Grant Sanderson

3Blue1Brown, Manim, and visual mathematics education

Grant Sanderson is a mathematician, educator, programmer, and animation creator who built 3Blue1Brown, a YouTube channel explaining mathematics through moving pictures. A Stanford mathematics graduate, he constructs explanations by selecting a problem, finding a revealing representation, programming its movement, and narrating the connections. His principal public work is education and exposition.[1]

Consider a matrix, an object that many students first meet as a rectangle of numbers. In Sanderson's linear-algebra lessons, it becomes an action on space: a grid tilts, stretches, or collapses while two basis vectors show what determines the change. A calculation can then be read as a record of something the viewer has watched happen. This is the channel's characteristic opportunity: to give an unfamiliar symbolic object an intelligible behavior before asking a learner to manipulate it.[2]

That work grew from a specific conjunction of circumstances. A child accustomed to mathematical games became a student with both mathematical and programming interests. A content fellowship supplied experience making lessons for an existing educational organization. A personal graphics project became a public animation tool, and a public channel became a livelihood supported by viewers. Its subsequent growth involved other educators, software maintainers, musicians, and translators. Understanding the career requires following these relationships and the different kinds of work they made possible.

[External image / 外部圖片] Portrait of Grant Sanderson
Grant Sanderson in the portrait accompanying his Stanford Mathematics Research Center profile. Stanford Mathematics Research Center; photographer not stated · Rights retained by the source and respective rights holders; no open license stated. · Image source

Education: Park City, Stanford, and early tutoring

Sanderson graduated from Park City High School in Utah in 2011 and from Stanford in 2015, having studied mathematics and computer science. The Park City Education Foundation's alumni account also places his Khan Academy content fellowship in 2015–2016. These are useful institutional boundaries for a story whose early stages he has usually described retrospectively in interviews.[3]

In a December 2016 MathTango interview, he recalled his father arranging sugar cubes into geometric counting puzzles, with a cube as a reward for a solution. His father's own mathematical education had gone only a little beyond calculus; what he transmitted was

curiosity and a way to play. Sanderson singled out his calculus teacher, Phil Sakashita, for opening mathematical possibilities. His aspirations subsequently moved around: in high school he imagined a mathematical career, early in college he leaned toward computer science and software or data work, then technology internships made him miss mathematics. Graduate-level classes brought him nearer a possible research path, but he decided to spend time outside academia. Those changes matter because neither the mathematician nor the programmer was merely a supporting identity. The eventual work needed both.[4]

The Art of Problem Solving books and online world supplied another route into creative mathematics. In his own recommendations, Sanderson identifies Richard Rusczyk's original book as a formative influence. Its importance is more precise than a general enthusiasm for difficult subjects: a problem gives the learner something to attempt, a reason to search, and a way to discover that a familiar approach is inadequate. This relationship between a concrete task and the concepts needed to solve it would become a recurring structure in his videos.[5]

Stanford also gave him a social world. In a 2019 interview with Stanford in real life, he remembered choosing the FroSoCo freshman residence because its application asked an essay question, and finding stimulating company there. His older brother, a Stanford graduate of 2012, connected him with another circle. He described himself as introverted, with friendships distributed among Stanford, Khan Academy, and educational YouTube. He also recalled free tutoring begun during college, including three children whose continuing relationship with him became almost familial. That small-scale teaching offered contact with particular learners alongside an increasingly immense remote audience.[6]

He recalled a family difference about risk. His father encouraged experimentation. His mother, who had emigrated from Ireland and experienced poverty as a child, placed more weight on the security of return offers from internships. He described her concern sympathetically and recalled taking her to South America after promising that his education work would create a chance to travel. The apparent freedom of an internet career was weighed against an ordinary question: whether an uncertain project could become dependable work.[7]

Speaking to David Perell, he recalled that identifying early as good at mathematics helped produce a reinforcing cycle of liking it, thinking about it, and getting better. He regretted not engaging more with Stanford researchers, partly through shyness, and said that finding new perspectives on known ideas often gave him more pleasure than pursuing an unknown research frontier.[8] The choice of exposition was therefore not simply a research career interrupted by YouTube success. It was a developing preference for a different kind of mathematical activity.

2015–2017: Khan Academy and the first 3Blue1Brown series

In a 2025 interview for the International Association of Physics Students, Sanderson traced an early prototype to a late-undergraduate hackathon. He programmed a way to display functions as transformations, then made an animated explanation with it. The channel and the tool developed together; making something that communicated mathematics provided a purpose for improving the code.[9]

His October 2023 conversation with Dwarkesh Patel locates the first upload in March 2015, during his final undergraduate year. He was still considering data-science work and a mathematics PhD. Starting by writing his own graphics software was an inefficient route to a finished video, he acknowledged, but owning the tool meant he could change what it did when an explanation demanded something new.[10]

After graduation, Khan Academy gave him a more structured setting: videos and articles about multivariable calculus for an organization already concerned with learners' needs.[11]

His independent channel developed beside that work. By the end of 2016 it had become his principal focus. The deliberately unusual name came from his right eye, whose different-colored sectors look approximately three-quarters blue and one-quarter brown; the eye also supplied the logo.[12]

The early work was not exclusively remedial or curricular. What does it feel like to invent math?, dated August 2015 on the channel's site, follows infinite sums into p-adic numbers, a number system whose notion of distance differs from the familiar one.[13] The governing invitation is to experience why a construction might be invented. Such an invitation can remain valuable even when the mathematical destination is established knowledge: the learner encounters the pressure that makes a definition useful instead of receiving it as an unexplained rule.

The Essence of linear algebra series in 2016 marked a consequential expansion. In the IAPS interview, Sanderson describes it as an early sustained engagement with material people actually needed for courses, following more exploratory mathematics. Its reception made the educational usefulness of the channel clearer to him; he resists assigning growth to one decisive breakout video.[14] It established a durable arrangement in which an individual video could attract curious viewers while an ordered sequence could supplement a student's formal studies.

The transformation lesson shows the production logic particularly clearly. Matrix columns become the destinations of the basis vectors; the rest of the grid follows. Rather than begin with a multiplication recipe and subsequently promise a geometric interpretation, the lesson makes the geometry generate the need for the notation. Written adaptations credit Kurt Bruns, James Schloss, and River Way, reminding readers that today's lesson pages have their own contributors.[15]

The April 2017 Essence of calculus opening likewise starts from a concrete construction. A circle is divided into thin rings, whose approximate areas connect circumference with an

accumulating sum. Making the rings thinner leads toward an integral and a reason for the familiar area formula. The aim is a guided reconstruction of an idea, not a claim that watching reproduces the labor of discovering calculus. The text adaptation is credited to Bruns.[16] The lesson works by keeping the same object visible while changing how it can be measured. That continuity gives the increasingly abstract operations somewhere to attach.

Neural networks, Fourier transforms, and later lessons

The 2017 neural-network sequence translated another apparently remote subject into an inspectable example: recognizing handwritten digits from a 28-by-28 grid of pixels. The introductory lesson, adapted in writing by Josh Pullen, emphasizes that its network is deliberately simple and needs image preprocessing. Its educational value lies in making the mechanism accessible, rather than claiming to display the best available recognition system.[17]

The backpropagation lesson asks how a wrongly classified digit should change the network. Desired adjustments at the output are carried backward through the connections, with their relative effects tracked before the calculus notation is introduced. Weights and biases, rather than the intermediate activations themselves, are the quantities the training process can alter. Sanderson then connects the picture with gradients and averaging across examples.[18] This is a recurring explanatory maneuver: first locate the adjustable things, then show the consequences of adjusting them, then introduce the expression that records those consequences. Calling a system “learning” becomes less mysterious when the viewer can say what changes and what criterion guides it.

The January 2018 Fourier-transform explanation gives a particularly strong example of an animation serving a mathematical operation. A signal is wound around the complex plane at an adjustable frequency. Its time-sampled average position changes as the winding frequency changes, revealing frequency components. The operation eventually becomes a formula involving a complex exponential and an integral. The written version credits Schloss for adaptation and Way for interactives.[19] The picture earns its keep because the viewer can vary a parameter and anticipate a change; it is more than a decorative diagram placed beside an equation.

That year also brought Visualizing quaternions, a collaboration with Ben Eater, known for tutorials that build computers and electronics from understandable components. Eater calls the project an experiment in “explorable videos,” developed in partnership with Sanderson, explaining a four-dimensional number system used to describe three-dimensional rotation.[20] This partnership extended the question of representation into the medium itself: what might an explanation gain when its visual object can also be explored? It connects Sanderson’s practice with a wider community of educational programmers interested in interaction as well as broadcast.

A different connection followed the 2019 videos about colliding blocks whose idealized

collision counts encode digits of pi. Writing in Quanta in January 2020, Sanderson credits Gregory Galperin’s 2003 result. He then describes physicist Adam Brown, a viewer, recognizing a connection with Grover’s quantum search algorithm and discussing it with him at a conference. The resulting article links alternating reflections in the collision problem to operations in the quantum algorithm.[21] This episode shows circulation in both directions between public exposition and specialist mathematics. The video did not discover Galperin’s result; its presentation placed a known structure before someone who recognized a further correspondence. Attribution is integral to the story, not a footnote to individual ingenuity.

The February 2022 Wordle video demonstrates how the channel can recruit an audience through a contemporary amusement. Choosing a guess becomes an information problem: each possible colored response partitions the remaining candidate words. The lesson motivates bits through successive reductions of uncertainty, then uses expected information to evaluate guesses. It also distinguishes the information a guess might reveal from the chance that the guess itself solves the puzzle.[22] A familiar game supplies both the question and a testable computational setting. This is a different entry point from a course, but it leads toward substantial probability and algorithmic thinking.

The follow-up a week later is equally revealing. A shortcut in the code mishandled some repeated-letter responses, changing the computed leading opener. Sanderson acknowledged the error and explained the corrected analysis, including why maximizing information over one step need not minimize the eventual number of guesses. He also emphasized how a result optimized for a particular answer list differs from human play.[23] The incident exposed the distance between the educational aim and the audience’s memorable takeaway: a headline about the “best” word could outlive the mathematical qualifications. It also made a normally hidden part of production visible—simulation code can embody the wrong rules while its output looks precise.

In the March 2023 central-limit-theorem lesson, an idealized Galton board and sums of dice rolls lead toward a normal distribution. The animation changes both the starting distribution and the number of terms being added. Centering and rescaling make the emerging common shape comparable. At the end he returns to the assumptions of the version being taught: independence, identical distributions, and finite variance, warning that a real Galton board need not satisfy them.[24] The explanatory task is consequently twofold: make the phenomenon surprising and make its scope exact enough that surprise does not become a false universal rule.

The 2024 attention lesson moved the neural-network repertoire toward transformers and language models. It uses an ambiguous word, “mole,” to show why a word’s vector representation must acquire context, then introduces queries, keys, and the pattern of influence between tokens. Its adjective-and-noun example is explicitly an illustrative construction rather than a report of how a particular trained attention head behaves; Justin Sun is credited for the text adaptation.[25] Such qualifications matter for a creator addressing rapidly developing technology. A lucid model of a mechanism is useful only if viewers can

distinguish the model’s teaching choices from empirical claims about a deployed system.

These examples span course foundations, unusual mathematical connections, games, and contemporary computing. Their continuity lies less in a stable list of subjects than in a recurring design problem: finding an action a viewer can understand, and making that action carry enough of the mathematics to support the next step.

Manim, video production, and collaborators

Manim made many of these actions producible. Its public repository describes a Python engine for precise mathematical animations and carries an MIT license. Sanderson’s branch is now commonly called ManimGL; the repository directs users toward a separate community project when they want a more maintained general-purpose tool.[26] The relevant distinction is between making a tool that serves an author’s changing work and making one that other people can reliably install, learn, and extend. Both are substantial activities, but they have different requirements.

The Manim Community documentation reconstructs the divergence. Sanderson began an OpenGL-oriented shader branch in late 2019; a community fork formed in mid-2020; his branch was merged in early 2021 and became ManimGL. The projects remain distinct, with different development priorities.[27] The Community Edition’s own repository describes collective maintenance and includes documentation, examples, and ways to contribute.[28] Credit for the tool’s broader usability therefore belongs to the maintainers and contributors who undertook that work, as well as to its originator. Software diffusion is not adequately described as other educators simply using Sanderson’s invention unchanged.

Programmatic animation can encode relationships instead of requiring every position to be set separately. To illustrate the difference, suppose an author wants a hundred vectors to respond to the same transformation. A program can derive every endpoint from the same rule; changing the rule changes the whole scene consistently. A scene can then move continuously between cases, label an object, or keep a comparison visible. This advantage follows from the mathematical structure being expressible in code. It does not remove the editorial questions of which cases to show, which motion clarifies them, or how much a viewer can absorb at once.

The public repository of video code reveals a more specific workflow. Its instructions describe working in Sublime Text with a running scene and using `checkpoint_paste` to execute selected code against a saved scene state. Revising and rerunning a section can restore that state; an author need not rebuild an entire scene simply to inspect a local change. The repository also warns that older videos may require older versions of the animation library. Its video code is distributed under a Creative Commons Attribution–NonCommercial–ShareAlike license, different from Manim’s MIT license.[29] These details clarify two practical matters often obscured by the phrase “open source”: reproducibility depends on a changing software environment, and sharing animation software does not

make every associated media asset commercially reusable on the same terms.

In the 2023 Patel interview, Sanderson describes placing animations along a timeline, recording the narration, and performing a final edit. More consequentially, he says that writing code and editing are themselves ways of thinking through the explanation. This helps account for difficulty delegating: an English specification of exactly what should happen may be harder to produce than the code that makes it happen.[30] Production is not simply the execution of a fully finished script. The scene can reveal a problem in the argument, while the argument can require a different scene. Revision crosses the boundary between content and tool.

His conversation with Perell adds a method for testing an explanation before committing to it: sample lessons with individual people, in person or remotely, attending to where they become confused or interested. He distinguishes a problem-solving narrative, whose beginning and destination may already be supplied, from exposition that must decide both. He also cites Bret Victor as an influence on questioning inherited assumptions about media and computing.[31] Testing with a learner helps address a particular professional hazard: familiarity can make an author forget which connections the audience has not yet made.

The soundtrack has its own authorship. Vincent Rubinetti’s The Music of 3Blue1Brown, released in February 2018, identifies Grant’s Etude and Grant’s Opus as Sanderson’s compositions, with names Rubinetti chose to distinguish them from his own. The track Zeta credits Rubinetti with composition, production, and mixing and dates its original video use to November 2016.[32, 33] Music joins pacing and color in making sustained attention possible, but it should not be folded into an account of Sanderson doing everything himself. A recognizably unified audiovisual style can result from complementary work by different people.

The public credits accessed on October 3, 2026, listed Paul Dancstep for animation and writing; Ashley Hamer Pritchard for operations; Rubinetti for music and web development; Aaron Gostein and Nishad Deulkar for animation; and Mitchell Zemil and Claire Vermillion for illustration and animation.[34] The credits establish a division of labor, without disclosing everyone’s employment terms or how each lesson’s decisions are shared. A familiar narrator’s voice remains a point of continuity across an operation whose production capacity now involves multiple specialists.

Written and interactive adaptations are another expansion of the practice, not simply transcripts. They can let a reader pause indefinitely, inspect an expression, answer a question, or change a parameter. Their credited adapters have repeatedly appeared in the discussion above. Reading, watching, and manipulating an object offer different kinds of control over an explanation; maintaining all three also creates additional work in editing, software, and keeping versions aligned.

Live teaching, university courses, and A Trip to Infinity

The pandemic brought a change of format. The channel announced Lockdown Math on April 16, 2020.[35] A 2021 Dropbox interview describes ten livestreamed lessons that spring, with Itempool supplying real-time feedback through connections with former Khan Academy colleagues. Sanderson reported that lesson planning consumed much of his attention. The same interview contrasts the several Khan Academy videos he could make in an afternoon with the month or more a carefully animated channel video could require.[36] A live lesson and a constructed visual essay impose different constraints: one must respond to unfolding participation, the other can revise and compress a sequence before anyone sees it.

In autumn 2020, he joined Alan Edelman, David P. Sanders, James Schloss, and Benoit Forget in MIT’s Introduction to Computational Thinking. The course used Julia to approach image analysis, particle dynamics and ray tracing, epidemic propagation, and climate modeling. Its public website preserved notebooks and lectures, while enrolled MIT students submitted code-based problem sets through university systems. Non-MIT learners were encouraged to use Discord and find partners for cross-grading. The schedule combined prerecorded Tuesday material with Thursday live sessions and an MIT-only discussion.[37] This collaboration brought the channel’s explanatory work into a setting with assignments, deadlines, and feedback arrangements that a public video alone does not supply.

The institutional world continued to intersect with his independent practice. Ravi Vakil, whom Sanderson identifies as a former professor, contributed a 2021 picture-book-style explanation of exact sequences to the site, aimed at people with the relevant mathematical background.[38] That contribution expands the range beyond introductory viewing: visual explanation can be a way for experts to organize a difficult abstraction, too. Stanford’s Mathematics Research Center subsequently lists Sanderson as a public-lecture visitor for 2025–2026 and records his 2025 lecture Who cares about high-dimensional spheres?.[39] The visit brought his public teaching back to the university where he had studied.

He also contributed to the 2022 Netflix documentary A Trip to Infinity.[40] A production interview in Motionographer with directors Jon Halperin and Drew Takahashi describes an interview-based film whose varied animation came from artists in eleven countries. Netflix executive Jason Spingarn-Koff, editor and co-writer Alex Ricciardi, and producers including Angus Wall helped shape and realize the project.[41] This placed mathematical visualization inside a film whose overall structure, budget, and visual mixture belonged to a larger production.

The film won the 2023 documentary Emmy for Outstanding Graphic Design and Art Direction. The official winners document lists Sanderson and Rebecka Taule under motion graphics, alongside creative directors, animators, and other artists.[42] The achievement is best understood as participation in an award-winning team. It marks a reach beyond the channel while preserving the distinction between contributing a specialist practice and authoring the whole film.

Patreon, sponsorships, and recruiting partnerships

Viewer support became central to the channel's economy. The Dropbox account reported almost 8,000 Patreon supporters in early 2021 and described Patreon as the dominant source of funding then. Sanderson explained his preference for work that would remain useful over many years, whereas a sponsor's attention was commonly concentrated on the first period after release.[43] Reusable lessons can accumulate value long after an upload's immediate publicity has passed.

The current Patreon page makes the arrangement unusually explicit. Public educational videos remain free; supporters receive early access and form an inner audience that helps refine them. Funding also supports translators, written and interactive adaptations, and the Summer of Math Exposition. The page distinguishes the externally maintained Manim Community Edition from channel side projects. It offers monthly support, one-time contributions, and a store, while explaining that predictable monthly support helps plan work.[44] The supporter is therefore a patron of a broader educational operation, not merely a customer buying access to one lesson. Early feedback also makes patronage part of production: paying viewers can help improve material that will later be available to everyone.

The 2018 Fourier video included a Jane Street sponsorship.[45]

The FAQ consulted in October 2026 says the channel now does not incorporate brands or sponsorships within videos, while offering recruiting partnerships.[46]

The chronology matters. Treating the current policy as a description of the channel's entire history would erase an earlier form of financing.

The 3b1b Talent site presents those partnerships as a virtual career fair. It combines information about organizations, technical discussions or puzzles, and application links. Listed partners span quantitative trading, computing and AI, STEM education, and energy; their advertised locations reach beyond the United States to places such as London, Hong Kong, and Singapore.[47] This gives commercial value to something the channel has assembled over years: an audience interested in technical reasoning. The connection between mathematical education and employers becomes visible in the interface itself, rather than only through an advertisement attached to a lesson.

On Jane Street's partner page, Sanderson describes being surprised by the trading firm's interest in education, then learning about internal classrooms, training, and people whose mathematical interests extended outside finance. He explicitly calls his encounters a potentially biased sample and his interpretation an outsider's view.[48] That qualification should survive a profile's retelling. The page documents an endorsed recruiting relationship; it does not independently verify every claim about the employer's culture or supply financial terms for the partnership.

The public sources establish funding mechanisms and some historical supporter counts.

They do not disclose Sanderson's salary, production costs, margins, contractor rates, or the relative returns from teaching, film, recruiting, and other work. Nor can a subscriber count be converted into a private income estimate. What can be said is that the operation combines an openly accessible educational product with voluntary patronage, commerce, and institutional or production collaborations. Its independence is built through those arrangements and maintained through ongoing labor.

Translation and the Summer of Math Exposition

In 2022, Scott Hershberger's Notices of the American Mathematical Society survey placed 3Blue1Brown within a larger YouTube mathematics world, reporting about 4.5 million subscribers at that time. The article describes channels using different presentation forms, and the difficulty of balancing rigor with reaching people beyond a small specialist audience.[49] Sanderson's audience development is therefore part of a wider shift: an individual can publish substantial mathematics globally without a television commission or a university course being the initial gatekeeper. That possibility does not eliminate gatekeeping; audience attention, recommendation systems, and the labor of making a compelling entry point become important conditions instead.

The October 2026 FAQ describes independent contractors with mathematical and narration skills producing dubs in Spanish, French, Hindi, Portuguese, Russian, Japanese, Arabic, and Korean, and volunteers making Chinese translations available on Bilibili.[50]

Criblate, credited to Ben Eater and 3Blue1Brown, provides another route: volunteers revise machine-generated subtitles line by line, submit them for creator approval, and publish accepted versions to YouTube.[51] The creator's voice can circulate through other voices and languages, but accuracy, tone, approval, and credit require a human workflow. Geographic reach follows from that work as well as from a platform's availability.

Sanderson's own recommendations recognize adjacent practices. He points viewers toward Burkard Polster's Mathologer, Brady Haran's Numberphile, Matt Parker's Standup Maths, and Mithuna Yoganathan's Looking Glass Universe. Their different combinations of proof, interviews, comedy, and worked explanation offer ways into mathematics that his own format does not exhaust.[52] These are documented recommendations, not evidence that every named creator co-produced his videos. They place the channel in a plural educational culture whose participants have distinct voices and methods.

The Summer of Math Exposition made that network more active. Announced in July 2021, it invited new, freely available English-language mathematical explanations, including written and interactive entries as well as videos. Brilliant sponsored five $1,000 prizes. The stated invitation addressed people with something worth explaining rather than only those with polished production skills.[53] The event supplied a deadline, an audience, and a reason to complete an explanation that might otherwise remain an intention. These were relatively

small interventions compared with producing a university course, but they could change what individual participants were willing to attempt.

The first results account, published that October, credits James Schloss with co-organizing. More than 1,200 submissions entered a review process using Gavel and pairwise comparisons, drawing on a Bradley–Terry model to identify a promising shortlist. Sanderson describes over 13,000 comparisons and acknowledges that non-video entries could be disadvantaged, prompting additional review.[54] This is a concrete example of organizing mathematics through software and collective judgment. It also exposes the limits of ranking explanations: a system can efficiently gather preferences without making "best" independent of the reviewers, the medium, and the intended audience.

Participants supply evidence of what such an invitation demands. Writing for Network Pages in September 2024, Benoît Corsini describes making a random-chess video: approximately a week for the script, two for the code, and several days for recording and editing. Translating his accustomed mathematical presentations into video required a new form of work.[55] The account is one participant's experience, not an average production schedule. It gives a useful counterweight to the apparent ease of a finished explainer: a modest public invitation can mobilize weeks of privately undertaken writing, programming, and revision.

Another participant, mathematician Dustin Mixon, described a 2023 entry about voting districts made with Boris Alexeev and John Jasper. Improving the explanation led them to refine the underlying proof; Mixon then storyboarded with Google Slides, animated in Keynote, recorded in GarageBand, and edited in iMovie, while Jasper built a web application. They chose familiar software over learning Manim for the project and sought outside feedback before final edits.[56] This example is particularly relevant to Sanderson's influence. A productive response to his work need not imitate his toolchain. The larger contribution of the event is to make explanation worth undertaking and sharing, including when the best available means are quite different.

By May 2025, Sanderson was questioning which audiences the competition rewarded. Reviewers enthusiastic enough about mathematics to volunteer could favor what other enthusiasts enjoyed. He therefore asked teachers about poorly served topics and proposed weighting teacher judgments of usefulness for students.[57] The January 2026 prize announcement described the difficulty of judging and awarded five $1,000 prizes for the 2025 round. He assessed how he might use portions of entries in a classroom, rather than simply assign whole videos.[58] That adjustment returns the competition to a problem encountered at Khan Academy: the most interesting topic for an author or enthusiast may differ from the explanation a particular learner needs.

Reading, information theory, and mathematical exposition

Sanderson's reading recommendations help explain the intellectual materials behind the

channel without turning a list into a genealogy. In 2020 he praised the Hubbards' Vector Calculus, Linear Algebra, and Differential Forms for its numerical and scientific grounding; Tristan Needham's Visual Complex Analysis for pictorial understanding; and David Cox's Primes of the Form $x^2 + ny^2$ for building substantial theory around a concrete question. He also recommended Daniel Schroeder's An Introduction to Thermal Physics, emphasizing how simple assumptions and combinatorics can illuminate thermodynamics.[59] What joins these preferences is an interest in how an abstraction becomes necessary and how different representations make it useful. The books are documented enthusiasms, not proof that any particular scene was borrowed from them.

The work continues to demand new study. In June 2026, announcing Reinventing Entropy, he described an intended explanation of a one-line cross-entropy expression in language-model training expanding into roughly two months of work and a three-part series, Compression is Intelligence. Reconstructing the relevant information theory became the project rather than a preliminary chore.[60] That episode shows a practical cost of his ambition: when the explanation must motivate its concepts, an apparently small formula can require a much larger account of why its ingredients belong together.

In September 2026, Sanderson published a guest essay on Terence Tao's blog arguing that motivated explanations should receive more academic recognition. He distinguishes showing that a claim follows from showing how someone might think of the constructions involved. He acknowledges his nontraditional, externally funded career and proposes greater credit for exposition within expert mathematics, beyond popularization. The essay names Michael Nielsen's "discovery fiction" and recalls the sphere-eversion film Outside In as an early influence.[61] His public practice has thus led to a proposal about the professional valuation of mathematics, not merely a defense of attractive videos. The proposal remains an argument, not evidence that universities have adopted its standards.

In his recommendations Sanderson insists that practice is essential to durable mathematical understanding.[62]

A revealing animation can supply a mental object, show an unexpected connection, or make a difficult topic approachable. It cannot perform the learner's next calculation, diagnose every misunderstanding, or substitute for the sustained work of solving problems. The course, tutoring, adaptations, and exposition events discussed here matter partly because they place different kinds of participation around the video.

Sanderson's career makes a specific kind of mathematical work sustainable: the long process of finding an explanation whose sequence another person can follow. It rests on abilities acquired across classrooms, puzzle communities, programming, and educational employment; on relationships that contribute specialized work; and on arrangements that let a public audience finance something it can also receive for free. Its strongest achievements are not only the moments when a theorem looks beautiful. They are the carefully constructed transitions through which a learner can begin to understand what an unfamiliar object does, why it was defined, and what to try with it next.

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3. Park City Education Foundation, “Grant Sanderson PCHS Class of 2011”, April 12, 2021.↩
4. MathTango, “Grant Sanderson··· An Eye for Math Video Instruction”, December 18, 2016.↩
5. Sanderson, “Recommendations”, June 1, 2020.↩
6. “Grant Sanderson (B.S. ’15),” Stanford in real life, January 25, 2019; autobiographical interview testimony.↩
7. “Grant Sanderson (B.S. ’15),” Stanford in real life, January 25, 2019; autobiographical interview testimony.↩
8. David Perell, “Grant Sanderson: Math for the Masses”, interview and transcript.↩
9. Thara Caba, “Exploring the Path of 3Blue1Brown: A Conversation with Grant Sanderson,” IAPS, January 22, 2025.↩
10. Dwarkesh Patel, “Grant Sanderson—Past, Present, & Future of Mathematics”, October 12, 2023, transcript.↩
11. Park City Education Foundation, “Grant Sanderson PCHS Class of 2011”, April 12, 2021.↩
12. 3Blue1Brown, “About” and FAQ, consulted October 3, 2026; current credits and policies.↩
13. “What does it feel like to invent math?”, August 14, 2015.↩
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15. “Linear transformations and matrices”, August 7, 2016; current written adaptation credits.↩
16. “Essence of calculus”, April 28, 2017; text adaptation by Kurt Bruns.↩
17. “But what is a Neural Network?”, October 5, 2017; text adaptation by Josh Pullen.↩
18. “What is backpropagation really doing?”, November 3, 2017; text adaptation by Josh Pullen.↩
19. “But what is the Fourier Transform? A visual introduction”, January 26, 2018; video, ending sponsorship; caption access.↩
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21. Grant Sanderson, “How Pi Connects Colliding Blocks to a Quantum Search

Algorithm,” Quanta, January 21, 2020.↩

22. “Solving Wordle using information theory”, February 6, 2022; video captions.↩
23. “Oh, wait, actually the best Wordle opener is not ‘crane’ …”, February 13, 2022; video captions.↩
24. “But what is the Central Limit Theorem?”, March 14, 2023; video captions.↩
25. “Attention in transformers, visually explained”, April 7, 2024; text adaptation by Justin Sun.↩
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30. Dwarkesh Patel, “Grant Sanderson—Past, Present, & Future of Mathematics”, October 12, 2023, transcript.↩
31. David Perell, “Grant Sanderson: Math for the Masses”, interview and transcript.↩
32. Vincent Rubinetti, The Music of 3Blue1Brown, released February 22, 2018, album description.↩
33. Vincent Rubinetti, “Zeta”, composition and original-use credits.↩
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35. “Lockdown math announcement”, April 16, 2020.↩
36. Anthony Wing Kosner, “Grant Sanderson channels his passion for math into marvelously intuitive explainer videos,” Dropbox, March 4, 2021.↩
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39. Stanford Mathematics Research Center, “Grant Sanderson”, public-lecture visitor entry, 2025–2026.↩
40. Netflix, A Trip to Infinity, 2022 film entry.↩
41. Stuart Groves, “A Trip to Infinity: The Making of a Netflix Documentary,” Motionographer, April 5, 2023.↩
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43. Anthony Wing Kosner, “Grant Sanderson channels his passion for math into

marvelously intuitive explainer videos,” Dropbox, March 4, 2021.↩

44. 3Blue1Brown Patreon, public funding description, consulted October 3, 2026.↩
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