

Introduction to Scientific Communication

BrookEdge Academy (“BEA”)

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Letter From the Author

When I first entered the world of science, **I didn't know how** to read a journal article. I didn't know how to write like a scientist. I didn't even know what a research poster was. What I did have, though, was curiosity, desire, and support.

I began this journey in high school, as a sophomore in the *Science Research in the High School* program. Under the guidance of Mr. Thomas Vartuli and Mr. Robert Livingston—whose patience, and belief in their students cannot be overstated—I began to master the language of learning. Not just its technical vocabulary, but its rhythm, its rigor, its responsibility.

My focus became Harmful Algal Blooms (*HABs*), an actively growing environmental threat with effects ranging from toxin production (and subsequent “poisonings”) to total ecosystem collapse. I studied the potential of *Eichhornia crassipes*, the common water hyacinth, as a rhizofiltrative tool—a way to clean contaminated waters using the plant's root system. I built a wetland model, gathered data, revised my approach when it failed, and ultimately, presented my findings at the *Regeneron Greater Capital Region Science and Engineering Fair* (GCRSEF). There, I was honored to receive the American Society for Microbiology, Eastern NY Division Award for my poster presentation.

But awards aside, what stayed with me most was the experience of **sharing** that research. The poster, the conversations, the questions that came afterward—that was where the real learning happened. And **that's** why I wrote this curriculum.

This guide is for anyone who has felt overwhelmed by dense articles, daunted by lab reports, or unsure *how* to communicate their science with clarity. It's for students just starting their journey, and for educators who want to bridge the gap between academic knowledge and public understanding. **It's everything I wish I had known when I first started**—and everything I've learned since.

Warmly,

Paul A. Shannon, BrookEdge Academy Writer & Editor

Foundations of Scientific Communication

There's a longstanding myth—one that still subtly lingers in academia—that science is best left to the experts. That it exists solely behind locked doors and paywalls, peer-reviewed into silence. But the truth is far more pressing: in a world grappling with ecological collapse, public health crises, and the ethical implications of technology, science can no longer afford to whisper only to itself.

But when many try to explore scientific literature, they find that it can, oftentimes, feel like a foreign language of some sort. It's dense. It's incredibly structured. It's packed with so much intricate detail that, at very first glance, it might seem **almost impossible** to break through. But hidden within those pages? The foundation of nearly *every* scientific and technological advancement we see today.

It is, **in absolutely no way**, a process solely meant for researchers in lab coats, mixing complex solutions and conducting thorough data analysis. If you have even the slightest curiosity regarding scientific knowledge, knowing how to navigate research papers isn't just helpful—it's **essential**.

Why? Because scientific papers aren't just reports. They're conversations—arguments, counter-arguments, collaborations, and challenges—all unfolding on the pages of major journals like *Nature* and *Science*. Every study, every dataset, every carefully worded conclusion adds another piece to the ever-growing field that is Science Research. But to truly take part in that conversation—to ask the right questions, and to recognize what matters, to see where the gaps (or even biases) lie—you need **the right tools**.

And that starts with understanding structure.

Research papers follow a strict format for a reason. They take complex ideas, massive amounts of data, and detailed analysis, and organize them in a way that (ideally) makes them **clear, concise, and accessible**. Every section—the Abstract, Introduction, Methodology, Results, Discussion, and Conclusion—serves a purpose.

Take the abstract, for instance. If a research paper is a movie, the abstract is the trailer. It's the hook. The snapshot. The quick rundown of what you're about to dive into. In just a few sentences, it should tell you the "*why*," the "*what*," and a glimpse of the "*how*." The background. The methods. The key findings. A well-written abstract lets you know, in moments, whether **this** study is relevant **to you**. And just like a trailer, it shouldn't give away everything—it should strike a balance between clarity and conciseness, pulling you in without overloading you with unnecessary details.

Because the truth is, learning to read research papers isn't just about understanding science—it's about understanding the process of discovery itself. And once you crack that code, you're no longer just a passive reader. You're part of the **conversation**.

Why Science Communication Matters

Science doesn't have *to* exist in a vacuum. It can influence policy, education, and public opinion when applied. But for science to have real impact, it must be communicated **effectively**. *Here's* why I, as a student researcher, think Science Communication matters:

- 1.) Many groundbreaking discoveries fail to reach the public due to poor communication.
- 2.) By translating research into accessible language, misinformation can be mitigated.
- 3.) Scientists, journalists, educators, policymakers, and even influencers hold influence over public perception.

As an activity, to reinforce this idea, watch the news for 30 minutes today. Find a scientific topic, write it down, and then Google it. Compare how **three different sources** present the idea(s). What differences do you notice? What could be causing these differences?

Breaking Down the Sections of a Research Paper

If you've ever opened a scientific paper and felt like you were staring at a **brick wall** of dense text and technical jargon, *specialized scientific language* unpronounceable to the average person, you're not alone; it's something many of us have felt before. But here's the thing—**every** research paper **follows a structure**. A blueprint. A system designed to take a complex idea and break it down into something understandable. Once you know what each section's intended purpose is, reading a paper becomes *a lot* easier.

Think of it like this: A research paper isn't just a collection of facts, or the words of researchers—it's a scientific story. A structured, methodical, and sometimes painfully detailed story, but a story nonetheless.

A standard research paper typically consists of **six major sections**:

- 1.) **Abstract** – This portion of the paper should serve as a concise, effective summary of the entire paper, highlighting the research question(s), method(s) utilized, potential key findings, and drawn conclusions. It's the first thing a reader sees, but often **the last thing** an author writes. This section should allow the reader to determine whether or not the paper is relevant to *them*. An example of a good *Abstract* can be seen in *Appendix A*.
- 2.) **Introduction** – This section establishes why the research matters. It should provide a brief background, funneling broader topics into the niche research question. Your introduction should (additionally) go over the history of the concept, provide references to all past literature, and, ultimately, define the overarching research question. This is your **Review of Lit.**
- 3.) **Methodology** – The methodology is a detailed, step-by-step breakdown of specifically *how* the study was conducted, explaining the materials (i.e. where they were sourced from), procedures, and any analysis techniques that might have been used. The goal is to ensure **reproducibility through transparency**—allowing other researchers to replicate the study.

- 4.) **Results** – A direct presentation of the study's findings, often accompanied by tables, graphs, or other statistical analysis. No interpretation *at all* should occur here, save that for the *Discussion*—in the Results, present just raw data and note general trends.
- 5.) **Discussion** – The place where researchers interpret their findings, explain their significance, compare them to past studies, and acknowledge limitations. This is where the real meaning of the research emerges.
- 6.) **Conclusion** – A summary of key takeaways and a look toward the future. What did the study achieve? What questions remain unanswered? Are there any future research questions that need to be addressed?

How to Read a Research Paper Efficiently

Unlike novels or news articles, **research papers aren't meant to be read from start to finish** in a linear fashion. Instead, reading a research paper effectively requires a strategic approach—one that allows you to extract key information without getting lost in unnecessary details.

Some of the most widely recognized strategies for tackling scientific literature are those similar, in some form, to the **three-pass method** as illustrated by Keshav in 2007. This approach, fundamentally, breaks down the reading process into three stages; as opposed to reading through the paper with one look, each stage, here, serves a distinct purpose in disseminating the paper's information. The first pass functions as a **broad skim**, where the reader should focus on the title, abstract, introduction, and conclusion to quickly determine whether or not the paper is actually *relevant* to their research goals. Citing *irrelevant* or *unrelated* studies with no real connection to your research question just acts as filler information. The second pass involves a closer look at the **methodology** and **results**, given that the paper was found relevant, ensuring a deeper understanding of how the study was conducted and what it found. Finally, after you understand *how* they did the study, you should understand *what* the study says; **the third pass is a critical analysis**, where the reader thoroughly examines the discussion, cross-checks findings with other literature, and evaluates the study's limitations, holes, and potential biases.

Evaluating Credibility and Bias in Scientific Literature

There is **always** one surefire way to vet the information you're researching: look at the author's affiliations and previous research. By doing this, one can correctly identify who *is* an expert—and who *isn't* an expert—in your specific field. In looking at their past publications, assess the quality of the journal, as well; are they known for publishing works in reliable journals like *Nature* or *Science*? Or are most of their pieces published in **predatory journals**? (More information regarding this, as well as a list of some common predatory journals, can be found on *Beall's List* online).

Additionally, at the end of nearly every scientific journal, there is an *Acknowledgements* (as well as a “Conflict of Interest”) section wherein appreciation is expressed regarding any of the following, though this list is not exhaustive: sources of funding, borrowed implements, as well as methodological inspirations, among other things. If, within the *Acknowledgements* section, you see a potential conflict of interest (e.g. a company selling chemotherapy drugs funding an anti-cancer “cure”), it is probably best to stay away from that particular study. This is but one example of biases, however, and more biases found in Science Research can be seen in *Figure 1*.

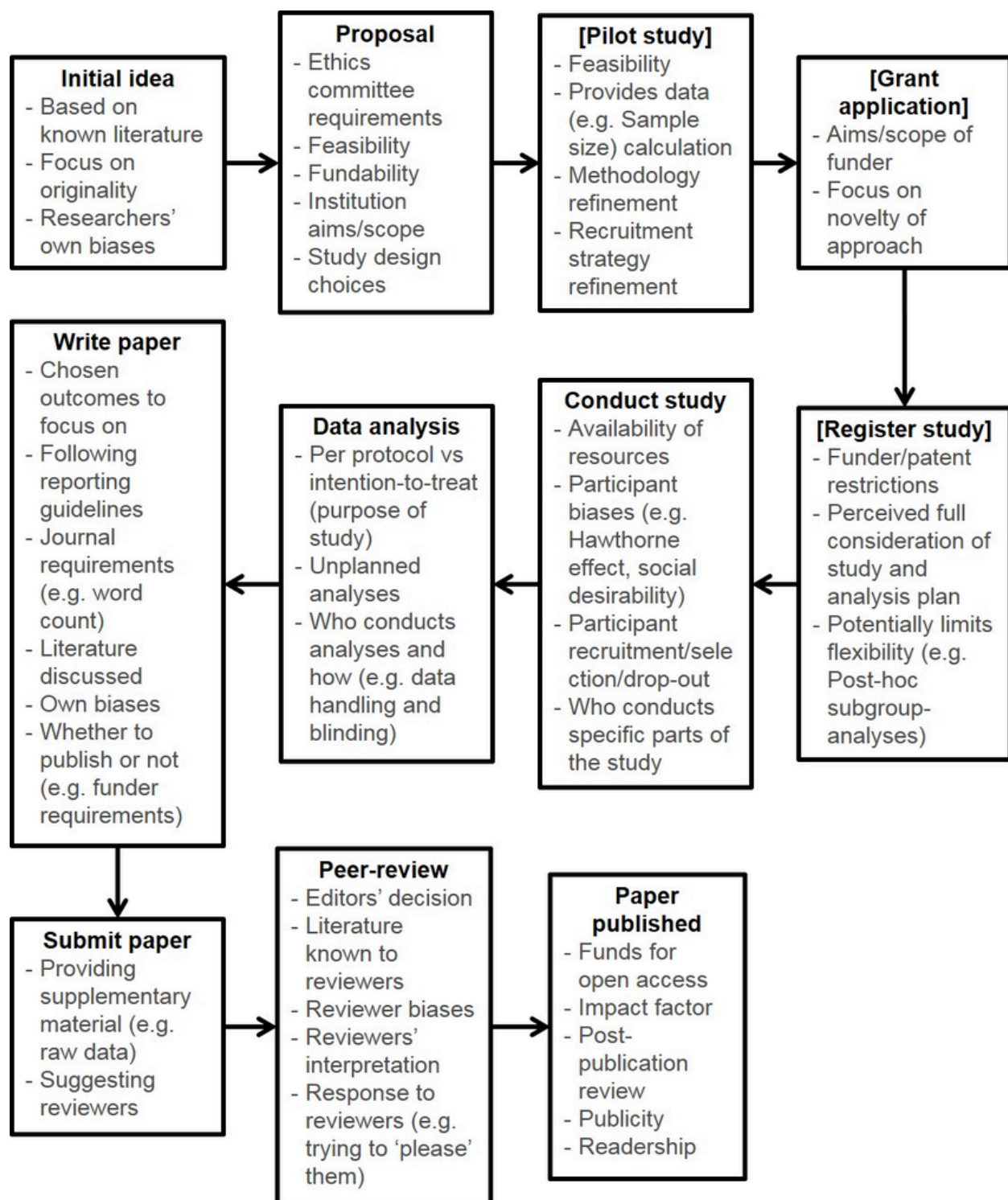


Figure 1: (Carroll) presents examples of potential sources of bias during the entire research process.

Writing Like a Scientist

You have a basic understanding of *why* Science Communication matters, *how* it is done, and *when* it is used. But how do you, specifically, write like a scientist? For those considering research in professional (or academic) capacities, this question is paramount.

The Hourglass Model of Science Communication

Scientific writing is not merely a collection of disconnected paragraphs—it **follows a particular shape**. One of the most commonly used metaphors to describe effective scientific structure is the *hourglass*.

At the top, you start broad. This is the introduction, where you set the stage, outline the general field, introduce key debates, and highlight what's already known. Your writing here should **funnel the reader** from general background into the specific research question.

Then, in the middle—the narrowest part—you get *specific*. This includes your *Methods* and *Results*, which are often technical and focused. This is the heart of your paper: the data, the numbers, the experiment. It should be presented with clarity, precision, and little to no ambiguity.

Finally, you broaden out *again* in the *Discussion* and *Conclusion*. Here, you pull the study back into the larger context. What do the findings mean? How do they fit into the broader field? What new questions arise because of this work? Do you have any newfound research questions? Suggestions? It's your chance to reflect on the implications and invite further inquiry.

Visualizing your paper this way can help you keep your writing coherent and purposeful—knowing where to zoom in and when to zoom out.

Clarity Isn't Simplification—It's Translation

One of the greatest misconceptions in this field is that to communicate science to a general audience, you have to “dumb it down.” That phrase, frankly, does a disservice to the science, researchers, and the reader.

The goal isn't to strip away complexity. The goal is to find the language that preserves complexity while **revealing meaning**. That means crafting sentences that breathe. It means anchoring abstract findings in real-world examples. It means asking, what does this mean for someone who doesn't already know the vocabulary?

Rachel Carson didn't write *Silent Spring* with the assumption that her readers were toxicologists. Carl Sagan didn't expect astrophysicists to be his only audience. They—like today's Ed Yong or Robin Wall Kimmerer—understood that storytelling is not a compromise of science. **It's one of its oldest forms.**

Who Is Your Audience?

One of the most important decisions a science communicator makes—whether they're writing, speaking, or posting online—is *who* they are trying to reach. Because the shape of your message should **always** be molded by its intended listener.

Are you speaking to policymakers, who need concise implications and immediate relevance? Are you addressing a classroom of high schoolers, who might benefit from emotional analogies and questions that spark curiosity? Are you writing for the public at large, where trust, tone, and timing can matter **as much as truth**?

You don't need to reach everyone at once. You just need to know who you're talking to—**and why they should care.**

From Questions to Proposals

One of the hardest parts about Science Research, as a beginner, is the process of establishing your research question.

To make it easier, think of your research process as **a funnel**, as shown in *Figure 2*, presented by : start broad, and continue to specialize thereafter. To do this effectively, choose one form of science—any form—and then find a *very* general topic within that field that you find interesting. Read any one research paper revolving around this topic, and using what they disseminate, try to move towards a more focused research question. Below is an example of the successive process that I, the author, have used before:

Environmental Science → Harmful Algae Blooms (HABs) → Toxins Produced by HABs → Neurotoxic effects of BMAA → Hepatotoxic effects of MC-LR → HAB Remediation → Duckweed HAB Remediation → **Water Hyacinth HAB Remediation (Final Project)**

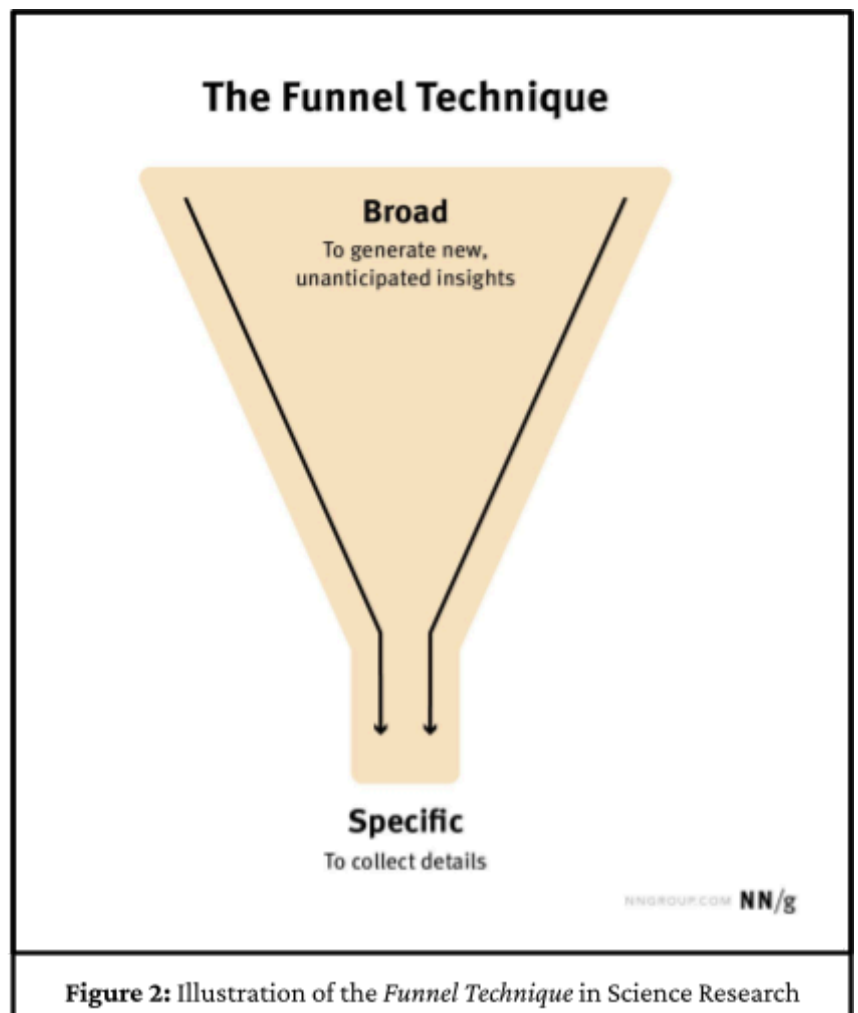
You should be taking notes throughout the entire process. This will allow you information to refer back to for general knowledge regarding your overarching topic. This process may take anywhere from weeks, to months, to years, for more convoluted concepts.

The Peer Review Process

At the heart of nearly every scientific discovery, there lies a gate. And that gate? **It's called peer review.**

Before a study makes its way into the world—into classrooms, policy discussions, or another researcher's hands—it first undergoes **scrutiny by experts** in the same field. Even this curriculum, for instance, was sent out to multiple people for edits.

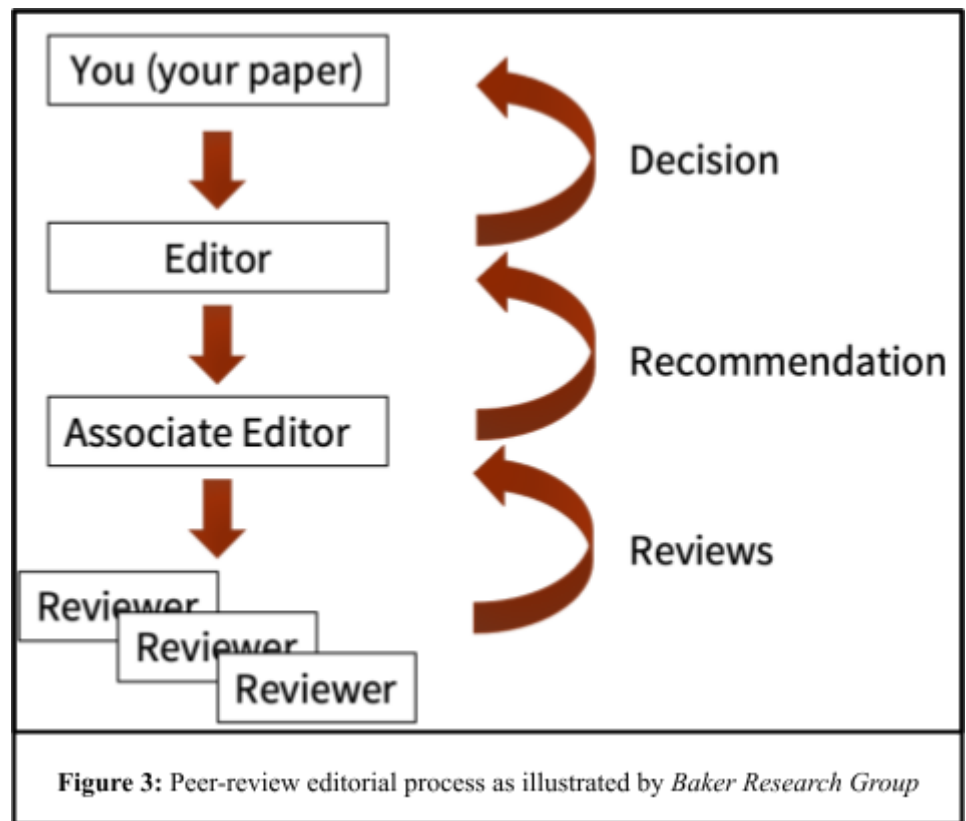
This isn't just a formality. It's a quality control mechanism. A system designed to ask: *Is the science sound? Is the question novel? Are the conclusions valid?* At its best, peer review improves a paper's clarity, validity, and impact. At its worst, it reflects the very human flaws of the scientific community—bias, oversight, and, sometimes, outright gatekeeping.



So what exactly happens during peer review?

When an author submits a manuscript to a journal, it gets sent—often anonymously—to a few (usually two or three) specialists. These reviewers are asked to evaluate the paper’s methodology, originality, clarity, and importance. Sometimes they spot holes in reasoning or recommend clarifying key points. Sometimes they recommend rejection. Sometimes they miss things entirely. The journal’s

editor weighs all these reviews and decides whether the paper should be published as-is, revised, or rejected outright.



What Peer Review Should Do—And What It Can Do

According to large-scale surveys across thousands of researchers, the expectations placed on peer review are high—some would say too high. A survey conducted by Sense About Science at the University of Surrey, consisting of 4,000 researchers, showed that **over 90% of scientists** surveyed believe peer review should improve the quality of published work, evaluate originality, and determine the significance of findings. And yet, according to a 2002 study, many researchers still believe there’s little evidence for this in reality.

This gap—between the ideal and the actual—is worth remembering. Reviewers are fallible. They can’t always detect plagiarism or fraud, especially when access to raw data is limited. They might miss major oversights or let personal bias

(regional, institutional, or otherwise) cloud their judgment. In fact, researchers ranked **seniority bias** and **regional bias** as two of the most common issues still plaguing the peer review process.

But despite its imperfections, most researchers still value it. The same survey showed that a full 84% say **peer review is essential** for maintaining control over scientific communication, while more than three-quarters agree it improves articles. Peer review, for all its flaws, is still viewed as the best system we've got—though many argue it's time for reform, not replacement.

Blind, Double-Blind, and Open Review: What's the Difference?

There's more than one way to structure a peer review process. The most common models include:

- 1.) **Single-blind review:** Reviewers know who the author is, but the author doesn't know the reviewers. This is the current standard in many fields but has been criticized for enabling bias—especially against authors from lesser-known institutions or developing regions.
- 2.) **Double-blind review:** Neither party knows the other's identity. Most researchers agree this is the fairest model available, with the majority rating it 8/10 or higher in effectiveness. It helps minimize discrimination based on gender, geography, or institutional prestige.
- 3.) **Open peer review:** Both the author and reviewer are known to each other. Some versions even publish the review reports alongside the article. Advocates say this improves accountability and encourages civility. Critics argue it invites censorship or retaliation.

No model is perfect. Each has trade-offs between transparency, fairness, and practicality. And preferences often vary by field, region, and career stage.

Visualizing Data and Scientific Storytelling

At its core, science is a process of discovery. But discovery alone doesn't translate to understanding—at least not automatically. For that, we need a story. **We need visualization.**

Visualization, when done well, does more than display data. It animates it. It transforms columns of values into visual moments—comparisons, evolutions, turning points—so that we don't just read the science; we see it. The very best visualizations aren't separate from the story—they are the story.

Data as Narrative

So what makes a visualization a story?

According to researchers at *UC Davis* and *NASA*, good storytelling with data hinges on familiar components: a setting, characters, a plot, and a deliberate pace. **The setting is context**—everything the viewer needs to understand before the story begins. The characters are your **data points**, and the plot is the sequence of **interactions, tensions, or revelations** that unfold as you move through the visualization. Even the pace matters: a scatterplot that builds slowly, revealing clusters one variable at a time, tells a very different story than a high-density chart overloaded from the start.

Why Storytelling Matters

From a cognitive science perspective, people tend to remember stories more vividly than facts. That's because stories engage episodic memory—our ability to remember sequences, patterns, and cause-effect chains—while plain statistics tend to live in semantic memory as **isolated facts**. In other words, stories stick. And when we use visualizations to structure our data as narrative, we give that information a better chance of being remembered, believed, and understood.

This is especially crucial when communicating complex or abstract scientific ideas—things we can't physically see, like climate patterns or particle behavior. At its best, scientific visualization doesn't just show what's happening. It expands our senses, rendering invisible systems visible, abstract theories into spatial models.

What a chart looks like deeply influences what the viewer understands. Color, spacing, scale, and timing all carry cognitive weight. Poorly chosen color schemes can lead to misinterpretations, or even a complete lack of visual accessibility (in terms of colorblindness). Excessive data can overwhelm. Even well-designed visuals can fail if the viewer doesn't know what to look for.

Static vs. Interactive Storytelling

Not all visualization is the same—and not all storytelling works the same way.

Static visualizations (charts, infographics, still images) are more controlled. The creator determines the beginning, the middle, and the end. But interactive visualizations introduce a new narrative challenge: choice. With interactivity comes flexibility—and with flexibility, a risk of fragmentation. If viewers can click, zoom, and alter timelines at will, how do we ensure they still receive a clear story?

That's where hybrid models come in. Some visualization systems (like *AniViz*) allow users to explore data at their own pace, but also follow a built-in narrative structure—a sequence of “**story nodes**” and transitions. These systems preserve both control and curiosity. The viewer becomes a “*spect-actor*,” choosing how deeply to engage, while still being guided through a compelling visual arc.

Common Mistakes in Scientific Writing

Even the most revolutionary, groundbreaking research can find itself never disseminated if it's not communicated in an effective manner. That's why recognizing common mistakes in scientific writing—especially in manuscripts intended for serious publication—is essential **not just for clarity**, but for credibility as well.

The Introduction: Too Long, Too Loose, Too Much

The *Introduction* is where your reader decides if your work is **worth their time**. And yet, ironically, it's often the most bloated section of a paper—overflowing with tangential reviews of literature that obscure, rather than clarify, the research question.

Many early-stage manuscripts stem from larger academic works like theses or dissertations. In those formats, long literature reviews are expected. But in a scientific paper? They're a distraction. A good rule of thumb: keep the introduction **under 10%** of your total word count. Prioritize flow and coherence—every idea should guide your reader toward the study's objective, and by the final paragraph, the research question should feel not only natural, but necessary.

Another common misstep? **Over-citing**. When a study is padded with dozens of references, it may signal a lack of original thought. Worse still, it can frustrate expert readers, who expect a strong point of view, not a bibliography parade. Use citations strategically and never let the author overshadow the information. In other words, don't write "Smith found that..."—instead, write what was *actually* found. Let the finding be the subject, **not the person**.

When in doubt, follow the **KISS** principle: **Keep It Simple, Scientist**.

Materials and Methods: Incomplete, Incoherent, or Inappropriate

If there's one section that demands total transparency, it's this one. The *Materials and Methods* section isn't about style—it's about **reproducibility**. And yet, it's often either riddled with vague language or written as if the reader already knows the study inside and out. Your study, in its finalized stages, should be repeatable by a **non-expert** in the field.

All methods must be written in the **past tense**—you're describing what was done, not what you plan to do. This section also needs to clearly state whether you obtained approval from an institutional review board (*IRB*). Even if your study feels low-risk, IRB oversight isn't just a formality—it's a safeguard. Studies conducted without prior approval are **often barred from publication altogether**.

Be meticulous. Describe all procedures, materials, and instruments in detail. List manufacturers. Avoid brand-centric language that reads like advertising. And don't forget to include a full account of your **statistical methods**—not just the software you used, but why that statistical approach was appropriate. If you're not confident in your statistical literacy, consult a statistician before submitting.

Plagiarism, Paraphrasing, and Proper Citation

At its core, science is a **collaborative pursuit**. But collaboration doesn't necessitate uncredited borrowing—and discovery doesn't justify duplication. For research to hold any sort of weight, for the words around it to be trusted; there must be honesty in *how* ideas are presented and *where* they come from.

Plagiarism breaks that trust. **It cuts corners**. It disguises theft as insight. And in the world of scientific writing, where integrity underpins every word, that kind of shortcut isn't just unethical—it's disqualifying.

What It Is—and Isn't

Plagiarism isn't always obvious. It doesn't always look like a copied paragraph or stolen graphic. Sometimes, it's quieter: a paraphrased idea without attribution. A reused sentence from your own past paper that isn't cited. A statistic pulled from a study that never makes it into your bibliography.

When we use another's words or ideas—whether directly or indirectly—they must be cited. Not out of obligation, but out of respect. Citation is the academic form of acknowledgment. It says: "*This insight isn't mine—but it matters.*"

There's a common misconception that rewording someone else's statement erases the need for citation. It doesn't.

Paraphrasing is a skill. It shows you've processed the information deeply enough to explain it in your own terms. But even reworded ideas still require credit. They didn't originate with you—and that matters.

The only time citation isn't needed? When the information is common knowledge—facts widely accepted and verifiable *without* a source. Water boils at 100° C. Barack Obama was the president of the United States in 2009. Everything else? **Attribute it**.

When Quoting is Better

Sometimes, a sentence is so well-constructed—or so precise—that paraphrasing would water it down. That's when you quote. Use quotation marks. Be selective. Quote only what adds value. And always pair it with a proper citation.

Some style guides specify that any copied string of six or more consecutive words requires quotation. But beyond the rule is the reason: it shows your reader exactly where your voice ends and someone else's begins.

Citation as Credibility

The real function of citation isn't formality—it's clarity and honesty. A strong citation strategy doesn't distract from your argument. It supports it. It anchors your thinking in a wider body of evidence and invites readers to trace the path you took to get there.

APA, MLA, Chicago, Vancouver—styles differ, but the goal is the same: traceability, transparency, and trust.

Every claim that builds on someone else's work should leave a trail. Every source listed in your bibliography should appear in your writing—and vice versa. Consistency is the quiet architecture of academic honesty.

Below are examples of in-text citations, in *APA-7* (the most widely used formatting guide for Science Communication), for both direct quotes and paraphrased statements:

- 1.) According to Foreman et al., "The UCMR program was developed to meet the Safe Drinking Water Act (SDWA) requirement that the EPA collect national occurrence data for contaminants that are suspected to occur in drinking water and do not have health-based standards under the SDWA."

VS.

- 2.) UCMR, otherwise known as the Unregulated Contaminant Monitoring Rule, was created to monitor for potential contaminants not yet recognized with a drinking water standard established by the EPA (Foreman et al., 2025).

Self-Plagiarism: Yes, It Exists

Recycling your own writing without acknowledgement is still plagiarism. If you've said something before—in another published paper, a class assignment, a report—it needs to be cited. Just because the words are yours doesn't mean they're free to be reused.

Journals increasingly scan for self-plagiarism. Readers notice when work feels copied. Editors notice too.

Plagiarism isn't just about copying. It's about pretending. Pretending that someone else's insight was your own. Pretending that research happens in a vacuum, that science isn't cumulative.

And the easiest way to avoid it? **Don't pretend.** Cite where you learned something. Quote when it matters. Paraphrase thoughtfully. Keep track of your sources. Let the reader see where your ideas come from—and let your own voice emerge in the spaces between.

Creating a Research Poster

A research poster is not simply a **smaller version** of a thesis, nor is it a **visual dumping ground** for data. It is a medium of storytelling—compressed, intentional, and designed for both clarity *and* engagement. Unlike a journal article, which rewards the patient reader, a poster must **captivate at a glance** and guide a viewer through your narrative in under a minute, the same way your *Abstract* does, just visually. This constraint is not a limitation—it is an invitation to refine your message until only the most vital ideas remain.

Design begins not with color palettes or font sizes, but with purpose. Ask yourself: What do I want a passerby to understand **within thirty seconds**? What image or phrase will catch their eye as they sip coffee and navigate a sea of content? Start with structure. Posters should flow with intuitive logic—typically in columns from top to bottom, left to right. Use clear section headings drawn from the natural arc of your research: *What* did you investigate, *why* did it matter, *how* did you explore it, *what* did you find, and **so what**? These questions are not just rhetorical—they are architectural.

Simplicity, however, does not mean blandness. Design choices should serve the science. **Avoid** clutter, large blocks of text, or decorative elements that distract more than they direct. **Leave white space**—it allows the eye to breathe and the brain to process. Fonts must be legible from a

distance, with titles visible from across the room. Use color sparingly and strategically. A chart should speak more loudly than a paragraph, and every figure must earn its place. Resist the temptation to include every result; instead, choose those that tell **the most compelling version of your story**.

Ultimately, the poster is only part of the experience. You are its presenter, its narrator. When someone stops, it is not just to read, but to connect—with the work, and with you. Prepare your words as carefully as your layout. Be ready to speak with clarity, listen with curiosity, and share the essence of your research with those who pass by, if only for a moment.

Attached, below, you will find one of my Research Posters—the one that, ultimately, led to my winning an award at GCRSEF.

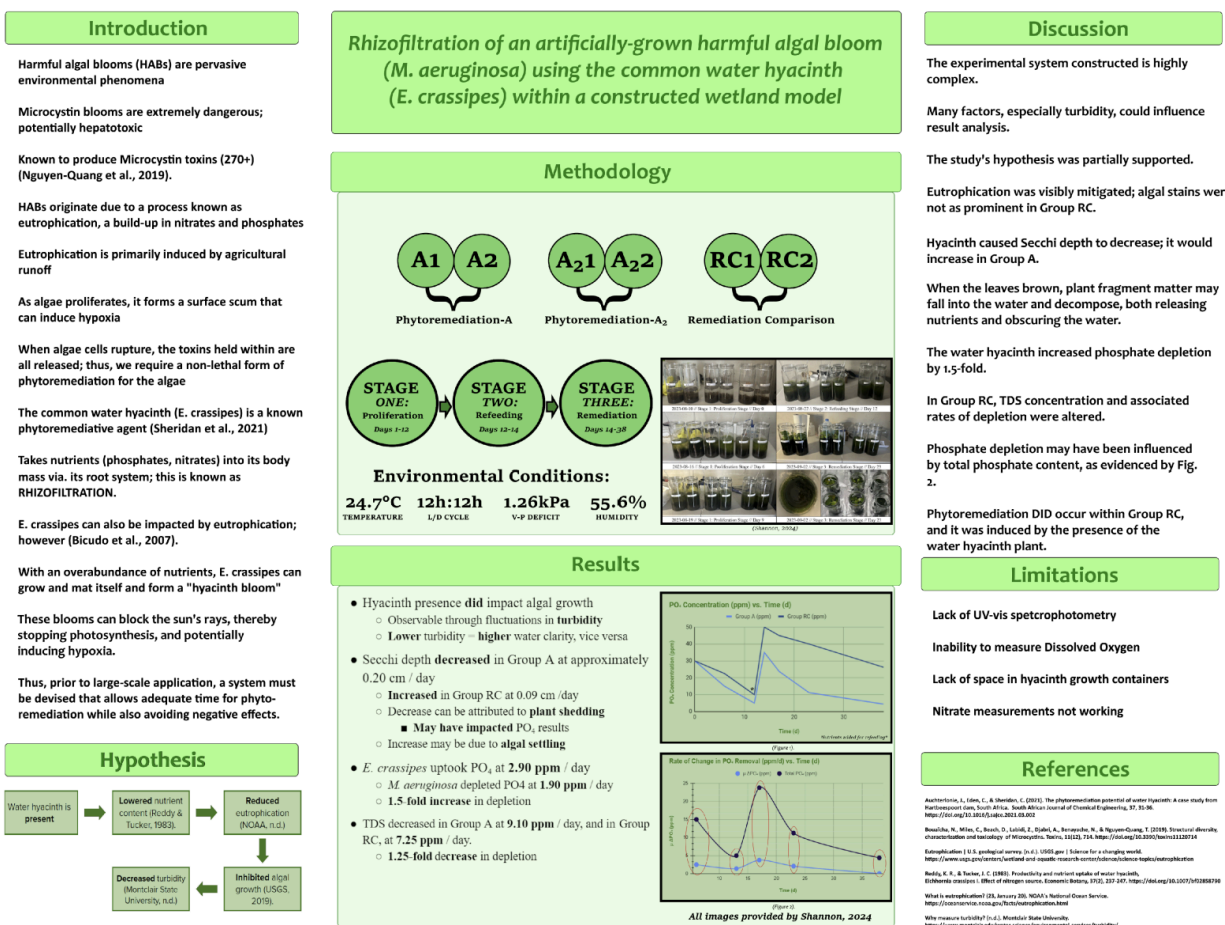


Figure 4: (Shannon, 2023) research poster

Presenting Your Research

Begin with clarity. Relate to the audience. Pull them in. Prepare a brief, compelling overview—**one or two** sentences per section—that tells your story without overwhelming the audience. You might think of it like a guided tour: you point, you explain, and you listen. Use the **And-But-Therefore** framework or a similar structure to help your summary flow: I explored this **AND** discovered that, **BUT** we still face these challenges, **THEREFORE** this is why my work matters. Keep your tone natural, your language accessible, and your pacing conversational. Anticipate common questions: *What* did you find? *Why* does it matter? *What* exactly is next? And when asked, answer openly—not defensively, not performatively, but with the quiet confidence of someone who knows their work deeply. **You** are the best guide to your research story.

Remember that people are **more likely to remember you** than your results. Be visible, but don't block your poster. Share the space generously if you're presenting as a team. Make eye contact. Smile when appropriate. Stay present—this is your chance to gather feedback, build connections, and refine your thinking. A good conversation may lead to collaboration. A thoughtful question may reshape your conclusions. Be curious in return.

Scientific literacy, especially today, is not a luxury of the educated. It's a survival skill. It shapes how societies vote, legislate, parent, consume, and imagine the future. Whether it's climate models, vaccine efficacy data, AI ethics, or emerging gene-editing technologies, the questions aren't just scientific—they're moral, social, and personal. And that makes scientific communication not just important, but essential.

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Appendix A: “HABs in the G/FLR” Abstract

1. Abstract

The Genesee-Finger Lakes Region (G/FLR) is an expansive region consisting of nine counties. This region, home to 11 Finger Lakes and one Great Lake, is regularly impacted by eutrophication and subsequent HAB events (NYSDEC, 2001). It has been established in the literature that, as an overall trend, increasing levels of climate change exacerbate HAB incidence, severity, and levels of algal growth (CDC, 2024). However, to the best of the author’s knowledge, no regional study to date has explored the problem of climate change-fueled HAB incidence in the G/FLR specifically. Between 2020 and 2024, HAB reports in the region increased sixfold, with individual report submissions rising from an average of 36 to over 220 annually. Three counties—Yates, Seneca, and Ontario—emerged as clear “Algal Hotspots,” each demonstrating report rates more than 40 times higher than neighboring counties. These same counties showed seasonal temperature averages consistently within the *Microcystis*-favorable range (20–30°C) and maintained high precipitation anomalies, which strongly correlated ($r = 0.77$) with HAB frequency. Soil analysis further revealed that lakes classified as “High-Severity Problem Lakes” (Canandaigua, Seneca, and Cayuga) are surrounded primarily by Group D and B/D soils—those most prone to runoff.

(Shannon, 2025).