The Great Ideas

Learning to be a Great Thinker

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The Great Ideas: An Overview

Some people have no use for great ideas. Perhaps you are one of those people.

Some people think it is presumptuous to consider some ideas "great." They believe that all ideas have the same value; that none should be considered greater than other; that "all ideas are created equal."

Some people believe they come from the "concrete" world and have no time or use for ideas. They believe that the lofty consideration of ideas is a waste of valuable time.

However, as you read this e-booklet, you will find that ideas really do matter. Ideas form the bedrock of everything we do. And as you will see, some ideas really are better than others.

Why Ideas Matter
Everything begins with an idea. That is a fundamental law of the universe. Nothing that was ever created, for good or for evil, began with anything but an idea.

Whether considering grand universal principles to making decisions about dinner menus, everything we do springs from our ideas. Even things we believe to be automatic or "instinctive" are the result of deep-seated ideas.

So the quality of our ideas determines the quality of our actions, especially over a long period of time. The quality of our actions inevitably determines the quality of our lives. And the quality of our lives determines the quality of our existence, our relationships, and our legacies.

Perhaps most important, the quality of our ideas determines the quality of our decisions. To the extent that we are able to deal with big, powerful ideas, we become better informed. As we become better informed, we become able to make better decisions. And as we make better decisions, we achieve better results. It is as if the quality of our ideas is the fertilizer that feeds the "seeds" we sow with our decisions.

So ideas truly matter. In the grandest sense, our ideas are our destiny.

What Makes a Great Idea
All ideas have consequences, some seen, some unseen; some expected, some unexpected. If we did nothing but measured the consequences of our ideas, we could conclude that all ideas are not equal.

Some ideas truly are better than others. Some ideas lead directly to better decisions, to better outcomes, better policies, better habits, and innumerable other "better" outcomes.

It is crucial here to understand what we mean by "better." It has become fashionable lately to make everything equal, as though nothing or no one has a claim to being "better" than anything or anyone else.

Unfortunately, this trend toward equalization overlooks one fundamental point: some ideas lead to more favorable outcomes than others. For the purposes of this e-booklet, we will consider ideas "better than others" if they lead toward some very specific outcomes:

- They inspire people to great achievements over a long period of time;
- They promote progress in conquering disease, ignorance, and oppression;
- They help us become more noble, more graceful, more wise;
- They transcend time, space, and culture to benefit all peoples of all nations.

So while it may seem "insensitive" to elevate some ideas above others, that is exactly what we will do. For some ideas do more to benefit us, or less to devastate us, than others. We owe it to ourselves, to our society, and to future generations, to understand and apply these Great Ideas.

Why Are Great Ideas So Old?

Great ideas are sometimes considered the exclusive property of history. Often, when a scholar or a philosopher describes “great ideas” they are referring to great books, great tomes, and great stories written by classic authors many, many years ago.

Often, the language of those documents is antiquated. The ideas seem to be presented in the densest possible fashion.

The original authors, even Aristotle, Plato, Shakespeare, and Byron were writing to impress people in their own age. They used the most sophisticated language possible, much as our academics do today when they are describing their research or ideas.

Just because the language is old--and perhaps dense--does not necessarily mean the ideas are stale. Truly great ideas never get stale. Truly great ideas are timeless.

Great discoveries are made every day. Profound truths are articulated, described, and lived out in our modern dramas, just as they were in Greek tragedies and comedies. Beauty is created in our studios and our labs, just as it was in Leonardo’s day.

Sometimes to help us grasp great ideas, teachers provide the ancient foundations for those ideas. To the extent that this provides clarity and context, it is useful. However, to the extent that it misguides us into believing that great ideas are “old,” it does great ideas a real disservice.

The Core Great Ideas

The premise of this e-booklet is that if we master a small core of great ideas, those ideas will help us understand other, related ideas, help us make better decisions, and help us become great thinkers.

That core of great ideas lies in the foundations of great study disciplines:

- Philosophy
- Science
- History
- Art

Finally, for some in our culture, relating to God means giving up access to great ideas, as if we have to “check our brains” if we acquire faith. We will finish this e-booklet with a discussion of God and The Great Ideas, observing that faith and great ideas are compatible after all.

None of these ideas is difficult to comprehend. That is one of the secrets of The Great Ideas. Most of them are quite easily understood.

The key to the Great Ideas is that their simplicity unlocks the sophistication and complexity of the world around us. That is what truly makes them Great Ideas.

However, although The Great Ideas are not difficult to comprehend, they do require the application of some brainpower. They are not easy, quick fixes for ignorance, but are rather the distilled versions of profound concepts.

Therefore, you will probably find it helpful to read each Great Idea more than once. If you are also following along with the course that accompanies this e-booklet, you will encounter many opportunities to reinforce and apply these great ideas. The discussions and assignments are designed for exactly that.

For each Great Idea, we will take an issue from a classic debate about that particular idea. In every case, it will be up to you to determine the truth, based on the power of your mastery of The Great Ideas.

We will begin with, perhaps, the greatest idea of all: what is truth?

Great Ideas in Philosophy, Part I: What is Truth?

Perhaps the greatest idea of them all is this: some things are true and some things are not. While that may seem like an elementary concept, the whole notion of truth is continuously under attack.

For example, ask ten of your friends the question "what is truth?" The answers will range from: "Whatever I say it is," to "Whatever God says it is," to "Whatever can be proven to the exclusion of an any other possibility," to a myriad of others.

For this discussion, let us begin with a stringent, secular definition of truth. For us, truth will be, “that which can be proven to the exclusion of an any other possibility.”

The challenge we will face as we seek to determine what is true in any given situation is “the exclusion of any other possibility.” One reason for that challenge is that we live in a time when people like to examine “other possibilities.”

Factual Truths
Let’s take a very simple example. What would you say if I were to ask you, “is the sky blue?” In this case, I am simply looking for a factual truth. I could as easily have asked what shoe size you wear or what time you got home last night.

You might say, “Well, of course, the sky is blue! What a dumb question.” As almost always happens with the truly great ideas, things are not as simple as they seem.

From a scientific perspective, the sky has no color at all. It merely reflects the color of the earth and water beneath it. And from an artistic point of view, there are so many shades of blue as to render the question unanswerable.

We can notice that, even given a simple question like, “is the sky blue,” we can dissect certain realities. We can know that in order to agree on whether or not the sky is blue, we must first agree on the nature of “blue.” And we must agree on what “the sky” is. And, perhaps most disconcertingly, we have to agree on what the meaning of the word “is” is (mostly to account for the color of the sky at night).

Normally, when looking for factual truths, what we are really looking for is “the truth” within a measurable range of possibilities. In other words, you might easily agree that the sky is blue, not green. You might not be so quick to agree that the sky is robin-egg blue or light blue, or any other version of a particular shade of blue. Once we change the range of possibilities from the entire color spectrum to various shades of light blue, factual truth becomes more difficult to discern.

So when we are looking for factual truth, we have to be careful about the way we construct the question, and about the way we seek the answer. That necessity often governs a real search for truth.

Philosophical Truths
A more difficult form of truth to discern is the philosophical truth, or its cousin, moral truth. With philosophical truth, we are seeking that which “we can agree is true to the exclusion of all other possibilities.” With moral truth, we are seeking that which “we can agree is right to the exclusion of all other possibilities.”

In either case, the point of conflict is our frequent inability to “agree.”

With either philosophical or moral truth, what we are seeking is a solid, consistent point of reference. That is, we must first agree on how to find the truth before we can begin to identify it. That point of reference is called the “premise,” which is an accepted starting point.

For example, in most cultures, it is considered wrong to take another person's life without cause. (Notice that since we're looking for philosophical truth, we begin using phrases like "without cause.") So we can easily reach the premise that "murder is wrong."

We share a common revulsion when a child is killed by an abusive relative. We hurt together when a teenager dies in a senseless, seemingly random act of drive-by violence.

Much like we found with factual truth, however, philosophical truth can also be slippery and difficult to grasp. Sometimes, even if we agree on an idea, its application can cause us to disagree about a truth.

The discussion about murder, though, becomes much murkier when we change the subject from sheer, senseless murder to abortion. If we are seeking the philosophical truth (or the moral truth), we might phrase the question, "is abortion wrong?" Or, more politically problematic, "should abortion be legal?"

This issue has caused a polarizing debate like few have in our time. However, if we investigate closely the issues involved, they will lead us to seek factual, philosophical and moral truths.

If we agree that taking a life without cause is wrong, then to find out the moral or philosophical truth about abortion, we have to learn whether the abortion qualifies as murder on factual grounds. Our answer to the philosophical or moral question (whether abortion is "right") depends on our answer to a factual question (whether abortion qualifies as "murder").

The philosophical answer to whether or not abortion is "wrong" boils down, to a factual question: Is the fetus rightly considered a "life?"

If, as some claim, "life begins at conception," abortion involves taking a life and is therefore clearly wrong. If, as others assert, "life begins at birth," abortion involves a surgical procedure and is therefore not clearly right or wrong, but is rather a matter of choice to the person(s) involved.

The Whole Package of Truth

However, we do not seek just the factual truth. Nor do we seek just the philosophical truth. We want the whole truth. We seek a position that which can be proven to the exclusion of any alternative.

So on the issue of abortion, if we were looking for the whole truth, we would take the factual truth and combine it with the moral truth to understand the "truth" of abortion. To do that, we would need to learn the factual truth about the beginning of life. And once we learned that, we would apply that factual truth to our premise about murder and reach a conclusion about abortion.

If we find that the factual truth is that life begins at conception, or premise about murder will lead us to the conclusion that abortion is wrong. If we find that the factual truth is that life begins at birth, then we might conclude that abortion is either permissible or is neither right nor wrong.

Either way, the whole truth depends on both the factual and the philosophical truth.

Selective Truth

Separate from either factual or philosophical truth is "selective truth." Selective truth is "that which I say is true," or "that which I feel is true."

Selective truth fails our tests for truth under two conditions. It is not durable and it cannot be proven to the exclusion of other realistic possibilities. It is what we call "subjective," or "open to interpretation and change."

For our purposes, "selective truth" or "my truth" is not truth at all. It is opinion. Adhering to selective truth is a seductive option, as it helps us justify behaviors and choices that either factual or philosophical truths would prohibit.

Believing that because something is “true for me” it is actually true is incorrect. It is also dangerous and is evidence of a lazy intellect.

It is dangerous because societal order depends on a shared set of values, particularly, a shared set of philosophical and moral truths. If enough of us accept that the answer to "what is truth" is "whatever is true for me," then we get an increasingly dangerous society because we tend to define “what is right for me” into increasingly permissive and destructive behaviors.

Conclusion

To believe anything, to learn anything, to know anything, we must begin with a belief that some things are definably true; and some things are definably not true. We may define that which is true as “good” and that which is not true as either “false” or “evil” (depending on the nature of the issue involved).

In order to move on to grappling with other great ideas, we must begin with the belief that truth exists and that we can know it.

Great Ideas in Philosophy, Part II: Principles of Logic[1]

Logic is the process by which the human mind comes to correct conclusions. It is the scientific process by which we evaluate arguments, making good ones, detecting bad ones, and categorizing all of them.

In terms of logic, "arguments" does not refer to the heated discussions we sometimes have with friends, family members, or spouses. "Arguments," according to the logician's definition, are sets of statements, often used to persuade. Arguments are always made up of one or more statements (called the "premise") that lend support to another statement (the "conclusion"). For example:

Premise: All mothers are women.
Premise: My aunt Louise is a mother.
Conclusion: My aunt Louise must be a woman.

Logically, based on two small bits of knowledge about my aunt Louise (our premises), we can accurately come to a third bit of knowledge (our conclusion).

"Formal" logic is concerned only with the form arguments take. In the argument above, formal logic requires that the conclusion naturally flow from the premises as stated. If I had concluded that my aunt Louise is tall, I would have committed a logical mistake. Based on the two premises presented, I cannot know whether or not my aunt Louise is tall.

"Informal" logic is concerned with the semantics and ambiguities of language, assumptions, and tactics in argumentation, such as analogies. If, in the first premise, I had stated that "all mothers are ladies," I would have committed a logical mistake given the wide variety of possible interpretations of the term "ladies."

Logic's Governing Principles
The study of logic is governed by two very important concepts. They help us understand the parameters of logic and separate it from other subjects, such as psychology or emotion.

First, logic is based on a concrete notion of reality. In other words, in strict logical terms, reality exists independent of one's consciousness. So the statement "perception is reality" has no basis in logic. Logic contends that reality exists regardless of our perceptions about it.

Second, principles of logic define correct reasoning in the face of human fallibility. As human beings, our lives are governed by principles of logic, whether we behave logically or not. Because we are prone to make mistakes, logic acts as a sort of "check" to determine if our thinking is correct.

Logic follows the same "law of non-contradiction" that also governs reality. The law of non-contradiction states that a thing cannot both "be" and "not be." I cannot, for example, have my shoes both on and off. So just as reality does not permit these essential contradictions, neither does logic.

Logic vs. Other Subjects
The primary difference between the study of logic and the study of other topics, such as psychology, mysticism, and other branches of philosophy is a difference in purpose. Most other topics are "descriptive," that is, they seek to describe the world as it is. Logic is "prescriptive," in that it seeks to describe the world as it should be, according to the science of reason.

There are those who attack logic and logical thinking as "too narrow" or "too restrictive." Some would even seek to stretch the law of non-contradiction, for example, by imagining ways that I could indeed have my shoes both on and off.

However, their arguments are based either on wishful thinking or on alternative philosophies, neither of which results in the clarity or simplicity of simply observing the laws of logic. If the objective is to learn to be a great thinker, the principles of logic provide an ideal foundation for study and evaluation.

The Analysis of Statements

One of the fundamental practices of the science of logic is the analysis of those statements that make up arguments. There are two primary types of statements used in arguments:

> Cognitive Statements: Those which can be proven either true or false.
>
> Non-cognitive Statements: Those that cannot conclusively be proven true or false, such as questions, emotional expressions, and commands.

Further, there are two types of cognitive statements, “self-supporting” and “supported”. Self-supporting statements can be defined as true or false based just on information contained in them. Supported statements require other statements to prove or disprove their validity.

Self-supporting statement: I am here. (Can be determined as true or false based just on the words.)

Supported statement: I am six feet tall. (Cannot be determined as true or false without information located outside the statement.)

The Burden of Proof

To properly create a statement in an argument, it is sometimes necessary to create a path of information that results in proof or evidence of support for certain elements of the statement. The requirement to provide this information is called the “burden of proof.”

The burden of proof in an argument always rests with the person who asserts something in the positive in any dispute involving reality. This is because it is almost impossible to prove a negative. For example:

Statement: John drove to the lake.

If someone were trying to assert that John drove to the lake, it would be necessary for them to provide some form of evidence. Otherwise, it would be impossible to conclude that John drove to the lake. Conversely, it would be very difficult for John to prove that he did not drive to the lake. (He could assert that he was somewhere else while he was supposed to have been driving to the lake. In doing so, he would be asserting a positive, which would shift the burden of proof to him.)

So in our example and also in the tradition of Western law, the burden of proof lies with the person making the assertion of the positive. In law, the burden of proof lies with the prosecution.

In arguments involving ideas or philosophy both sides have the burden of proof. Anyone who makes a claim about ideas must prove their claim. However, on factual issues within an area of philosophy, the burden of proof still lies on the positive.

Definitions

In any argument, it is critical to define terms. Sometimes defining terms means identifying rules for the proper conduct of a debate. Since the use of words is often the cause of misunderstanding, sometimes defining terms refers to literally identifying the meaning of words and phrases.

Definitions serve several specific purposes in analyzing statements.

> They can be used to report or create agreement about an understood meaning.
> They can be used to introduce new meaning.
> They can be used to remove ambiguity, to clarify, and to make language precise.
> They can be used to persuade or to influence the thinking of others.

Good definitions share several important characteristics.

Noncircularity: A good definition of a word does not use that word or one of its derivatives.

Affirmative: A good definition articulates an object's properties positively. It does not merely tell what something is not.

Accuracy: A good definition must be neither too broad nor too narrow.

Clarity: A good definition must be understandable to its audience.

Neutrality: A good definition should not include language that biases its meaning.

Several types of definitions are used to make language as precise as possible:

Synonyms: One word definitions.
Example: Hide = Conceal

Enumerative: Definitions that list examples or properties of the things they define.
Example: Pets = dogs, cats, birds

Operational: Definitions that identify a procedure to follow to determine if something is or is not in the class or object being defined.
Example: In a product recall, a manufacturer might say, "To find out if your tires are defective, turn your vehicle as tightly as possible to the left at 10 mph. If your tires stay on the rim, they are not defective."

Analysis of Arguments
Once we establish clarity as to the statements that make up an argument, we can take on the task of analyzing the argument as a whole. We analyze arguments to establish their strength, their validity, and their implications for our lives.

Recognizing Arguments
An argument is a group of statements structured such that one or more premises form the base of support for a conclusion. However, often arguments are not presented in a structured pattern, it is important to be able to recognize arguments when they occur.

Arguments are often presented using "indicator words," which can be subtly inserted into statements to turn them into arguments. Examples of indicator words include "since," "because," "due to," "hence," and "whereas," which can be used to indicate an approaching premise. Words such as "therefore," "so," "thus," and "it follows that," can be used to indicate an approaching conclusion.

Not all groups of statements meet the criteria to be considered an argument. Some groups of statements that are not arguments:

Expositions: Presentations of facts without an intent or attempt to prove anything. Expositions may be the cause of arguments but are not themselves considered arguments.

Conditional statements: Statements of perceived reality, usually preceded by a form of "if…, then…" Conditional statements often act as premises, but are not full arguments.

Explanation: An attempt to articulate why something is true, as opposed to the attempt to prove that a thing is or is not true.

Inference and Implication

One of the primary purposes of arguments is to trigger "inference." Inference is the mental process by which the human brain moves from one thought to another, related thought. Inference occurs when the mind hears one or more premises and reaches a conclusion.

In logic, one or more premises is used to guide the observer's mind to a clear, rational conclusion. In persuasion, premises are used to guide the observer's mind to the conclusion the persuader seeks.

Sometimes, premises are presented and a conclusion is left unstated. It is left to the observer to come to a conclusion of their own. This is the use of "implication," by which the premises strongly suggest an unstated conclusion.

Deductive and Inductive Arguments

Most arguments fall into either the "deductive" or the "inductive" classification. Depending on their construction, use, and application, arguments may be equally effectively developed in either style.

> Deductive Arguments: The premise or premises, if true, guarantee the truth of the conclusion. They provide absolute support for the conclusion. In a deductive argument, if the premises are true, it is impossible for the conclusion to be false.
>
> Example:
> (Premise) All Chervrolets are manufactured by General Motors.
> (Premise) My car is a Chevrolet.
> (Conclusion) My car was manufactured by General Motors.
>
> If both premises are true, the conclusion will be true. If one or both premises is false, the conclusion will also be false.
>
> This example offers us the opportunity to analyze a common occurrence in arguments. In deductive arguments, the connection between the premises and the conclusion is direct. If either of the premises is false, we would automatically consider the conclusion false, also. Conversely, we would also consider a false conclusion an indicator of a false premise.
>
> Inductive Arguments: The premise or premises, if true, do not guarantee the truth of the conclusion. They provide only partial support for the conclusion, leaving room for a false conclusion, even given true premises.
>
> Example:
> (Premise) On sunny days the beach is usually crowded.
> (Premise) It is sunny today.
> (Conclusion) The beach will be crowded.
>
> Even if both premises are true, the conclusion could be false. The sunny day in question could be Christmas, or shark season may be in full swing. There are many reasons why the beach might not be crowded, whether the sun is shining or not.
>
> From this example, we can see another common occurrence in logical arguments. The premises make it very likely that the conclusion is correct, but do not guarantee it. In this case, if the conclusion is false, we will need to investigate outside the premises to find out why.

Some arguments are not immediately recognizable as either inductive or deductive. In those cases, sometimes it is helpful to construct a "counterexample." A counterexample is an argument with the same logical form as the given argument, but provides true premises and a false conclusion.

Our example of the sunny day at the beach during a particularly heavy shark season shows the potential of a counterexample. The counterexample identifies the potential weakness in an inductive argument.

With inductive arguments, the closer the premises come to guaranteeing the truth of the conclusion, the more “cogent” they are considered. And as premises become more cogent, they are considered stronger in their support for the stated conclusion.

There is a wide variety of inductive arguments, of course, ranging from very weak to very strong. However, under even the strongest inductive argument only establishes the likelihood, but does not inconclusively establish the truth of the conclusion.

Logical Fallacies
In analyzing arguments we often find that faulty logic leads to the fallacy of either a premise or the conclusion of an argument, or both. Many common fallacies show up in our daily lives and especially in our public conversations.

Examples of logical fallacies include:
Argument from Ignorance: Conclusion that something is false just because it has not been proven true, or vice versa.
Example:
Premise: No one has ever proven that mental telepathy is possible.
Premise: If something is not possible, it is impossible.
Conclusion: Mental telepathy is not possible.

False Dilemma: Argument which sets up a false “either/or” situation, usually making one conclusion seem obvious. Often results from the failure to point out other available options.
Example:
Premise: On the Fourth of July, either we watch fireworks or we stay home.
Premise; We do not like fireworks.
Conclusion: We stay home.

False Cause: Implies that one event, because it is associated with another event, is that event’s cause.
Example:
Premise: Mother warns that hanging out with the wrong crowd will cause you to become a loser.
Premise: You become a loser.
Conclusion: You became a loser because of the crowd with whom you hung out.

Hazy Generalizations: Drawing conclusions about a group from a sampling which is either too small or unrepresentative of the larger group.
Example:
Premise: The Democrats I met in California tended toward Socialist policies.
Premise: The Governor of California is a Democrat.
Conclusion: The Governor of California must be a socialist.

Appeal to Authority: Argument based on an appeal to a certain person or group based only on that person or group’s power or status. Ignores the reasoning of the person or group’s position in favor of an implied expectation of their truth.
Example:
Premise: Scientists say that the earth is getting warmer.
Premise: Scientists have a lot of education.
Conclusion: The earth must be getting warmer.

Ad Hominem: An attempt to attack the person presenting an argument instead of attacking the merits of the argument. This is an attempt to discredit an argument by discrediting the person making it, usually without regard for the quality of the argument.
Example:
Premise: Ed Norton believes the speed limit on Elm Street should be 35 mph.
Premise: Ed Norton is a convicted embezzler.
Conclusion: A 35 mph speed limit on Elm Street is a bad idea.

The Great Ideas in Science: The Scientific Method

Science is one of mankind's great accomplishments. The ability to develop technology, conquer disease, and enhance lifestyles has had a monumental impact on societies allover the world.

The process of "doing" science, known as the scientific method, links together sciences of various disciplines with pursuits often not considered "scientific." It provides an organized, rational means for generating innovation and creativity that has revolutionized civilization.

At the same time, science and scientific activity can be intimidating to those who do not think of themselves as scientists. Large words, lofty degrees, and complex processes sometimes give members of the scientific community an aura of superiority.

To better understand science and discovery, it is necessary to understand the scientific method. Using the scientific method as a starting point, it becomes much easier to understand scientific discovery and, very important, to recognize politics and posturing disguised as science.

Beginning as early as perhaps the 1600's those who sought to understand the world around them (scientists) realized that they had to go about their work in an orderly way. Over the course of time they devised a methodology by which they could create knowledge reliably.

That methodology has become known as the scientific method. And although it comes under occasional criticism for its linear structure and rigidity, for generations the scientific method has provided an excellent framework for scientific discovery.

Steps in the Scientific Method

1. Observe something about the universe and describe what you have seen.
2. Make a guess (called a hypothesis) about the thing you have just observed.
3. Use that hypothesis to predict some other event or phenomenon related to the observation.
4. Develop and run tests (called experiments) to check the accuracy of your hypothesis.
5. Modify your guess (hypothesis) to match the result of your experiment.
6. Go back to number 3 and continue until your experiment produces the same results every time.

All science relies on each step of this process. "Results" that are reported in the media or elsewhere that are achieved by taking shortcuts or by stopping before the end of the process may be entertaining, financially enriching, or politically useful. However, they are not science. And the generally fail to hold up to scrutiny over time.

A Simple Example
One day an executive walked into his office. His favorite plant, which he had placed directly in the window and was careful to water daily, was looking frail.

He asked several colleagues about the situation and received answers that included, "you're watering it too much," and "put it in a bigger pot."

He tried cutting back on the water. The plant only weakened more. He tried a bigger pot. It improved not at all. He tried an exotic plant food, also to no avail.

Finally, one day, frustrated and about to give up, he thought, "I wonder if the plant has just gotten too big. Nothing else seems to be working. I might as well just trim it back and see if that works."

He trimmed the plant rather radically, cutting leaves and stems and stalks, some of which appeared to be quite alive. When he was finished, his beloved plant was a shell of its former self.

Within days, he noticed the plant had started to grow again. It had put up new shoots. It was growing new leaves. Within weeks an entirely "new" plant had emerged and was on its way to healthy growth.

"Sometimes you have to have to get less to get more," he thought, philosophically.

Here is the application of our executive's scientific process:

> Observation: The plant looks weak.
> Hypothesis: Less water. Bigger pot. More food. Trim back.
> Prediction: Trimming back the plant might give it the renewed energy to grow.
> Experiment: Cut back the plant.
> Result: A healthy office plant.

In this case, we should note that the executive actually moved through the scientific method many times on his way to the final conclusion. Each solution he tried (less water, bigger pot, more food) involved developing a hypothesis, using that hypothesis to predict an outcome, performing the test and, finally, retooling the experiment based on his observation that the results were not sufficient.

We should also notice that with each failure, the executive went back and refined his hypothesis. He did not seek to blame those who had helped him to the wrong hypothesis; he did not try to make his conclusion fit the hypothesis; he did not persecute those who disagreed with his hypothesis. He simply kept persistently looking for the truth.

That is the work of the scientist, and of all great thinkers.

Observation
The first step in the scientific method is almost deceptively simple. It is to observe. Just watch. Look around. Notice the world that surrounds us.

We are making observations all the time. We notice people, events, objects, space, sounds, smells, vibrations, and other items. We may not attribute any particularly "scientific" properties to them; but as human beings, any time we encounter the world, we make observations.

One of the most important characteristics in understanding or practicing science (or knowledge) is simple openness. Every great innovation has come from noticing an object, a need, or a problem.

Limitations of Observation
It is very important to understand that observation is just that. There are no conclusions embedded in our observations, even though we often leap to conclusions based just on observation.

Sometimes our beliefs and biases are so strong that we let them influence what we actually see or notice. This "selective blindness" is the scientist's and the clear thinker's enemy. A scientist and anyone who wishes to become a great thinker must approach this and every step in the scientific method with an open mind and with open senses.

Hypothesis
A "hypothesis" is commonly considered an "educated guess," or a "probability" related to the observation. The hypothesis is often an answer to a "why" or "how" question about an observation.

To form a hypothesis, it is first necessary to form a question about some observation. The ability to ask great questions is another of the clear thinker's primary tools. It is a natural ability that children possess and use to great effect. Sadly, it is an ability that seems to get socialized out of most of us some time around the age of ten.

Fortunately, the ability to ask great questions is relatively easily restored in most people by simple practice. In fact, the human brain is "wired" to respond to questions much more than to commands.

So as you make observations in the world, learn to ask questions, especially “why” and “how” questions. You might be surprised that the answers you get back form the basis for some very interesting hypotheses.

For almost any observation, especially one that lends itself to great questions, there are several possible hypotheses and interpretations. One of the scientist’s great joys, and great burdens, is the wide variety of answers that may exist to any given question.

The scientific method is designed to reduce the number of possible explanations for any observation, ideally to one. However, this often takes uncommon tenacity and patience, requiring sacrifices that even trained scientists choose not to make. They choose to either give up or take a shortcut, either of which taints the results of their work and their conclusions.

Using the Hypothesis to Predict

Once we have created a hypothesis, we use that hypothesis to predict some factor about the observation. Although it may seem a bit strange to use a brand new guess to predict anything about the nature of an observation, this is an important step.

It is at this point that the scientist or the clear thinker uses deductive reasoning to establish premises that will help point toward a conclusion. Specifically, the scientist moves from general knowledge about the observation to more and more specific answers to great questions.

Often, the prediction we associate with the hypothesis is the answer to a problem or response to a need. In those cases, we might call the process more a matter of creating a “hope” than a prediction.

The Experiment

The tests we develop should be designed to prove the prediction based on the hypothesis. Experiments can of course range from very simple to very sophisticated, but they should always directly relate to the prediction in question.

The conclusion, or result, of any experiment should be a sterile object. That is, the experiment should be designed so that its result can be drawn fully and exclusively from the experiment and not from intervening factors. This is a difficult but crucial step.

In any scientific endeavor, it is crucial that the experiment be designed so that its results only confirm or do not confirm the prediction put forth from the hypothesis. The experiment must be designed so that no other conclusion is possible.

In addition, the results of any given experiment can only reliably be applied to that experiment and to situations that are exactly like it. Any variation in the environment (the observation) will lend itself to variation in the experiment’s results.

As human beings, we like to generalize. So we often fall into the trap of adopting results from one situation to another situation. We especially like to offer solutions proven in very specific experiments to more general problems to which they may or may not apply.

Shifting the Hypothesis

In analyzing the results of any experimental activity, it is crucial that the results be used to modify the hypothesis if they do not confirm the prediction. In other words, since the hypothesis is a guess, it should form a “moving” target that propels the scientist toward the truth.

It is painfully common in our contemporary environment for scientists to hold tighter to their beliefs (hypotheses and predictions) than to the truth of their own experiments. To be a clear thinker, it is imperative to understand that our guesses and predictions are open to change. Conclusions to well designed experiments are not.

The Great Ideas in History: Historical Accuracy[2]

History is not just an accounting of the past. It is the story of us, of humanity, of human beings. History is the fascinating account of the sweeping drama that is life itself.

Unfortunately, the teaching of history often focuses on dates, names, places, and events. The connection of these things to the people, the decisions, conflicts, and consequences involved is often lost. The rich texture of the "story" is lost against the sterility of the reported "facts."

Each of us writes a piece of history every day of our lives. We interact with others, undertake projects, seek to do things great and small. We create "the story of us" every day. So to truly understand "history" one would have to know and understand the very personal histories of each of us, an impossible task.

So it becomes necessary for the person interested in recording our stories to filter out the meaningful from the trivial. And of course, that scale also depends upon the locale and the events surrounding the reporter. Compare a small town newspaper, with its emphasis on the local PTA meetings and local high school sports stories, to the Los Angeles Times, with its global scope and reach.

In addition, for the person working to make sense of all this activity the filtering process also includes her or his priorities and perspectives. A person writing a history of a small town in Oklahoma would have vastly different priorities and perspectives than someone writing about the fall of the Berlin Wall. Each work will of necessity include material that is totally irrelevant to the other.

The two projects mentioned above, and innumerable other historical documents, dramas, reproductions, and products do share a crucial characteristic. They must be accurate to be valid.

To the historian, the storyteller, the filmmaker, or any of us who wishes to pass on the rich experience of the moment that has passed, accuracy is everything. And just as we, when telling our stories, sometimes embellish, forget, misplace details, and err, so do formal historians.

However, those who seek to tell the story of the past have a special burden of accuracy. For history, when it is interpreted and told in a dramatic fashion, creates an emotional bond between the observer and the historical figure. Much as we do with our contemporaries, we become emotionally involved with historical figures when we are able to see the events of their lives replayed "as if" they were real.

So simple integrity and the obligation to create a correct relationship between a current observer and a figure from history combine to create the need for historical accuracy. Although no retelling of events lends itself to perfection, the historian must strive to be as accurate as possible.

Whatever the method employed, the historian's duty is to report events and circumstances as they actually happened. By definition, then, an historical record must result from an observation. If an event was not observed and appropriately documented, it is not history. It might make for great entertainment, lively debate, or engaging philosophy. However, it is not history.

Some of the methods historians use to assure accuracy are grounded in common sense and investigative procedures. And the choices they make about history often reflect their own beliefs and biases. Some of the historian's tools include:

Direct Observation
Some historical observations can be made directly in contemporary reality. The geologist and the archaeologist, for example, can make direct observations about history based on work they do now.

Since these direct observations are most susceptible to interpretation and disagreement, they require the historian to be especially well trained in their craft. Even so, the scientific studies and historical truths that can be discerned from direct observation make the efforts very well worthwhile.

Documentation

Using documents is the historian's most powerful skill. Traditionally, documentation involved statements and records written on paper. However, as technology marches forward, visual and digital records are becoming more common as historical tools.

Original Documents

Original documents are those preserved as they were created. They are generally written in the first person or by a direct observer. They may include letters, diaries, business or civil records (ledgers, filings, petitions, statements of account, birth certificates, etc.), and more currently computer files and server logs.

Statistical Data

Statistical data is information that is abstracted directly from an original document. It might include census data, compilations of business or civil records, or measurements of various types of changes in the state of an historical object.

Accounts and Articles

Records that come from the historical period and concern the historical object under study are considered reliable documents. These can include such materials as newspaper articles, postings, newscasts, and other secondary sources.

Collaboration

The historian, especially in any area of fact, requires collaboration for any claim. This collaboration may come from as few as two accounts for the same event, but the accounts must agree materially for the historian to conclude on a matter of fact.

Generally, the collaboration must arise from independently created accounts of an historical event. Those who created the historical document may or may not have known one another, but must not have conspired to create indistinguishable accounts for their own sakes.

On the matter of independent collaboration and on many other issues, history like any discipline is open to human error and fraud. It is for the careful historian with a love of the truth and a passion for telling our great story to preserve the integrity of the work.

The American history story involving George Washington and a certain cherry tree provides an excellent example. The legendary Washington reportedly admitted to having chopped down a cherished family cherry tree. He confessed because, as he told his father, "I cannot tell a lie."

Further historical research proved, of course, that the story is a fabrication. There is no discernible historical evidence that the cherry tree chopping ever occurred. In fact, historians now commonly agree that the story was circulated to build public confidence in the first U.S. president.

That it is a beloved legend and not a detested lie tells us something important about our relationship with history and historical figures. As we often do in contemporary life, we tend to believe what we want to about the past. Our desire to believe the best about some characters helps us build positive emotional attachments to them and their activities.

Napoleon reportedly said, "the winners write history." He would have been more correct to state that the winners have the power to create common perceptions of history that serve their own purposes.
Real history, though, the grand tapestry of our experience, requires and ultimately rewards accuracy above all.

The Great Ideas in Art: Beauty and the Principles of Design[3]

The human ability to create is one of our most precious gifts. It gives us the opportunity to enhance our lives with beauty, comfort, security, and convenience. It offers us the chance to live to our fullest potential.

Any time we build, draw, write, sew, manufacture, or otherwise make almost anything, we are participating in a process of creation. That process of creation inevitably involves design.

The term “design” can refer to either a process or a property. “To design” something is to create its structure and qualities before undertaking the actual construction. The property known as “design” refers to the aesthetic and functional qualities of the thing once it is in existence.

So whether we are referring to a song, a painting, a chair, a highway grid, or any other created object in the world, we can assign to it the property of “design.” That is to say it has “been designed” by someone and it possesses certain functional and aesthetic qualities of “design.”

We can also assign the characteristics of design to processes. In fact, many of the most rewarding and most frustrating experiences of our lives (from falling in love to paying parking tickets) can result from either a well-conceived or an ill-conceived process of design.

Since every creation is a function of design, every creation is knit together by the common principles of design. We can take any created object and evaluate it against a set of principles that define design. The purpose is not necessarily to criticize or evaluate the object, but to understand it.

Traditionally, “beauty” has been the objective of excellent design, and has been the hallmark of creative artists, writers, musicians, and even those who practice more mundane forms of design. We have customarily equated “beauty” with excellent design.

In fact, in the past, the purpose of art, music, literature, and other forms of design was to inspire, uplift and to celebrate beauty in the world. In our contemporary environment, while we still can observe great beauty in our creations, the artist’s creed has become less to celebrate beauty and more to shock.

Tastes change, and popular culture is especially fickle. So the commitment to, and the rewards for, creating beauty may well come back into fashion. Whether it does or not, all creations can be evaluated against the timeless principles of design. Because a creation is popular does not necessarily make it beautiful, or well designed. And the reverse is of course also true.

The principles of design presented below are intended to address the characteristics of any created object. Graphic designers, artists, musicians, Web designers and those who practice other forms of design may find the list lacking in some terms and concepts that are specific to their particular discipline.

Unity
Unity in design refers to the purpose of the object. Unity suggests that each element in the object should share the overall object’s purpose, and each object should meaningfully contribute to that purpose.

In many created objects we can identify patterns that contribute to the object’s unity. Elements of color, tonality, pitch, shape, and function, used consistently, promote an object’s sense of unity.

> Visual Unity: Occurs when a visual design possesses a consistent, identifiable theme. Imagine a painting of a bicycle race on a beautiful fall morning in New York City’s Central Park. Thousands of bicycles are arrayed at the starting line, riders at the ready, focused, concentrating, ready for the starting gun.
>
> Now imagine the same scene with a bulldozer right in the middle of it. While certainly not impossible, it does influence our sense of the imaginary painting’s unity.

Musical Unity: We generally expect a musical composition to establish a form by its rhythm, melody and harmony, use of instrumentation, and perhaps lyrics. Changes in the overall format of a song, while often entertaining, play on our sense of the composition's unity.

Functional Unity: Objects that are created for a purpose are usually best kept to that purpose. The much-expected blending of the television and the personal computer has largely been a non-event. We might contend that, while the two appliances share many operating characteristics, to their users they have distinctively different purposes.

Variety

Within unity, we also expect well-designed objects to offer us variety. We expect variations in colors, tones, shapes, and functions, often from the same or comparable creations.

Balance

Balance refers to the human sense of symmetry, the notion that things should balance one another. Rooted in our physical sense of balance, we also seek other forms of balance.

Visual Balance: Elements in a visual creation should be arrayed approximately equally across the creation. Imagine a painting of the inside of a grand cathedral, with its massive ceiling spans, great pillars and arches, and rows and rows of benches, divided with an aisle down the middle. Now imagine that everyone in the painting is seated on the right side of the aisle. In addition to inspiring curiosity about the left hand pews, the image violates our sense of balance.

Musical Balance: In music, balance often takes the form of harmony. When more than one musical sound is featured, we expect to hear harmony and especially notice its absence.

Functional Balance: In industrial and commercial design, we look for a functional capacity to do work or fulfill a need. Balance is necessary to adequately turn energy into productivity in many functional creations. For example, many people are unnerved by a three-wheeled car. Interestingly, many people are also unnerved by a three-wheeled motorcycle.

Emphasis

Emphasis refers to the notion of creating a focal point. Emphasis is generally created either through contrast or repetition.

Contrast refers to the use of an interruption that draws an observer's attention. In a visual creation, this can be done through the use of contrast in color, size, shape, or texture. In music, a contrasting note, volume, lyric, or sudden rhythmic change can create powerful contrasts.

Repetition involves reproducing a creation's element more than once. Advertisers, politicians, and other sellers often design their campaigns to create emphasis through repetition. Highway billboards, NASCAR racing vehicles, and product placement in movies are strategies that use repetition to create "brand awareness," emphasis on one brand as opposed to another.

Rhythm

Rhythm refers to movement, specifically to the patterns of movement an object creates. It can take several forms.

Physical rhythms such as the movement of a dancer or an airplane in flight can range from smooth rather rough.

Tonal rhythms in music and sound can range from the steady roar of the waves to the driving beat of many hip hop hot hits.

Visual rhythms are a little more subtle, but are very powerful just the same. Imagine a painting of a traditional prairie quilt. Small squares of fabric stitched together form a large blanket used for warmth against cold weather. In the painting, the squares are all of equal size and are arranged

in rows of blue and white. A row of blue. Then a row of white. A row of blue. Then a row of white. Very soon, the eye begins to “move” along the rows and sense their visual movement, even though they are not moving at all.

Proportion

Proportion refers to the size and scale of elements involved in an object’s design. Generally, we expect elements in a design to remain in proportion, or scale, with one another.

In design circles, the common standard for measuring visual proportion is the human body. We can view an object visually and instantly compare it to ourselves physically or two a representation of a human being as shown in the piece.

In other words, we can stand some distance from a cruise ship and instantaneously get some sense of its size as a function of its proportion to our own. Likewise, we can look at a photo of a crowded cruise ship dock and get a sense of the ship’s size in proportion to the people standing on the dock.

We can also observe proportion in music (perhaps by noticing that a drum solo is much too long) in functional design (by observing that there seem to be way too many attachments with my new vacuum cleaner), and in other forms of design.

Violating the Principles of Design

Many historic and contemporary artists have created designs which seemed to violate the laws of good design with impunity. This is almost always done on purpose, either to shock the observer’s sensitivities, to draw attention to the artist’s work, or, sadly, to appeal to an ever-increasing appetite for bad design.

For non-artists involved with any kind of creation, violating the principles of design is almost always bad business. Since every object we create is subject to the process and principles of design, we are best served to simply honor them. However, on those occasions when a well-placed violation of the principles of design is appropriate,

The previous sentence fragment is a violation of this section and this booklet’s sense of unity. For the reader, it’s annoying and perhaps unnerving. And in any case, it renders the rest of the section much less useful. However, it does prove a point.

The sentence should read…” However, on those occasions when a well-placed violation of the principles of design is appropriate, it is always best to do so with a clear purpose in mind.”

God and the Great Ideas

At the heart of the Great Ideas model is the notion that by grasping certain core principles, we gain the tools to wrestle with profound questions and concepts. And, undeniably, the greatest question, and the most profound concept, we face is “What about God?”

Our humanity cries out to understand the mysteries of our lives. How long is eternity? How big is the universe? What happens after this life is over? What happened before life began?

If each, or any, of these questions has an answer, and even if they do not, then the questions and their potential answers must necessarily point an honest seeker to the great question, “What about God?”

To wrestle with great questions, to grasp great ideas, each of us must first settle for ourselves the issue of God. We must establish our belief about whether or not God exists. Is there one God? Many gods?

We must establish for ourselves our belief about God’s nature. Is God a loving Father? Is God an icy, uninvolved deity? Is God a tyrant?

We must establish for ourselves the belief about God’s role in the created universe. Did God build the universe? Did God build the universe, and then just walk away? Does God run the universe now? What are God’s principles for governing the universe?

“What about God?” is the single great question of all humanity and all history. The answer each person reaches determines their life’s path and their eternal destiny.

We can use the Great Ideas model to establish a foundation for the answer to that question. Although the Great Ideas structure is not grounded in any particular religious dogma, it acts as a framework through which to develop a personal answer to “What about God?”

God and the Truth
The Great Ideas premise is that we can comprehend truth, that truth about any issue can be discovered. For some issues, truth can be grasped through investigation; for others, through instruction. The truth about God can only be perceived through faith.

Faith, a powerful conviction about truth, is a prerequisite to any belief about God. Believing God does not exist requires just as much faith as believing that God does. Either position is a function of a powerful conviction, not hard evidence. At the end of every discussion about God’s existence and work is a statement of belief. That is the nature of the mystery of God.

God and Logic
The logical law of non-contradiction tells us that in reality something cannot both be and not be. The law of non-contradiction requires that God either exists or does not exist.

One may bring convincing logical proofs that God exists; another may develop equally compelling logical proofs that God does not exist. However, logic indicates that both cannot be true.

God and the Scientific Method
It is impossible to use the steps in the Scientific Method to conclusively “prove” anything about God. For that reason, science has often sought to separate itself from God, as if mysticism and science could not comfortably coexist.

However, the inability to concretely “prove” anything about God does not necessarily “disprove” anything, either. As we have learned with the advance of technology, the inability to observe something does not disprove its existence or activities.

We are using the Scientific Method to learn more and more, at an ever-increasing rate of detail, about the world around us. As we do so, we are discovering intricacies and patterns that require an honest scientist to consider the mathematical probabilities that the physical world around us was created and operates on mere chance, or on nothing at all.

Our best applications of the Scientific Method point us back, not to a clear, definable answer, but inevitably to a great question, "What about God?"

God and Historical Accuracy
To the extent that there would be an historical record involving God, we would expect it to stand up to the strictest test of historical accuracy. Conversely, we would also expect any documentation that disproves anything about God to meet an equally high standard.

There are many books about God, and about various gods. Very few meet any rigorous standards of historical accuracy. Books of ancient mythology are, by definition, about mankind's inability to experience the gods directly. Books of ancient wisdom may commonly suggest the presence of God or gods, but are not overtly presented as God-centric.

The essential question about God revolves around ancient scriptures that are said to have been given directly from God to humanity and, more specifically, around the Holy Bible developed from them. Singularly, given its claims of absolute authority, the Bible lends itself to scrutiny against the premises of the Great Ideas.

The essence of the Great Ideas is to pursue truth; the process is to follow logic; the standard is to investigate scrupulously. Given that, the Bible must stand the test of historical accuracy.

Without exception, the book known as the Holy Bible passes every test of historical accuracy. It is authentic as to its use of sources and documents, as to its collaboration by first-hand witnesses, and as to is application of appropriately contemporary practices and principles.

Unique among the ancient holy writings, the Bible passes the test of historical accuracy.[4]

God and Beauty and the Principles of Design
Design always involves a designer. Where a designer is at work, we will find design. Where we find design, a designer must be at work.

We would expect God to be the consummate designer. We would expect that no human creation could surpass God's design, for complexity, intricacy, or perfection.

In the natural world around us, we find examples of design everywhere. From the unimaginably sophisticated operations of a single cell to the seasonal patterns of the earth and in literally billions and billions of placed in between, we can look and, with honest scrutiny, observe the work of a designer.

We see unity. We see balance. We see variety. We see rhythm. We see emphasis. We see proportion.

Observing the structure of the natural world from a design perspective forces the observer to a choice.

One must either accept the existence of a divine Designer. Or one must accept the mathematical probability that the complexity we see in the natural world is a product of mere chance.

Either way, it is a matter of faith.

Notes

[1] For this discussion of the principles of logic, I am indebted to Professor George Leef. His mastery of logic's principles was matched by his commitment to their practice.
[2] For this discussion of historical accuracy, I am indebted to the online presence of several institutions. Their commitment to preserving the rich fabric of history is evidenced on their public Web sites and I am grateful for them:
Florida State University: http://www.fsu.edu/~library/guides/hisres.html
College of Charleston, Department of History: http://www.cofc.edu/~history/

[3] For this discussion of design and beauty, I am indebted to Charlotte Jirousek's excellent online book on the topic and to various design professors who have done their best to inform my limited capabilities in visual design.
For Charlotte Jirousek's book: http://char.txa.cornell.edu
[4] For an excellent discussion of the Bible's historical accuracy, see Jeffrey Sheler's "Is the Bible True."