spherical Sputnik to the decagonal Voyager

probes, cylindrical Hubble Space Telescope and, most recently, James Webb Space Telescope with its eye-catching hexagonal main mirror, humanity is advertising its grasp of base-12 to the galactic neighborhood. A welcome sign to other intelligent life of our scientific maturity: that we likely have beer, know how to cut pizza into twelve equal pieces and celebrate the practice of Happy Hour. So, had science embraced base-12 right off the bat, Earth would already be a well-established party place for aliens rather than an intellectually stagnant backwater infected with the metric system. No wonder ET's practice such extreme social distancing.

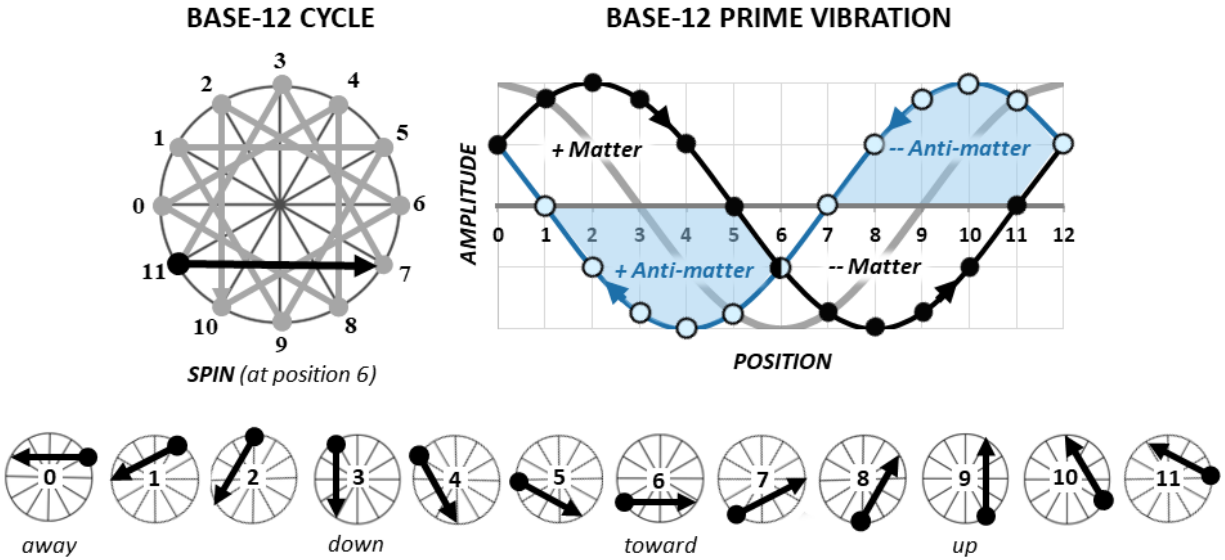
## Nature In Its Prime

As all possible integers can be described by successive cycles of the base-12 positions from 0 to 11, mathematics can be viewed as a cyclical construct. However, as every integer is either a prime number (only divisible by 1 or itself) or the product of primes, all that's needed to generate the integers are those positions on the base-12 cycle at which primes can occur in any given cycle: at 1, 5, 7 and 11. Thus, the notions of *integer* and *prime* become imperative to science. Note that positions 2 and 3 are excluded as they are prime numbers in the first cycle only and can therefore be considered the structural factors of the base-12 cycle itself (i.e.  $2 \times 2 \times 3$ ). Position 1, however, is included as it is only non-prime in the first cycle. So, in a base-12 cyclical context (and to annoy mathematical traditionalists), logic dictates that 1 should actually be a prime number after all. Thus, the base-12 prime cycle of positions 1, 5, 7 and 11 represents mathematics at its simplest and most primal. Or does it?

The four prime positions of 1, 5, 7 and 11 in the base-12 cycle also possess a symmetric 2:1 rectangular geometry, something base-10 lacks with its prime positions awkwardly staggered at 1, 3, 7 and 9. Also, positions 1 and 7 being opposite each other on the base-12 cycle, as are 5 and 11, each pair subtracts when treated as vectors. This reduces to two equal net vectors of length 6 ( $7-1 = 6$ ,  $11-5 = 6$ ) at positions 7 and 11, rather than four vectors of differing lengths at 1, 5, 7 and 11. This reveals an even simpler cyclical embodiment of mathematics, that of a base-12 cycle of radius 6 generated by prime positions 7 and 11 alone. Still, as any cycle is inherently biased in one rotational direction, the base-12 prime cycle would necessarily manifest along with its polarized opposite so as to maintain dynamic neutrality overall.

This brings us to what logic suggests is the final stage in reality's geometric emergence in the simplest neutral way, that of the bidirectional base-12 prime cycle expressed over time into the 3D double-helix *prime vibration* shown below. To the right is the 2D front view an observer would perceive and to the left its side view, the base-12 cycle from it emerges (shown at its "home" spin direction of position 6). Also shown at the bottom for clarity are the individual spin orientations for each of the twelve positions of matter along the black wave, the twelve anti-matter positions following the opposite sequence along the blue wave.

As the prime vibration is generated by the circular rotation of two prime positions, it creates a standing wave consisting of two out-of-phase *sine* waves which, when combined, become a *cosine* wave (thick grey line). Thus, *trigonometry* gets added to our mathematical toolbox.



Wherever this 2D projection intersects the neutral real axis – again, at positions 1, 5, 7 and 11 – “real” prime particles can therefore occur relative to an observer’s orthogonal perspective, while all other positions within the waveform prefer to remain anonymous as “imaginary” potentials (unless bullied onto the real axis by a particle collider, say). This suggests that the “observer effect” of seeming wavefunction collapse in quantum experiments doesn’t collapse anything, but simply imposes a frame of reference that establishes specific intersection points between the probability wave and the real number line relative to our line of sight, what we perceive as fixed point-like particles. This brings the observer front and center in science and would bolster interest in pilot wave theories along the lines of de Broglie-Bohm in which the explicate reality is a limited perspective of some deeper implicate vibrational structure. And, unlike string theory which views particles as individual vibrating strings or loops, the prime vibration sees particles as twelve vibrational states within the same vibration, much like the chromatic scale of music.

The prime vibration also looks remarkably like DNA, a resemblance that’s more than skin deep. Both are generated by the same geometric formula of four protein bases (prime vectors) in pairings of long and short from opposite strands – adenine to thymine (vector 7-1) and guanine to cytosine (vector 11-5) – resulting in twin helical strands (prime waves) running in opposite directions (as a standing wave) and separated by a constant gap (of 6). This direct mathematical and vibrational correlation between DNA and the prime vibration could possibly have facilitated the cracking of the genetic code earlier and put biology on an accelerated learning curve.

Although the base-12 cycle simplifies to two prime positions, all four are restored when expressed vibrationally in a bidirectional way: positions 1 and 7 as prime positions along the forward moving wave and positions 5 and 11 on the backward wave. This agrees with the temporally opposite nature of matter and anti-matter and why the up and down quarks and their anti-matter counterparts are the “prime” particles of which all composite matter and anti-matter are made. We see that the outermost positions 0 and 12 as point geometries above the real axis

would also manifest, but as isolated charged particles which remain at the perimeter, namely the electron and its anti-particle, the positron. Further, the figure-8 flow of the prime vibration creates a lateral symmetry of two polarized half-cycles which suggests, at the cosmic scale, our universe is one-half of a mirrored universe pair, each subject to an opposite arrow of time and probability polarity. Which means Spock and anti-Spock can't meet without fireworks.

Nevertheless, our golden rule of neutrality through polarity suggests time itself is an illusion, the past and future merely polarized perspectives relative to the timeless neutral now of position 6. Had science and society in general not taken time so seriously, we would have realized that daylight savings time doesn't save anything, that jokes never get old and that living for today is more important than worrying about dying. Still, the mere mention of such horological heresy would cause seismic tremors through the boardrooms of life insurance companies and investment firms. The tourism industry of the famously divisive little town of Greenwich, England, would not be amused either. After all, they do have a longstanding reputation for being mean.

### **Qualia Over Quanta, Consciousness Overall**

The prime vibration, as mentioned above, is the front view perspective of an observer. Its twelve positions appear from this vantage as varying amplitudes (probabilities), polarities relative to the neutral axis (charge) and spin direction (angular momentum), up or down – the very same properties confirmed in particle physics. However, this is just the projected side view of the base-12 cycle as it rotates into the page, so to speak. Hidden from view is the perpendicular component of spin. So, what appears to be binary spin, up or down, may actually be full rotational spin – up, down, forward and back – through twelve rotational increments. This suggests rotational qualia are fundamental and only appear as linear quanta to an observer.

This idea of extra-dimensional spin offers a remarkably simple interpretation of gravity as the localized direction of spin. Conventional downward gravity would be that of position 3, while “dark matter” would be the perpendicular spin which varies through the other positions: fully outward at position 0 (causing the perimeter of a galaxy or cluster to spin faster), none at position 3 (causing the midway bulge via conventional gravity) and fully inward at position 6 (causing the inward flow of a black hole). Maybe that's why the profile of galaxies and clusters look just like the prime vibration. Likewise, “dark energy” may just be that same undulating spin profile when applied to space itself. That would mean that, when it comes to matter, what you see is what you get.

Intriguingly, the geometry of position 6 at the very heart of the waveform could even be described as the quality of *love* – of opposite polarities intersecting into a timeless neutral still point of unity and connection through which everything else is weighed (a.k.a. the Higgs ground state). If true, this would suggest that everything is ultimately love gaining awareness of itself through polarized expressions of itself. A profound revelation that would give science a warm and fuzzy feeling indeed.

However, science has had more of a love-hate relationship with itself that's been far from neutral. A legacy of fraternal exclusivity not only hampered the advance of science by barring

much of humanity's intellectual potential from the club, but also imposed a distinctly masculine and physical bias to the pursuit of science. This has tended to make the game of science a full contact sport of deduction through destruction, of boys with their billion-dollar particle collider toys smashing apart the very structure science seeks to understand whole. This penchant for fragmentation likewise carried over to the excessive specialization of academia and science itself. Gone are the days of the broad polymathic education of ancient Greece, of the *quadrivium* of geometry, arithmetic, music and astronomy – paradoxically, the very same cross-disciplinary amalgam suggested by our reimagining of science here. In its place developed a pervasive tunnel vision which has only made it harder to see the synergies through which nature works.

Such emphasis on the physically measurable, discrete and quantum stuff of nature over the wave-like qualities of its relationships, especially between the observer and the observed, is what makes the “measurement problem” of seeming wave function collapse even a problem at all. If nature at its most intimate teaches us anything, size doesn't matter but only position versus momentum – a hard and fast rule of quantum coupling that must have made Heisenberg blush when he conceived it.

Even well-meaning efforts to STEM the tide of inequality in science through affirmative action policies can inadvertently push the pendulum too far in the opposite direction. This can, at least initially, lead to a patronizing numbers game of meeting minority quotas regardless of qualifications, a paradoxical two-wrongs-make-a-right tug of war which only keeps the pendulum swinging.

If qualia were our guide instead of quanta, science would be more experiential and pacifist, communing with nature instead of trying to control it. Subjective personal experience would be valued for what it paradoxically is, our most direct and therefore objective means of perceiving reality. Rigorous adherence to the scientific method of careful observation, testable hypotheses and experimental validation would still be crucial to the exploration of reality. Yet, we would be less prone to jump to materialist conclusions, striving to look beyond the rigid façade of reality to the hidden relational dynamics within: wave appearing as particle; continuous appearing as linear, imaginary appearing as real; vibrational appearing as spooky; neutrality appearing as everything. In short, science would be more conscious and conscientious.

The prime vibration embodies the very geometry of consciousness: an experiential self-referential cycle gaining awareness through polarized perceptions of itself. Not unlike the polarized structure and function of the human brain. Information gathered through each cycle of experience is reintegrated through the same central point of self-reference at position 6 – what we consider our focal point of self and “where” our identity seems to reside. Indeed, position 6 is the only place within the prime vibration which falls below the real axis of perceptibility and the only point at which the two prime waves intersect, perhaps explaining why consciousness – and love at its core – seem so deep within and just as elusive to grasp.

When all possible 2D cycles are considered together, they create a 3D toroidal dynamic in which the perceptual gap over position 6 becomes a circular black hole or, in the extra-dimensional physicality we perceive as 4D spacetime, a spherical event horizon the heart of

which is impossible to discern – that of atoms, magnetic fields, Spock, galaxies and perhaps the multiverse. Or, to use a baking analogy, if consciousness were a Bundt cake of all possible experiences, each cross-sectional slice would be a single experience and the hole in the middle would be you, the bottomless pit that wants to have the entire cake and eat it too.

### **R.I.P. Complexity, Conductors and Calculus**

If, as our Vulcan thought experiment suggests, reality were indeed geometric neutrality every logical step of the way and the base-12 prime vibration its manifestation blueprint, then science and its requisite mathematics could have taken a far simpler and more holistic path. Imagine a Langlandsian unification of geometry, number and vibration, but without all the complexity and interdepartmental chalk fights the current mathematical patchwork entails. That path would seek neutral ground in many areas where science has been traditionally conflicted: between qualia and quanta; panpsychism and materialism; women and men; human and machine; and even spirituality and science.

Mathematics could also become more conceptual, visual and relational, no longer triggering post-trigonometric stress in school-age children. Gone too would be all manner of frightful word problems. Mr. Darcy, the Conductor on train A, and Miss Bennet, the Conductor on train B, wouldn't care that they are travelling towards each other on the same track at 68 and 92 miles per hour, respectively, nor how far apart they were in station, just that they will be together soon.

Although other contemporary elaborations of mathematics, such as calculus, would likely emerge as well, they are neither derivative of nor integral to our rethink of science here. Besides, the need for precise trajectories of motion and areas under the curve really only come into play if you're planning to launch ballistic projectiles or chronically underachieve in life, neither of which justifies the limitless torment of calculus (Latin for "irritating little pebble in my shoe") – the branch of mathematics where fun(ction) goes to die an infinite death.

What is essential to Science 2.0 as envisioned here is that reality is the neutrality of duality expressed in the simplest geometric way. And it is through this single relational principle that mathematics, consciousness and physicality can all emerge and play nicely together.