HOLLOW HEARTLAND
.UNIT I.

SILENCE SCIENCE

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.FIRST.

Wind blasts from the vents.

Nestled between the patchwork of soybean and corn fields, a small grove of trees gives shade to the fresh tar blacktop. The tires of the blue hatchback cling to the first switchback turn in an otherwise straight highway.

The 45 minute commute from home to the small rural school is deep into the worn middle of the country. The abandoned, neglected and deemed irrelevant are denounced by the edges of the coast and doomed to erode until they collapse in on themselves.

In this empty space the mind wanders in boredom.

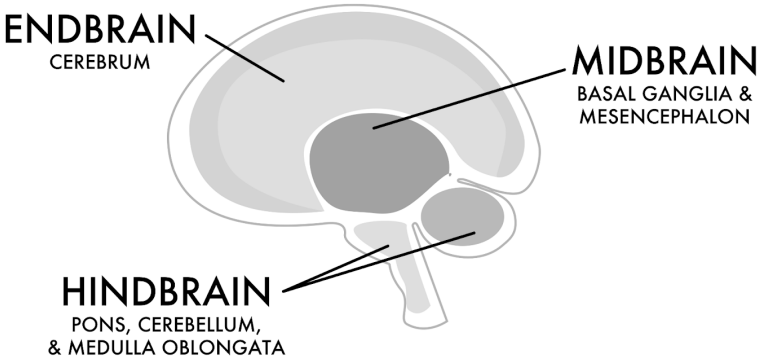
The critiques on our hollow heartland echo in rants.

These are the lectures to keep from students. These are the discussions one dares not to lead. These are the lessons that, if taught, would mean career suicide.

Questioning the decisions that lead to these rural ghost-towns is unpopular here in these barren deserts ruled by kings and governed by gods that are grinding the planet to sand.

Practicing discussions one can actually lead refocuses the attention on today's lesson. Reminders there is teacher-work to be done if the students

have any hope to change the world.



Begin with Science: Epigenetics.

Here in the heartland the road relaxes and rolls out for miles. Relaxes the way that thread-like DNA is uncoiled from the spool-like histones. Opens like a book so that the genetic code can be read. The rest of the tightly wound double helix is packed into a butter cookie tin sewing kit nucleus.

It is the job of another thread-like molecule, RNA, transcribed from DNA, that leaves the tin to be instructions for proteins. Proteins built from chains of amino acids.

The RNA student notes copied from the DNA textbooks. The As, Ts, Cs and Gs rewritten as As, Us, Cs, And Gs.

Coffee combats exhaustion on the long journey from the city into the rural landscape. Making the turn east, the sunrise paints the fields into a glowing red and yellow. The colors an infant witnesses in the beginning. The initial infestation of ideas etches into the blank slate of student minds.

The center line bends again. Without recognition, like an athlete in the zone, like a musician lost in the rhythm, like an author caught in the flow.

Without focusing. Without forcing it. Without freewill.
Routine produces the movements. Habits claim the wheel. Trapped in passive boredom, the act of driving is watched in third person. The pedal sinks to seventy miles an hour in a zen state of being. The brain switches to autopilot.

Begin with Science: Anatomy.
The brain evolved in layers.
The mental lecture continues.

The Survival Skills include breathing, beating, and eating. Just on the top of the spinal cord is the hindbrain: the medulla oblongata, pons, and cerebellum. These are the essential regulations of body functions that every animal with a cap at the top of the spinal cord is equipped with.
The threat was death. The selective pressure was suffocation and starvation.

Fifteen minutes pass unnoticed. Silos and fences that were once mile markers disappear without any interruption in the meditation. Eyes fixed on the middle path. Time passes, staring at the horizon, subconsciously guided by the line at the edge of the pavement. Like breathing, driving becomes more difficult as the driver becomes aware of the road.

The Habit Hub manages connections, coordination, and consistency. Inside is the midbrain in which resides the mesencephalon topped with the basal ganglia. This relay station passes messages from the hindbrain to the endbrain. It allows for shortcuts, an autopilot of actions that afforded the endbrain an opportunity to lighten the load of contemplation through habituation. To automate the mundane and conserve energy.

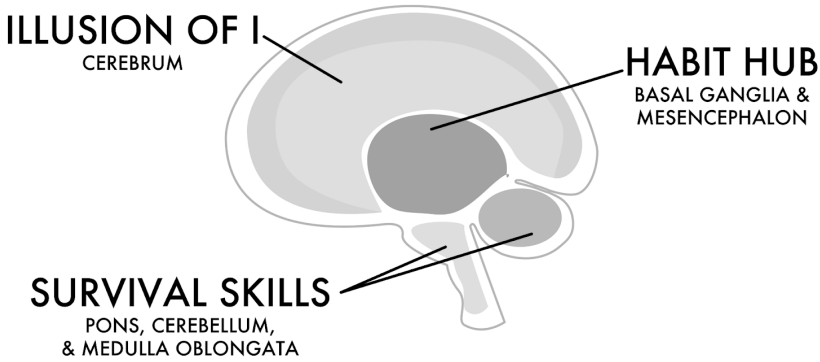
The threat was overthinking. The selective pressure was lag-time and delayed responsiveness.
Planning out the day, mentally writing out the objectives, targets, and assignments. Then, the ribs in the shoulder prevent the hatchback from diving into the ditch. Reflex and reaction correct the mistake of internal reflection. The vehicle barely crosses the double yellow lines before it finds the grooves in the asphalt again.

The illusion of I encases identity, ego, and self-importance. At the top is a layer of wrinkles, the cerebrum: the endbrain. The endbrain is divided into lobes: occipital, temporal, parietal, and the frontal lobe, which was last to evolve. Bored with the routine and habits, and the obvious exclusion of freewill, the brain created a *self*, a *me*, a new replicator.

The threat was meaninglessness.

The selective pressure was apathy and suicide.

As the hatchback pulls into the parking lot the gravel crunches like snow under the rubber tread. Staring at the orange brick walls, the movements are automatic. The brass key turns inside the lock. Soft chartreuse tile floors, calming khaki painted concrete blocks, banners that celebrate the last day of school before summer vacation.

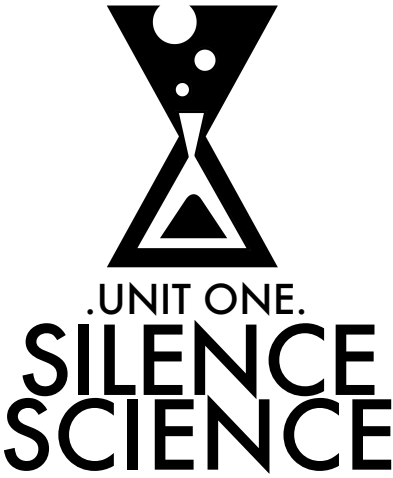


Begin with Science: Reasoning.

I suddenly exists. I enter my classroom.
I adjust my necktie. I greet them by name with a smile.

Aware I have resigned from my role as their teacher, the students ask one *last question*:

Why?

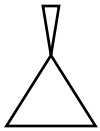

.UNIT ONE.
SILENCE
SCIENCE

Abandonment of previously held conclusions about my approach to teaching science specifically and my determination to induce change, was a permanent repercussion of the pandemic. After contracting the virus, I evaluated the resilience of scientific ignorance and indifference as related to the way the education system teaches science.

As variants of the virus rose in rural unvaccinated areas it was impossible to not connect the misinformation and misconceptions about science. The pandemic directly attached my career in science education at a rural school with my subsequent sickness.

Silence Science is an argument for science to embrace the position politics has thrust upon it. Undereducated Guesses, considers the descriptive nature of science in the pursuit of truth. Unreasonable Doubt, evaluates the predictive power of science and the possible pragmatic extension to be prescriptive. The power of legal laws have stifled the adoption of scientific theories.

Silencing science enforces ignorance
and embraces arrogance.



.CHAPTER ONE.
UNDEREDUCATED GUESSES

As an educator, the pandemic became personal, an obvious result of the way society is undereducated about the potential purposes, philosophical limitations, and overall applications of science. The indifference of some toward the well-being of others affects us all.

The indifference to the scientific ignorance of others has similar consequences. Therefore, through redefining science this may help you to continue the conversation beyond the classroom and produce change.

I. Truth

Ask students: *What is the purpose of science?* Their reluctance to answer sometimes takes the form of: *I don't know. So... I guess... to find out stuff?* When pressed the answers of: *truth, real, facts, and prove* often are the first to arrive. However, these words present a false purpose and ambition of science that eventually compromises the trust and acceptance of science.

Overextending science to pursue these attributes including truth is misleading. This is in part due to under-educating students about the nature of science, so that they guess at the limitations, expectations, and applications of science. Ironically, the truth is: *I don't know, so I guess to find out stuff*, seems to be a complete answer.

To begin, objective truth is unobtainable by humans. Arguments that the purpose of science is to discover the reality and truth about the natural world are foolish inflations of the abilities of humans.

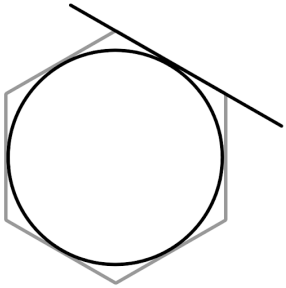
As a result, subjective truth is the only interpretation of the universe that is available. Individual perceptions and conclusions about the way the world is, when combined together, may offer a wider understanding of reality, but this is merely an agreement within a community and not the objective truth.

Of the most adequate representations of the inaccessibility of objective or absolute truth comes from psychiatrist and holocaust survivor Viktor Frankl most notably in *Man's Search for Meaning*. Truth approached from a variety of sides at best may encircle absolute truth. To extend this visualization, consider that a perfect circle is an infinitely sided polygon, and likewise impossible to comprehend. Each mathematical tangent on a circle provides another side to the infinite polygon. Still, infinite tangents escape human understanding of geometry.

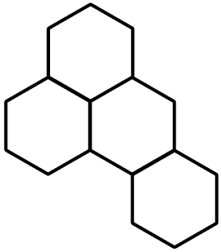
Instead, to simplify, reducing a circle to a hexagon, provides a shape which can be more readily understood. Hexagons can be repeated edge to edge minimizing wasted space. Each side within a hexagon tessellation can be shared endlessly without gaps between the shapes. Consider these gaps to be representations of gaps in knowledge. Hexagons prevent gaps. For this reason, hexagons occur often in the natural world from honeycombs to hydrogen bonds between water molecules, and subsequently are revered in many places as the best polygon.

Hexagons also appear in another representation of the unattainable objective truth. Thomas Kuhn used a necker cube in *Structure of Scientific Revolutions* to illustrate that paradigm shifts in science are similar to religious conversions. A Necker Cube, as an optical illusion, can be switched between two opposing perspectives with the border being a hexagon.

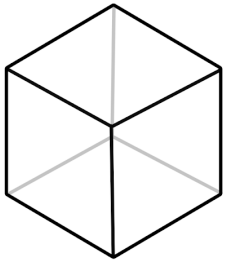
Instead of discovering more accurate truths, science undergoes paradigmatic shifts in which a previous paradigm is replaced. In light of new evidence new generalizations and explanations are adopted with their own set of assumptions that prevent the return to the old accepted science.



CIRCLE & TANGENT LINE



HEXAGON TESSELATION



NECKER CUBE

Both these combined representations of how objective, absolute truth are approached but out of reach, illustrate the paradigm used within this argument. Truth, as absolute and objective, when represented by a circle can be glanced by infinite tangents of subjective truths. Science provides simplified generalizations and explanations, comparable to a circle reduced to a hexagon. These scientific simplifications can be paradigmatically shifted like a Necker Cube.

Truth as a perfect circle remains unattainable. The subjective tangents ultimately do remain relevant, while the sciences continue to allow for paradigmatic shifts. This provides novel and innovative perspectives to reinterpret the simplified but unattainable circle.

Ultimately, the wanton accountability to absolute truth burdens science when scientists, philosophers, and the undereducated exaggerate the function and purpose of science to be about discovering the objective truth. This overextension sometimes leads to disappointment in and denial of science.

During the pandemic, science research was viewed in real time. Prescriptive directives were always being updated. This frustrated many, for some science became indecisive and unreliable. Some still accuse science of lying. This *lies to children* approach is especially obvious concerning the transfer of scientific discoveries to the public.

Lies are deception and disinformation. Science is investigation and discovery. Education is information and facilitation.

The pandemic helps make the distinction between scientific research and scientific education. Scientific research strives for complexities and complications. Scientists, at their best, question reality and challenge the accepted answers. Science education searches for communication and simplifications. Educators at their best, clarify accepted answers and challenge students to question.

Science is an oversimplification of reality, when communicated to an audience undereducated in that field. Education functions as a useful set of lies to communicate the most complicated discoveries of humanity about the physical universe. The pursuit of objective truth is admittedly endless and impossible to package simplistically.

Science pursues the perfect circle. Communication provides the hexagonal. Education prompts thinking beyond the box.

II. Useful

Instead usefulness may be a worthy solution to avoid this burden of objective truth, a way to circumvent the issue of an unattainable circle. Pragmatism focuses on utility: generalizations and explanations that work to make predictions. The ultimate form of this utility would be to prolong existence.

Instead of a focus on revealing the true nature of the physical world, science could be approached as useful fictions that aid in the survival of humanity. As a result, science serves the purpose of helping humanity avoid death by predicting and avoiding potential dangers. Without this predictive power of science, the discoveries, generalizations, and explanations are merely a dead book of facts. Pragmatism makes science a survival guide.

Survival over certainty, however, fails to avoid the crippling problem of induction. The infamous radical skeptic David Hume in *An Enquiry into Human Understanding* argued that our impression of causation is the result entirely of us attributing cause and effect to events that are correlated sequentially. Our understanding of the world is inferred by experience and is not innate.

Therefore, is not logical to conclude A caused B which caused C and so on simply because we experienced it in that order. In science, correlation and causation are the crux of all arguments when using data. This unresolvable conundrum is a result of the inescapable problem of induction presented by Hume. It is a uniquely unobtainable expectation of science found nowhere else in our society.

Science is built on induction, and uses those generalizations and resulting explanations, to deduce the next event. The logical relationship is that inductive reasoning uses specific evidence to form generalizations, whereas deductive reasoning uses those generalizations to determine a specific instance. However, this is at worst irrational and circular at best.

Each interaction with an enemy or predator, fight or flight survival skills are not philosophically justified by science. Each walking step is beyond a leap of faith that gravity will continue to function as it has in the past. Each pragmatic application of science for survival is not logical, it is an emergency response that does not require evidence.

Simply sampling an event from the future changes it to the present and then places it in the past. All predictions about the future are about something that has and can never be sampled. Simply sampling time changes it from future, to present, to past.

The problem of induction becomes an inescapable obstacle for science, preventing it from obtaining truth about the persistence of scientific generalizations and explanations over all of time. It is the standard of truth set for science that distinguishes it from religion.

Religion accepts the unknown with faith. Faith: a belief in something as true without evidence or in the face of contrary facts. Science endures the uncertainty with hope. Hope: an optimistic state of mind that anticipates positive outcomes for events and circumstances in life.

Science pauses the debate on the problem of induction with affirmations to keep us alive. Survival requires action beyond rumination. Scientific argumentation may result in overthinking, trying to make laws and theories with the evidence collected. Irrational hope may offer reprieve, to escape and gather additional experiences.

III. Morality

Many systems of faith, belief structures, religions and ethical philosophies, claim to provide a foundation of morality. A prescriptive guide for behavior, how one ought to be, is bestowed upon political entities, religious texts, and non-empirical essays without question. The descriptive has been the default function of science and kept science out of making moral claims.

Divorcing science from weighing in on morality and religious dogma by hiding behind a descriptive focus, has allowed science to avoid ethical scrutiny. If science maintains a descriptive nature, then it can avoid applications in policy and weighing in on moral dilemmas. Science can operate as though it is still morally objective: a disinterested, unaffiliated, secular source of evidence and conclusions.

However, if science is approached pragmatically, science starts to become prescriptive in nature. The transition to *ought* in a prescriptive sense, takes away the ability of science to avoid making moral claims. To proceed with life, science gives a prescriptive: humans ought to x, in order to stay alive.

Considering the pandemic, science continuously makes recommendations for the survival of the species with vaccinations, quarantines, and masking. With these recommendations, science becomes prescriptive, and transitions to include morality because it is being applied to behavior. The climate crisis shares a similar call to human ownership and responsibility to fix the issue created by humanity. Changing humanities behavior is morally prescriptive.

Some argue that prediction is not the same as prescription. However, to be used pragmatically for survival, science becomes useless if one predicts the outcomes of events without implying accountability and applying morality. Separating prediction from prescription, reduces science to just predicting outcomes: products from reactants simply to satisfy curiosity for entertainment.

Entertainment requires little in the need for useful prediction. For a child playing with a toy, it does not require predictions as a necessary feature. Unless that is part of the game, the child can just play for meaningless fun. Educated guesses suddenly become solely just for fun, to avoid boredom, which has limited utility for survival. Even if giving humanity a scientific puzzle to solve with its curiosity prevents mass suicide, this gives weight to there being a moral imperative to prevent suicide.

If these educated guesses are merely predictive as an *is*, the nature and power of science becomes useless. If science is to limit the focus on what has, is or will instead of what ought to happen, science provides no advantage over other systems of faith. This prescribes what science should or should not do, communicating that science ought to not address oughts. To extend this:
Is it morally inappropriate for science to make prescriptive suggestions?

This resolves itself to imply that science behaves immorally if it considers morals as part of its purpose. This reasoning becomes complex and circular, considering that something outside of science is determining the parameters of science.

Combining these sections, science is not: i. discovering, uncovering, or revising objective truth, because that over-extension exaggerates the abilities of science, ii. pragmatic predictions, because without prescriptive power, predictions are useless for survival and become merely entertainment, or iii. morality, because some outside force determines it ought not, since it cannot establish moral oughts itself.

The realization is that science is not morally allowed to discuss morality by limitations beyond science. The limitations of science appear to be determined by: the paradigm of the current scientific community or the political and religious society that is in power.

IV. Paradigms

With the: abandonment of pursuing unobtainable, descriptive truths, admittance of uselessness without prescriptive recommendations for survival, and the avoidance of comment on the moral ramifications of discoveries, the power of science is reduced to confirmation exercises to add to the dead book of facts of an already established paradigmatic lens.

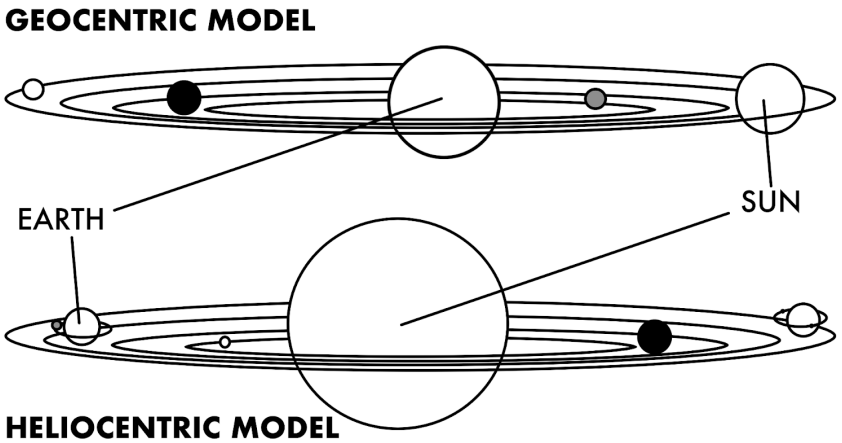
Confirmation exercises in science do nothing to discover new qualitative and quantitative data. Hypotheses as educated guesses can be determined as correct or incorrect, an unchallengeable and unchangeable validation of an established truth. Confirmation exercises make science a university-approved lab manual.

To illustrate, imagine if a student mixes a red and blue solution with the expected result of purple, they formulate a hypothesis, however the product is instead green. The student arrives at their professor's desk excited to share

the new discovery. Instead of being excited, the professor defends their previous conclusion claiming that the experiment was done inaccurately. A reproduction of the student's experiment refutes again and again, but the professor remains unconvinced. Each makes arguments, publishes papers, lectures, and ultimately attempts to win the support of the scientific community basing their conclusions on the evidence they themselves have collected.

Although distinct from dining room table arguments over politics and religion, these disagreements still occur in science. It is not required that all scientists agree, but eventually the scientific community takes a stance. The evidence is so overwhelming, the theory so explanatory, that the entire approach shifts. Science is again united under the surviving paradigm, the new way to look at the world.

Once our world, the Earth, was once considered the center of the universe. Great pains were taken to explain the observed movements of the planets that did not fit this model. In the 16th century, Copernicus proposed a simplified model with the sun in the center. Suddenly all the complicated calculations fell away. In the 17th century, Galileo confirmed the heliocentric model with his telescope, but the church at the time confined him to house arrest under the charge of heresy. He stayed there until he died.



Today, the scientific community accepts that we are a small rock on the edge of a spiraling arm of an average-sized galaxy in a universe without a center.

To science, we are not at the center of everything, the perspective of ourselves changed. Science does not just have the ability to change given new evidence. Science does not just have the ability to shift the scientific paradigm. Science has the power to change the perspective of humanity, to shift power.

V. Power

Science translates as knowledge. Knowledge is power. In the 21st century, some in positions of political and religious power feel that their power is now threatened. Not threatened by the acceptance of science, not even at warp speed, but instead that this virus, this climate is revealing that parts of culture are in cryogenic sleep. Science is progressive, advocates for change, and embraces new knowledge.

However, the power over knowledge belongs to those that write history and the rules: the winners of intellectual debates, cultural wars, religious conversions, and political elections. As this pandemic became ever more mismanaged and misinformation was intentionally spread, science became politicized. No comment was more telling than the presidential press secretary's statement upon the first re-entrance of students into school buildings that science should not stand in the way of reopening schools.

Science stood aside, schools reopened. Science maintained its data-driven descriptive position, politicians and religious leaders, media outlets and internet memes interpreted and distributed science. Science stayed in its lane of ethical neutrality, politics and religion prescribed recommendations on its behalf. Science became politicized, so politics could silence science.

But making science political offers it the *ought*. At that moment, with this pandemic, with this climate, science owns the prescriptive. The argument for scientific politicization is not for a party to be science, but for science to accept the role it has been given: inductive ethics.

VI. Immutable

Reluctance to accept the recommendations of science is not advocating for personal liberty. Refusal to get vaccinated is not being medically cautious. Revulsion to the mention of evolution is not a declaration of faith. Regression to denying the climate crisis is not economic responsibility.

Resistance to the paradigm shift is an attempt to force science under house arrest, to strip knowledge of power, and to make the universe revolve

around complicated attempts to save the antiquated. The obstruction of science is beyond obstinate, it is oppression through amputation.
For science to be truly pragmatic it must reach out beyond the predictive and become prescriptive. Avoiding the practical responsibility of science to prescribe those moral actions and behaviors leaves the power in the hands of non-scientists, political and religious leaders, to interpret and apply science to our survival, to guess at what needs to be done.

Humanity will not survive under the immutable rule of these undereducated guesses.

.CHAPTER TWO.
UNREASONABLE DOUBT

Those in positions of congressional power do more than prescribe an *ought* without being able to describe the *is*. They confirm the appointment of the highest court to interpret modern scientific terminology in the confines of the antiquated constitutional frameworks. Scientific progress falls to the mercy of those with degrees in justice rather than science.

Congress not only writes laws without expertise in science, but bestows omniscience to the Justices bound by shackles of precedent, and allows omnipotent enforcement of these interpretations to be administered by a President with emphasis on militant decrees concerned with constraints on truth instead of the survival of the country, species, and planet.

The semantic differences between the legal system and the philosophy of science are the cause for many misleading assumptions. Particularly the terms: laws, proof, evidence, and theory cause many issues between the application of the descriptive understanding of the past, the receptive acceptance of the present, and the prescriptive progress toward a future.

I. Proof

Precedents of the judiciary, established by trials, function on the failed legal acceptance of: *proof beyond a reasonable doubt*. Legally this merely convinces society that events have occurred and transgression have transpired. The evidence holds that the past happened in a certain way. Despite these cases being essentially rhetorical arguments to convince a judge or jury, it relies on an entirely different definition of: *proof*.

Science is held to a higher standard. Proof in science requires more than evidence that a past event occurred but that identical events will occur in the future. This is admittedly unobtainable in science, but compromises the courts the same way.

Punishment and correction rely on the prediction that the offender will commit a similar crime in the future. The courts therefore rely on an assumed predictive power of science that does not exist. There is no way to make this claim beyond a reasonable doubt.

This overextension falls victim to ultimately logic and epistemology including the limits of human knowledge based on life being temporally bound. Our movement though time simply prevents us from knowing the future.

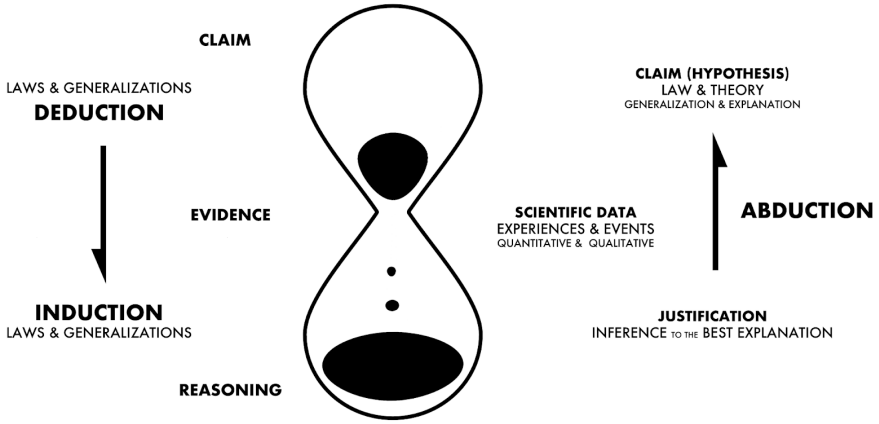
Subsequently, even if the courts prove something happened in the past beyond a reasonable doubt, the inescapable radical skepticism gives no reason to even speculate that the behavior will repeat in the future. If the judicial system is purely retribution, barbaric revenge does not require prediction. However, if the courts ambition is correction for integration back into society or prevention of further pain, a justification for this type of justice is nonexistent due to our confinement to linear time and the problem of induction.

II. Time

To illustrate the way time compromises particularly the words: *proof* and *law,* an hourglass diagram is helpful. Similar to *proof*, the term *law* has a specific meaning beyond the courts. Laws are not obeyed by nature but rather generalizations made through observations about the world. Not unlike congressionally created laws, scientific laws can be rewritten. However, instead of based on the will of the people, scientific laws are revised in light of new evidence.

Science is beyond a dead book of facts, handed down to humanity from a higher power. Instead, humanity wrote these laws using inductive reasoning. As a process of collecting evidence and building arguments, science uses induction to form generalizations from *evidence,* data and observations, called a law.

A way to remember is: Deduction *deduct*s (subtracts) sand from the top of the hourglass. With Induction the sand flows *in*to the bottom.



HOURGLASS: SCIENTIFIC ARGUMENTATION

Consider for example, science was charged with collecting evidence in the previous experiment. Science might generate the claim that: *Combining blue and red solutions produce purple*. The bottom of the hourglass. At the small pinched neck of the hourglass are these specific details, events and evidence. As they collect at the base a generalization forms. Every grain of sand adds to the generalization that: *Combining blue and red solutions produce purple*. The more evidence that supports this claim the heavier the base and stronger the conclusion.

However, the green solution produced in the students experiment is an outlier, pieces of data that do not fit into the set. This evidence presents science with a specific and unique opportunity making science malleable, meaning it can change over time given new evidence. As science collects more mixtures humanity may rewrite the book. Without this ability science is just that dead book of facts and lab manuals of confirmation exercises.

As a result, science can't prove anything since science cannot profess to make eternally accurate claims. The malleable nature of science creates the problem of induction by definition. The student's humble hypothesis is actually not an educated guess as taught commonly in elementary school, but rather a prediction. Predictions rely on applying the predictive power of deduction.

With the previous experiences that wrote the lab manual of confirmation exercises, the student approaches the lab with the prediction that each reaction will yield purple. The top of the hourglass is the application of those generalizations to a specific instance at the pinched point between the triangles.

Like the hourglass, time flows forward. Humanity is unable to reverse time, unable to go backward. So all the evidence collected currently cannot *prove* what the student will get. Science becomes merely a useful tool aiding your survival if all conditions remain constant.

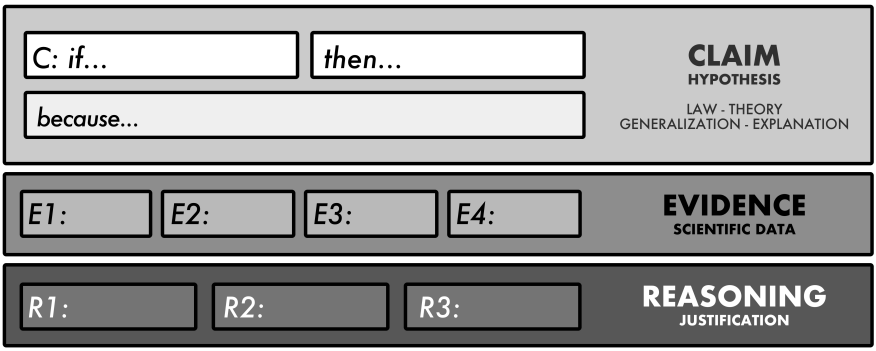
This impossible relationship with time gives humanity no logical reason to assume anything. There is not only no *certainty* but no *beyond a reasonable doubt*. Even the reliability of gravity is philosophically unreasonable.

With the flow of time as in the hourglass, humanity writes science with induction, collecting evidence to make generalizations and then using those generalizations to predict the future using deduction. Humanity uses the past to predict the future without ever really sampling the future. As humanity samples the future it becomes the present and immediately the past. Time ruins science's predictive power.

III. Change

Time has crippled science beyond its predictive power. Time has resulted in a pervasive, prevalent, and persistent misconception about the nature and language of science: Hypotheses become theories which become laws when proven. This statement is entirely inaccurate as argued by William McComas in *Ten Myths of Science: Reexamining what we think we know…*

A combination of two myths are correctly rewritten as: Hypotheses can become laws or theories depending on their purpose. Theories never become laws. Both laws and theories can not be proven. Hypotheses that predict are generalizations, that with support from evidence, become scientific laws. Hypotheses that explain are explanations, that with support from evidence, become theories. Hypotheses are beyond educated guesses because they are rigorously tested and thoroughly investigated to be either supported or revised.



SCIENTIFIC ARGUMENTATION : CLAIMS - EVIDENCE - REASONING MODEL

Science is malleable, plastic, and changes. The difference between science and religion is: science changes and adapts to new evidence and challenges, religion privileges belief despite no evidence and celebrates faith in spite of contrary evidence. This tentative feature of science makes it an argument rather than a conviction that requires belief and faith.

Science is not composed of agreements, but rather built through arguments. Scientific argumentation begins with a claim or prediction as an *if…, then…* statement, the law part of a hypothesis. The *because…*, is the theory part of the hypothesis. The evidence supports the claim or statement, but never proves it. Evidence never speaks for itself. It must have reasoning, a rationale justified. Evidence is the what, Laws are the how, and Theories are the why.

Above is a connection between Scientific Argumentation and the Claims Evidence Reasoning Model used to teach students how science builds arguments. Claims, as a law and theory, state that if X occurs, then Y will result, because Z. Evidence, as scientific data, supports the claim from E1-E4. Reasoning provides the justification for why the claim is supported by the evidence.

Immediately, the problem of induction and complications separating causation versus correlation, reveal the issues discussed about *truth* and

proof. One may abandon this argument here for another approach if *truth* and *proof* were the objective. Instead, the model is for an argument to convince another, not to reveal the proven truth but survival and sustainability.

Scientists argue, offensively and defensively, academically and politically. The process can be gradual and brutal, complicated with bias, privilege, and prejudice. The intended result is that overwhelming evidence will shift the paradigm because the law can no longer be supported by the theory no matter the justification. The geocentric model falls to the heliocentric given enough time.

Evolution, the theory of evolution by natural selection, remains one of the most contentious issues in our country. The justification for this opposition extends primarily from the public misrepresentation of biological evolution as *just a theory* and *not proven*. This all rests on incomplete treatment of science education either by honest ignorance, irresponsible incompetence, or the intentional silencing of science. Regardless, evolution education is still avoided and discouraged in many science classrooms.

The understanding and acceptance of evolution is often the source of pitting science against religion. Even the most determined evolution deniers admit that organisms change overtime within a species. They accept the generalization that organisms change overtime functions as the law. The objection comes with the theory, explanation that one species can give rise to another through natural selection.

Charles Darwin contemplated and withheld his conclusion *On the Origin of Species* for years knowing implications and vilification that would result. The relentless requests for more evidence of evolution: *missing links* and *the origin of life* are admissions of holding the previously addressed misconception about *laws, theories,* and *proof* in science. The revulsion that humans share a deep-time ancestry with apes, is twisted by adult egos into childish questions including: *if I came from a monkey, why are there still monkeys?*

These are tactical, dishonest inquiries that attempt to silence science as a result of deniers themselves being denied the explanation by previous

generations. Without the theory part of evolution: *by natural selection*, school never answers this question of *why*. Children ask earnestly for the reason, the justification, the theory: the why. Opposition to and the removal of evolution by natural selection from the classroom robs children of arguably the most impactful *why*.

If a theory in the claim is supported with enough evidence and reasoning, that unifying theory can become the foundations for a paradigm. As a paradigm, it starts to shape the way evidence is collected and understood. Consider how evidence of the theory of evolution is different from evidence for the theory of evolution.

As the unifying paradigm of all biological sciences, removing the theory of evolution by natural selection from any life sciences curriculum gives no scientific explanation for the diversity of life. It prevents conversations about the value of diversity, the autonomy of our own bodies, our responsibility to the planet and beyond.

In the heartland of our country, this unresolved conflict compromises science classrooms with lack of teacher confidence, risk of local controversy, and even omission due to personal denial.
Editing evolution from education is not only an obvious example of silencing science. Removing this crucial curriculum is a reminder that cornerstones of knowledge are still controlled by the institutional ignorance in power to keep the perspective of ourselves from changing.

IV. Chance

With theories, science provides another opportunity for reasoning beyond inductive and deductive. Abductive reasoning, abduction, and also called inference to the best explanation, gives a reason behind the prediction, providing justification to the *theory*. Again, theories are the most robust and important statements in science, unlike the common use of the world. A theory is a durable explanation of the real world supported by multiple sets of data, events, and evidence. In science theories are more powerful than the generalization called laws. Theories explain laws.

In courts of law, these theories, explanations or reasons, often are not the descriptions of the physics of the crime but the motivations or intentions of

the criminal. The legal use of theory and law are radically different from the scientific definitions. Since many politicians and lawmakers are former lawyers, and not scientists or versed in the philosophy of science, the legal terminology prevails. Disregard for the difference in unfortunately shared language essentially reduces the prestige theories held in science to hunches and incorrectly attaches laws to proof.

Exposing this discrepancy in the legal and scientific use of shared terms reveals another conflict regarding doubt. The phrase *proof beyond a reasonable doubt,* allows for legal proceedings to move forward to conviction, vindication, or other resolutions. As noted before, this criteria of certainty is far easier to achieve. The word *proof* not only has a different meaning of merely being scientific evidence, the term *evidence* is merely a clue. In the vernacular of investigators, lawyers, and politicians these clues connect to form hunches, commonly stated as: *I have a theory…*

The academic discipline many lawmakers pursue: law degrees, perpetuates misconceptions and undermines their understanding of the ways science functions, the rigor to which science is argued, and the use of language in science. Silencing science gives the power to undereducated guesses.

Further, the bar for philosophical *proof beyond a reasonable doubt* is so low, certainty is not even entertained. Still, lawmakers interrogate scientists, citing the admittedly unobtainable certainty as the reason to doubt science. This disproportional accountability is beyond unreasonable, it is tactical.

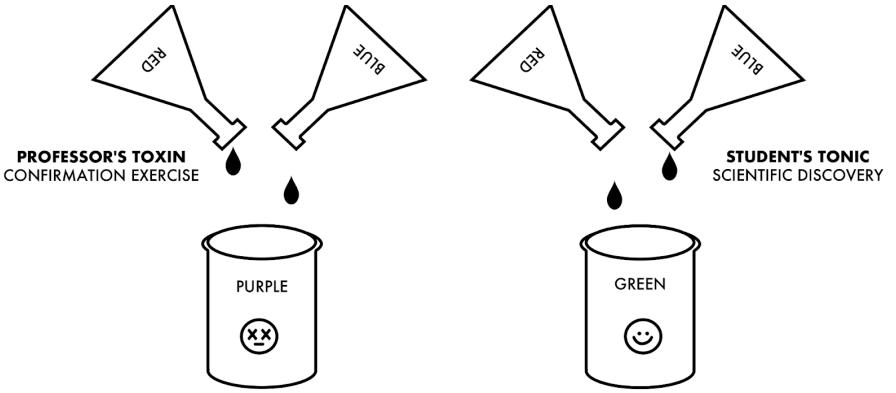
To reciprocate, utilizing the problem of induction to manifest doubt in science, opens the discipline of law to the same critique. The original argument of David Hume addresses causation, the inference that events are linked to causes. Although the legal proceedings already lower the bar allowing correlations to infer causation, the issue is rather law reduces the complexity of cause-effect relationships to interpretations of intentions.

Framing charges as *voluntary manslaughter*, cite *mens rea,* Latin for *guilty mind*, translated as intent or knowledge of wrongdoing, means the criminal is completely responsible for the crime either through intention, ignorance, recklessness, or negligence. Held to the same standard of causation that cripples science, law is at best a lottery. The following is a simplification of

an article by David Lewis, *The Punishment that Leaves Something to Chance*.

Return to the lab manual from before. Imagine the mixture was a recipe for a purple toxin, a toxic poison that produces death upon ingestion. However, the combination the student produced was a medicinal potion to treat a deadly disease instead. Consider, the accidental creation of the student prompted an investigation by the professor into the methodology uncovering the unaccounted-for order of combining the red and blue solutions results in the medicine.

To further this thought experiment, the story follows that the professor and student after working together create a rivalry and conflict to take credit for the discovery. Both the student and professor devise the same plan, to mix the red and blue solutions to create the purple toxin. In a celebration of the discovery, both simultaneously add the poison to the wine of the other. After the toast, the professor dies but the student survives.



Upon investigation, the courts discover that the professor mixed the solution in previously unknown conditions which produced the green tonic instead of the purple toxin. As a result, the student is convicted with premeditated murder by a jury and the professor is buried. Life in prison for one and death for the other has nothing to do with differences in intention or motivation. Instead it is merely chance or incompetence.

This means that the guilty mind, the wicked intention, the freewill tempted by evil, is not actually being punished or corrected. Instead, an occurrence

that left something to chance, the lottery of life, is what we interpret as the level of responsibility for the crime. The laws that require scientific evidence to enforce and even interpret are vulnerable to the same philosophical conundrum of causation.

The problem of induction extends beyond science. Even blessing humanity with the choice to interrupt the causal chain of events, still can not escape chance beyond our control. The prescriptive *ought* of law rests on these foundations of freewill. The variety of punishments and corrections that reference levels of responsibility while disregarding chance reveal the conflict between the reality described by science and the idealism prescribed by our current system of governance. Clinging to choice is our hubris.

V. Liberty

Freedom is at the foundation of American politics. Personal autonomy and liberties are protected in the Bill of Rights appended to the Constitution. Referenced as the ultimate guide to court decisions, the assumption of freewill is embedded in the legal system without challenge.

Beyond the physical limitations that prevent certain abilities that limit choice and freedom, beyond addiction, operant conditioning, and mental disorders, beyond the circumstances of birth, science still suggests that humans possess no freewill.

Without deeply venturing into the science behind the reason humanity must release themselves from the myth of freewill beyond the philosophical arguments against it, humanity must accept that the greatest minds in modern philosophy and science state that consciousness is merely a story the mind tells itself to justify the events that have already occurred.

The science comes from experiments in which human subjects recorded the exact moment on a wristwatch when they made the decision to flex their wrist. The conclusion of the experiment was that the wrist flexed moments before the subject confirmed they had the intention and made the decision. Data collected by recording the nerve impulses in the muscles of the wrist recorded with electrodes suggested that the cause of the contraction of the muscles was before the decision. The scientists explained this as writing a script for the events that occurred after the event.

Therefore, without proof, without logical laws and theories due to the problem of induction, without punishable or correctable intentions and motivations due to chance, and with evidence that conflicts with our desire for freewill, is it morally inappropriate for science to make prescriptive suggestions? Should science be given the privilege to guide the ought of the government rather than the present system?

The original question remains:

What is the purpose of science?

VI. Abdication

This *question* is similar to the way that students are first introduced to science in elementary school. The present system grants this privilege to politicians riddled with misconceptions, often reinforced by their former studies deemphasized by edits to the education system. To illustrate the absurdity of former lawyer lawmakers creating doubt in science, consider their willingness to pass prescriptive laws that rely on scientific evidence to enforce and even interpret.

Scientific illiteracy is rampant in our country. Unreasonable doubt in science is spread citing impossible philosophical obstacles by those in power while holding no other element of our culture to such scrutiny. The present system gives the privilege of writing our moral code, ethical laws, and prescriptive survival manual to persons that question the descriptive feature of science and challenge its predictive promise.

The systematic silencing of science in education solidifies the control over knowledge to powers beyond science to determine the *ought* of science. Often rotated with history lessons, instead science as a subject is the underrepresented education which results in misconception that science produces proof and truth. This is coupled with inaccurate assumptions that evidence speaks for itself and theories become laws. This grade school misrepresentation reduces science to a dead book of facts and removes the most important explanations humanity has for our existence and place in the cosmos.

Science is beyond knowledge.
Science is argumentation: logic and reasoning.

The answer to the final question: *what is the purpose of science?* still rests with the students. Students like the one that discovered the green solution. Instead of a competition between the professor and student, which resulted in the death of the old and punishment or correction of the student, the government should adopt the principles in science to abdicate the power of the wise certainty to the curious creativity of the youth.

This is a paradigmatic shift that is not only accepted by the youth as a personal benefit, but rather the new way to think of the rising generation in transition from traditional interpretations of government to a re-imagination of how to distribute power.

The suggestion is that the next generation ought to be focused on the urgency of scientific prominence in decisions to: mitigate and reverse the dire climate crisis, allow flexibility in legal language defined by scientific disciplines rather than politics, and pursue the prescriptive role of science to maintain sustainable survival of the country, species, and planet rather than define morality.

Ultimately, the populace requires a deeper education in science and politicians need to give privilege to scientific expertise, to provide realistic expectations and restrictions on the legal system. This paradigmatic shift is away from undereducated guesses to promote progress instead of detaining and punishing scientists, like Galileo, that challenge the power of the system in towers and prison until death.

Similar to removing the earth from the center of the geocentric model, humanity must dethrone itself from the center of the egocentric solipsism. This begins with those silencing science stepping down from thrones. Abdication is the only way to avoid their undereducated guesses and remove their unreasonable doubt in the student to create a green solution and save the universe before the hourglass is empty.

.DEAD BOOKS.

Hourglass counts down.
Time runs out.

The bell releases the students from the first period. They pour into the halls like sand from the hourglass. Bottlenecked at the threshold of my classroom.

I return to my post to observe. Watching them pull worn textbooks from the bottom of lockers. Broken spines that have not been creased all year. They remain unopened and unread. Buried under school supplies still in the sealed store packages, these are books that were never taken home and possibly never taken to class. Today, threatened with being charged for the missing reading material, they dig.

Unnecessarily thick, it contains more information than could ever be covered in a school year. An overwhelming abundance of units, chapters, and sections filled with bold terms embedded in endless text, broken randomly by diagrams. The irony we never escape.

Lockers slam, waking me from my self-reflection. Students race to the next period where another teacher waits to check a box on the inventory sheet: *returned.* Missing since last calendar year, suddenly it appears. I look back into my classroom at the boxes packed with cylinders and flasks, chemicals

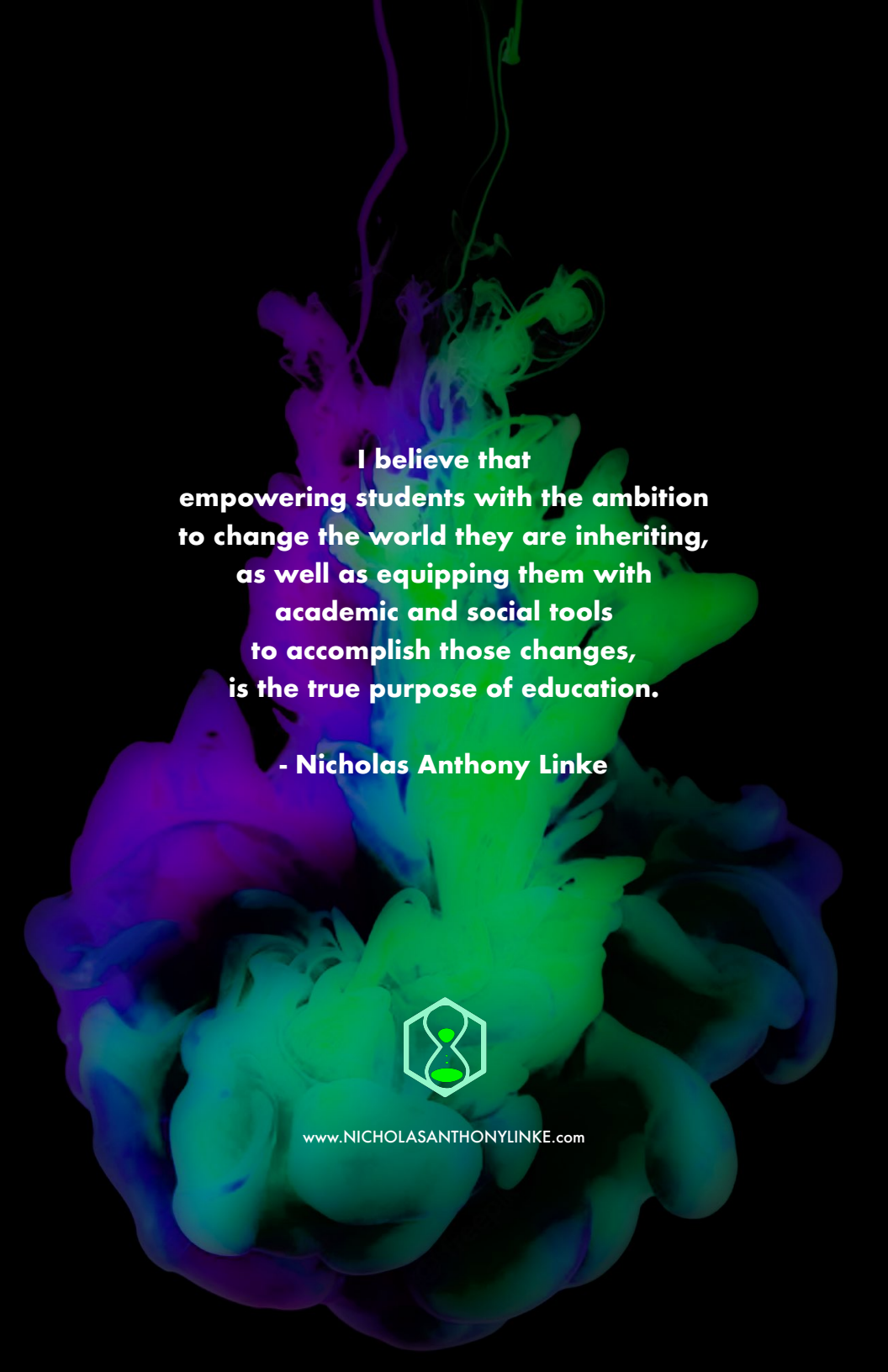
and models, posters and projects that, even on my last day, I can not bring myself to throw away.

The science classroom traditionally has the most diverse inventory. Every broken beaker, every missing piece on a microscope, every fragment of clutter that has potential to be in an invention is recorded.

The science textbooks, already dated, remain on the shelf of my room never checked out. Those numbers never change. I copy them to the next column without even counting. Written by companies, textbooks span the wide variety of state standards across the whole country.

Corporations write the content.
Schools define the context.
Teachers compose the curriculum.

Students change the world.


I believe that
empowering students with the ambition
to change the world they are inheriting,
as well as equipping them with
academic and social tools
to accomplish those changes,
is the true purpose of education.
- Nicholas Anthony Linke
www.NICHOLASANTHONYLINKE.com