

CRITICAL THINKING STUDENT SURVIVAL GUIDE

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7 Habits of Highly Effective People (and Students)

The Private Victory – Inside First

Habit 1: BE PROACTIVE

I am the force. Take responsibility for your life.

Being proactive is more than taking initiative. It is accepting responsibility for our own behavior (past, present, and future) and making choices based on principles and values rather than on moods or circumstances. Proactive people are agents of change and choose not to be victims, to be reactive, or to blame others. They take an Inside-Outside Approach to creating changes.

Habit 2: BEGIN WITH THE END IN MIND

Control your own destiny or Someone Else Will. Define your mission and goals in life.

All things are created twice – first mentally, second physically. Individuals, families, teams, and organizations shape their own future by creating a mental vision and purpose for any project. They do not just live day to day without a clear purpose in mind. They mentally identify and commit themselves to the principles, values, relationships, and purposes that matter most to them.

Habit 3: PUT FIRST THINGS FIRST

Will and Won't Power. Prioritize, and do the most important things first.

Putting first things first is the second or physical creation. It is organizing and executing around mental creation (your purpose, vision, values, and most important priorities.) The main thing is to keep the main thing the main thing.

The Public Victory – Outside Second

Habit 4: THINK WIN-WIN

The Stuff That Life Is Made Of. Have an "everyone-can-win" attitude.

Thinking win-win is a frame of mind and heart that seeks mutual benefit and is based on mutual respect in all interactions. It's not about thinking selfishly (win-lose) or like a martyr (lose-win). In our work and family life, members think interdependently -- in terms of "we," not "me." Thinking win-win encourages conflict resolution and helps individuals seek mutually beneficial solutions. It's sharing information, power, recognition, and rewards.

Habit 5: SEEK FIRST TO UNDERSTAND, THEN TO BE UNDERSTOOD

You Have Two Ears and one Mouth. Listen to people sincerely.

When we listen with the intent to understand others, rather than with the intent to reply, we begin true communication and relationship building. Seeking to understand takes kindness; seeking to be understood takes courage. Effectiveness lies in balancing the two.

Habit 6: SYNERGIZE

The "High" Way. Work together to achieve more.

Synergy is about producing a third alternative – not my way, not your way, but a third way that is better than either of us would have come up with individually. Synergistic teams and families thrive on individual strengths. They go for creative cooperation.

Habit 7: SHARPEN THE SAW

It's "Me Time". Renew yourself regularly.

Sharpening the saw is about constantly renewing ourselves in the four basic areas of life: physical, social/emotional, mental, and spiritual. It's the habit that increases our capacity to live all the other habits of effectiveness.

3 Principles of Efficiency & Time Management

Pareto Principle (80/20 Rule)

- 80% of the effects come from 20% of the causes
- 80% of your results come from 20% of your efforts
- 80% of your awareness come from 20% of your attention
- 80% of your happiness come from 20% of your relationships

Parkinson's Law

- Work expands so as to fill the time available for its completion.
- The demand upon a resource tends to expand to match the supply of the resource. The reverse is not true.
- The lower the price of a service or commodity, the greater the quantity demanded.
- The amount of time which one has to perform a task is the amount of time it will take to complete the task.

Occam's Razor (The Law of Parsimony)

- The principle is often incorrectly summarized as "other things being equal, a simpler explanation is better than a more complex one."
- In practice, the application of the principle often shifts the burden of proof in a discussion. Occam's Razor asserts that one should proceed to simpler theories until simplicity can be traded for greater explanatory power. The simplest available theory need not be most accurate.

- Bertrand Russell offers a particular version of Occam's Razor: "Whenever possible, substitute constructions out of known entities for inferences to unknown entities.

Symbols of Logic & Language

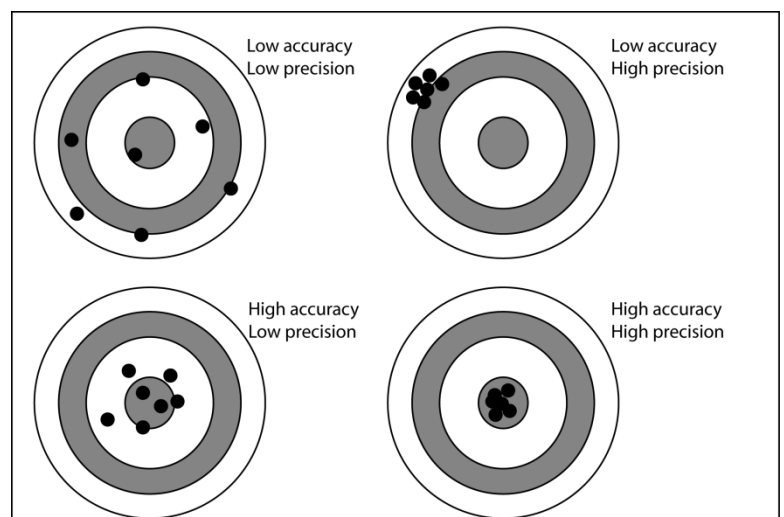
<u>Definition</u>	<u>Symbol</u>	<u>Definition</u>	<u>Symbol</u>
Infinity	∞	Not, Negation	\sim
Section	\S	Alternate negation sign	\neg
Negation of equality	\neq	And (Ampersand)	$\&$
Therefore	\therefore	More than	$>$
One-to-one correspondence	\approx	Less than	$<$
Delta/Change	Δ	If and only if/iff	\equiv
Null/Empty set	\emptyset	If, then	\rightarrow
Paragraph (Pilcrow)	\P	Equivalence	\leftrightarrow

4 Primary Logical Distinctions

Accuracy vs. Precision

Accuracy is the proximity of measurement results to the true value; while precision is the repeatability, or reproducibility of the measurement.

Accuracy is the degree of conformity and correctness of something when compared to a true or absolute value.



Something can be accurate on occasion as a fluke. For something to be consistently and reliably accurate, it must also be precise.

Precision is a state of strict exactness — how often something is strictly exact.

Results can be precise without being accurate. Alternatively, results can be precise AND accurate.

Correlation vs. Causation

The *cum hoc ergo propter hoc* logical fallacy can be expressed as follows:

1. *A* occurs in correlation with *B*.
2. Therefore, *A* causes *B*.

In this type of logical fallacy, one makes a premature conclusion about causality after observing only a correlation between two or more factors. Generally, if one factor (*A*) is observed to only be correlated with another factor (*B*), it is sometimes taken for granted that *A* is causing *B*, even when no evidence supports it. This is a logical fallacy because there are at least five possibilities:

1. *A* may be the cause of *B*.
2. *B* may be the cause of *A*.
3. Some unknown third factor *C* may actually be the cause of both *A* and *B*.
4. There may be a combination of the above three relationships. For example, *B* may be the cause of *A* at the same time as *A* is the cause of *B* (contradicting that the only relationship between *A* and *B* is that *A* causes *B*). This describes a self-reinforcing system.
5. The “relationship” is a coincidence or so complex or indirect that it is more effectively called a coincidence (i.e. two events occurring at the same time that have no direct relationship to each other besides the fact that they are occurring at the same time). A larger sample size helps to reduce the chance of a coincidence, unless there is a systematic error in the experiment.

In other words, there can be no conclusion made regarding the *existence* or the *direction* of a cause and effect relationship only from the fact that *A* and *B* are correlated. Determining whether there is an actual cause and effect relationship requires further investigation, even when the relationship between *A* and *B* is statistically significant, a large effect size is observed, or a large part of the variance is explained.

Example 1:

Sleeping with one’s shoes on is strongly correlated with waking up with a headache.

Therefore, sleeping with one’s shoes on causes headache.

The above example commits the correlation-implies-causation fallacy, as it prematurely concludes that sleeping with one’s shoes on causes a headache. A more plausible explanation is that both are caused by a third factor, in this case going to bed drunk, which thereby gives rise to a correlation. So the conclusion is false.

Example 2:

As ice cream sales increase, the rate of drowning deaths increases sharply.

Therefore, ice cream consumption causes drowning.

The aforementioned example fails to recognize the importance of time and temperature in relationship to ice cream sales. Ice cream is sold during the hot summer months at a much greater rate than during colder times,

and it is during these hot summer months that people are more likely to engage in activities involving water, such as swimming. The increased drowning deaths are simply caused by more exposure to water-based activities, not ice cream. The stated conclusion is false.

Example 3:

Since the 1950s, both the atmospheric CO₂ level and obesity levels have increased sharply.

Hence, atmospheric CO₂ causes obesity.

Richer populations tend to eat more food and consume more energy.

Necessary vs. Sufficient

A condition can be either necessary or sufficient without being the other. For instance, *being a mammal* (*P*) is necessary but not sufficient to *being human* (*Q*), and that a number *q* is *rational* (*P*) is sufficient but not necessary to *q's being a real number* (*Q*) (since there are real numbers that are not rational).

A condition can be both necessary and sufficient. For example, at present, “today is the Fourth of July” is a necessary and sufficient condition for “today is Independence Day in the United States.”



To satisfy S, you must be in N. When we are in S, we know that we are in N.

Example 1:

In order for it to be true that “John is a bachelor,” it is *necessary* that it be also true that he is

1. unmarried
2. male
3. adult

Stating that “John is a bachelor” implies that John is male. So knowing that it is true that John is a bachelor is *sufficient* to know that he is a male.

Example 2:

For the whole numbers greater than two, being odd is *necessary* to being prime, since two is the only whole number that is both even and prime.

A number’s being divisible by 4 is *sufficient* (but not necessary) for its being even, but being divisible by 2 is both sufficient and necessary.

Example 3:

Consider thunder, in the technical sense, the acoustic quality demonstrated by the shock wave that inevitably results from any lightning bolt in the atmosphere. It may fairly be said that thunder is *necessary* for lightning, since lightning cannot occur without thunder, too, occurring. That is, if lightning does occur, then there is thunder.

An occurrence of thunder is a *sufficient* condition for the occurrence of lightning in the sense that hearing thunder, and unambiguously recognizing it as such, justifies concluding that there has been a lightning bolt.

Vague vs. Ambiguous

1. A word or phrase is said to be **ambiguous** if it has **at least two specific meanings** that make sense in context.
2. A word or phrase is said to be **vague** if its meaning is not clear in context and lacks precision.

Example 1:

Consider this line from a help-wanted ad: “Three-year-old teacher needed for pre-school.” Most people think this is funny, because the ad seems to be seeking a teacher that is three years old. But the phrase is **ambiguous**: the ad is actually seeking a teacher for three-year-old pre-schoolers. The phrase is ambiguous because two specific and distinct meanings can be applied to it in the given context. (Notice, however, that the *level* of ambiguity is dependent on the terms involved. “English teacher needed for pre-school” would normally not be considered ambiguous, though in certain contexts it could be understood to be seeking a teacher from England. But how about “Vietnamese teacher needed for pre-school”?)

Example 2:

Vagueness, though, is a different problem. “Nurse needed for pre-school” is vague because there are many kinds of nurses, and the same job is certainly not open to them all: registered nurses, practical nurses, wet nurses, nannies, and so on. The problem is that the word “nurse” has many meanings, and so the ad’s usage is **vague**. The more details that are supplied, the less vague a phrase will be. “Registered nurse needed for pre-school” would be less vague, “Registered nurses with pediatric experience needed for pre-school” would be even less so. Notice that, for almost every word or phrase, you can probably imagine some situation in which it would be vague. We can tolerate a certain level of vagueness in language, but it is the job of a critical thinker to minimize vagueness by ensuring the language used is appropriate for its context—that is, for its subject and its audience.

Latin Terms, Phrases & Abbreviations

A priori

- You might come across this term in classes about logic or reasoning. It means taking a general law or idea and applying it to a particular instance without needing experimentation or observation. An example of an a priori statement that is used is, "all bachelors are single." You do not need to observe this to see that it is true because, by definition, bachelors must be single.

A posteriori

- A posteriori arguments are different than a priori because they are based on actual observation or experimentation. Continuing on the previous example, an a posteriori example of reasoning might be that "some bachelors are happy." This can be based on real life observation that is not a given based on what a bachelor is.

Addendum

- Thing or item to be added, especially a supplement to a book. The plural is *addenda*.

Ad hoc

- From the Latin meaning "to this," this term gained popularity in the mid-1600s and it still used today. It refers to something that is formed or done quickly to meet the needs of a particular problem or issue without regard to a more general application and generally lacking advance planning.

Ad infinitum

- You might be able to guess what this phrase means simply through its similarity to the word we use in English. It means "to infinity" and can be used to describe something that goes on, seemingly or actually endlessly, as some students might feel about certain classes.

Ad nauseam

- This Latin term is used to describe an argument that has been taking place to the point of nausea, often with the same arguments being rehashed over and over for years until everyone, except a select few, are simply sick to death of the whole thing.

Alibi

- A legal defense where a defendant attempts to show that he was elsewhere at the time a crime was committed. His alibi is sound; he gave evidence that he was in another city on the night of the murder.

Alumnus *or* alumna

- Pupil graduate or former student of a school, college or university.

Annuit cœptis

- One of two mottos on the reverse side of the Great Seal of the United States, it translates as "He [God] has favored our undertakings." It can be traced to lines by the Roman poet Virgil from the Aeneid, where a prayer by Ascanius, the son of the hero of the story, Aeneas, is offered to Jupiter just before slaying an enemy warrior, Remulus.

Ante bellum

- During your history courses, you are bound to encounter this term. It means in the most basic sense "before the war" and while it can be applied to any war it is most commonly used to refer to the American Civil War and the Antebellum Era that preceded it.

Bona fide

- While its literal translation means "good faith" this term has a few different shades of meaning in modern language. In legal terms, it is used to represent something that is presented without deception or fraud, or literally in good faith, honest, sincere and lawful. It is more commonly used to mean something that is the real deal or truly authentic.

Carpe diem

- This well-known phrase comes from a poem by Horace. While there have been arguments about the exact translation, it is most commonly held to mean "seize the day" encouraging individuals to live life to the fullest today without expectation of a tomorrow.

Ceteris paribus

- "Other things being equal." This expression is often used in economics where, in order to measure the impact of something on the economy (e.g., inflation or unemployment), you need to hold other variables fixed.

Circa (c.) or (ca.)

- "Around" in the sense of "approximately" or "about". Usually used of a date.

Cogito ergo sum

- Translated from the Latin, the quote means "I think, therefore I am" and comes from the writing of philosopher Rene Descartes.

Compare (Cf.)

- Translated, and can be read aloud, as "compare". It is an abbreviation for the Latin word confer, literally meaning "bring together", and is used to refer to other material or ideas which may provide similar or different information or arguments. It is mainly used in scholarly contexts such as in

academic articles (mainly humanities, physics, chemistry, and biology) or legal texts. It is the imperative singular form of the Latin verb *conferre*.

Compos mentis

- Meaning "in command of one's mind" this term is used in the legal field to denote someone who is competent to stand trial and not encumbered by mental illness or handicap.

Curriculum vitae

- A curriculum vitae is basically a fancy way to describe a resume. While it means literally "the course of one's life" the term is applied to mean a short list of your accomplishments and training – something any graduate will need to think about putting together soon.

De facto

- In Latin, de facto means "from the fact" and in use in English it is often used to distinguish what is supposed to be the case from what is the reality. For example, legally, employers are not allowed to discriminate in hiring because of age, but many still practice de facto (in reality, in fact) discrimination.

De jure

- "By law." Some states are currently working on legislation that would make English the de jure official language of the United States.

Deus ex machina

- In direct translation, this term means, "God out of a machine" and it harkens back to ancient Greek and Roman plays. When the plot would become too tangled or confusing, the writers would simply bring in God, lowered in via a pulley system (the machine) and he would wrap it all up. Today, it is still used in literature to describe a plot where an artificial or improbable means of resolving a conflict is used.

Dictum (plural dicta)

- A statement that forms part of the judgment of a court.

Divide et impera

- "Divide and reign." It was a political strategy proposed by Niccolò Machiavelli and used previously by the Roman Senate to dominate the Mediterranean.

E pluribus unum

- Simply take a look at American currency to see this Latin phrase in use. It means "out of many, one" and is found on anything bearing the seal of the United States.

Et alia (et al.)

- You are unlikely to encounter this Latin phrase in its unabbreviated form, and will most likely only ever see it as “et al.” when included. This is also a term that is found in footnotes and bibliographies which allows writers to refer to a large number of authors without having to write each name out (for example, you could say that your source is Dr. Henry Jones et al.).

Et cetera (etc.)

- Few out there are not familiar with this term but may not know it as well when it is spelled out like this and not abbreviated as “etc.” Meaning “and the others,” it is used to denote that a list of things could continue ad infinitum (see above) and that for the sake of brevity it is better to just wrap things up with a simple etc.

Ergo

- Simply put, ergo means “therefore” and you can exchange it with therefore or “hence” in any sentence and maintain the same meaning. For example, you could say, “I think, ergo I am” without changing the meaning of the original.

Exempli gratia (e.g.)

- You will often see this term abbreviated to “e.g.” in writing. It means “for the sake of example” and when you see it in a sentence you can expect that it will be followed by some examples.

Ex libris

- Back in the days when books were rarer and more expensive commodities than they are today, it was common to mark your books with a label bearing your own name and this phrase which means “from the library of.” While not as common today, some true bibliophiles still use the labels.

Ex parte

- “From, by, or for one party in a dispute.” An ex parte decision is one decided by a judge without requiring all of the parties to the controversy to be present.

Folio (f./ff.)

- Used as a citation, it means “on the (next) page.” For example, “Hornblower 258f.” would refer to pages 258–259 while “Hornblower 258ff.” would refer to an undetermined number of pages following page 258. When using a book reference to find a topic, one may encounter one or more ff. references, one or more f. references, and one or more normal references. Since an ff. reference means the topic is mentioned over several pages starting at the page number preceding the ff., it is normally useful to start with the ff. reference(s), followed by the f. reference(s), and then the normal references.

Habeas corpus

- A writ of habeas corpus, literally, “have the body” requires a person to appear before the court in person, generally to ascertain whether or not the detention of that person is lawful. Habeas corpus cannot be suspended unless there is reason to believe that a person could pose a danger to the public.

Ibidem (ibid.)

- Another abbreviated term, this word is more commonly seen in research writing in the form of "ibid." From the Latin for "in the same place" it is found in footnotes and bibliographies to designate that the same source has been cited twice in succession.

Id est (i.e.)

- You have likely seen this term in writing before, even if you were not aware as it is commonly abbreviated to “i.e.” In Latin, it means "that is" and is used in English when the speaker or writer wants to give an explanation that further explains a statement.

In situ

- If something happens “in situ” it happens “in place or on site”, though the term often designates something that exists in an original or natural state. Like a rare species sighted in situ or an invaluable artifact found on an archeological site.

In toto

- It means “in all” or “entirely.” Think of it as saying "in total" in a really weird voice.

In vitro

- Most students will be familiar with this term because of modern fertility treatments, but have you ever considered what the term actually means? In Latin, in vitro means "in glass." Any biological process that occurs in the laboratory rather than in the body or a natural setting can be called in vitro.

In vivo

- While an experiment taking place in a glass test tube might not cause a stir, many are up in arms about this kind of experimentation. In vivo means "within the living" and the two most common examples of this kind of experimentation are animal testing and clinical trials.

Ipsa facto

- Meaning "by the fact itself" this commonly used and misused term denotes when something is true by its very nature. For example, if you do not feed your dog you are ipso facto a bad owner.

Magnum opus

- Whether it is in writing, painting, sculpture or music, this Latin term denotes the greatest work done by an artist – a true masterpiece.

Mea culpa

- If you want to admit your own guilt or wrongdoing in a situation, use this Latin phrase that translates literally to "my fault." It is a bit like a fancier, less outdated way of saying "my bad."

Mens rea

- There is a big difference between murder and manslaughter, and "mens rea" is what separates the two. Mens rea means "guilty mind," and those who go into a crime intending to commit it have it, differing from those who commit a crime accidentally or without advance planning.

Novus ordo seclorum

- The second of two mottos that appear on the reverse (or back side) of the Great Seal of the United States, it translates as "New order of the ages." The phrase is a reference to the fourth Eclogue of Roman poet Virgil, and was meant to commemorate the founding of the United States.

Opere citato (op. cit.)

- A Latin abbreviation, meaning "in the work cited", is used in an endnote or footnote to refer the reader to a previously cited work, standing in for repetition of the full title of the work. Op. cit. should be used with the author's surname. For example, given a work called *The World of Salamanders* (1999) by Jane Q. Smith, the style would typically be "Smith op. cit.", usually followed by a page number, to refer the reader to a previous full citation of this work (or with further clarification such as "Smith 1999, op. cit."). See *ibidem* (ibid.)

Passim

- Meaning "here and there." Less literally, "throughout" or "frequently." Said of a word, fact or notion that occurs several times in a cited text. Also used in proofreading, where it refers to a change that is to be repeated everywhere needed.

Per diem

- Meaning "by the day" a per diem in most uses today designates a daily allowance used in traveling for work. It can also mean a per-day rate, or that someone is paid on a daily basis. Other common similar terms are per annum, meaning "by the year," and per capita, "by the person."

Per se

- The direct translation of this term is "by itself" and it means just that when used in English as well. You could use it to say that you do not find chemistry boring "per se," "by itself, intrinsically," but this professor's voice puts you to sleep.

Persona non grata

- From the Latin meaning an "unacceptable person" this term designates someone who is no longer welcome in a social or business situation.

Prima facie

- "By first instance," this refers to cases with sufficient evidence to warrant going forward with an arraignment.

Pro bono

- Pro bono means "for the good" and it is a term used to designate when something is done free of charge. While the term can be applied in any field, it is most commonly used to describe legal services.

Pro rata

- This Latin phrase is something you are likely familiar with in everyday life. Literally "in proportion," it means to charge at a proportional rate. So if a service is \$100 for 10 hours, then 1 hour of the service would cost \$10 pro rata.

Quid pro quo

- While Anthony Hopkins so sinisterly used this phrase in *The Silence of the Lambs*, in everyday life it is often used to describe an exchange of value necessary for a contract to take place. From the Latin meaning "this for that," it gets used everywhere from the courtroom to the classroom in modern English.

Sic

- "Thus, or "just as." In full: "sic erat scriptum," "thus was it written." Found in writing, this Latin word most commonly finds a home in brackets like this: [sic] when quoting a statement or writing. It indicates that there is a spelling or grammar error (or just something out of the ordinary) in the original quotation and that the publication has only reproduced it faithfully, not made an error of their own.

Status quo

- From the Latin meaning "the state in which" this term is used today to designate the existing state or condition of things. For example, if you are making money off of a high pollution industry it is in your interests to maintain the status quo when it comes to environmental law.

Subpoena

- A subpoena is a writ/document issued by a government agency, most often a court, to compel testimony by a witness or production of evidence under a penalty for failure to comply. The word subpoena comes from the Latin meaning "under penalty".

Tabula rasa

- When you were a child, your mind might have been more of a tabula rasa than it is today. This Latin phrase means "clean slate" and denotes something or someone not affected by experiences and impressions.

Terra firma

- Those who hate to fly or get seriously seasick will be able to put this term to good use. It means "solid earth," and you might be thanking your lucky stars to be back on it after a trip through the air or rough waters.

Veni, vidi, vici

- These famous words were purportedly uttered by Roman emperor Julius Caesar after a short war with Pharnaces II of Pontus. Translated, it means "I came, I saw, I conquered" an adage you can hopefully keep in mind when finals are over.

Verbatim

- If you repeat something verbatim you repeat it in exactly the same words, word for word with no changes and no improvisation.

Vice versa

- From the Latin meaning "to change" or "turn around", this term means to reverse the order of something. This quote from Samuel Butler provides an example: "In the midst of vice we are in virtue, and vice versa."

Videlicet (viz.)

- A less common Latin abbreviation meaning, "that is to say," or "namely" (used especially to introduce examples, details, etc.). For example: "The noble gases, viz., helium, neon, argon, xenon, krypton, and radon, show an unexpected behavior when exposed to this new element."

Common Logical Fallacies of Reasoning

Ad Hominem (Argumentum Ad Hominem)

Description: Attacking the person making the argument, rather than the argument itself, when the attack on the person is completely irrelevant to the argument the person is making.

Logical Form:

Person 1 is claiming Y.

Person 1 is a moron.

Therefore, Y is not true.

Example #1:

My opponent suggests that lowering taxes will be a good idea – this is coming from a woman who eats a pint of Ben and Jerry's each night!

Explanation: The fact that the woman loves her ice cream, has nothing to do with the lowering of taxes, and therefore, is irrelevant to the argument. Ad hominem attacks are usually made out of desperation when one cannot find a decent counter argument.

Example #2:

Tony wants us to believe that the origin of life was an "accident". Tony is a godless SOB who has spent more time in jail than in church, so the only information we should consider from him is the best way to make license plates.

Explanation: Tony may be a godless SOB. Perhaps he did spend more time in the joint than in church, but all this is irrelevant to his argument or truth of his claim as to the origin of life.

Appeal to Common Belief (Argumentum Ad Populum)

Description: When the claim that most or many people in general or of a particular group accept a belief as true is presented as evidence for the claim. Accepting another person's belief, or many people's beliefs, without demanding evidence as to why that person accepts the belief, is lazy thinking and a dangerous way to accept information.

Logical Form:

A lot of people believe X.

Therefore, X must be true.

Example #1:

Up until the late 16th century, most people believed that the earth was the center of the universe. This, of course, is not true.

Explanation: The geocentric model was observation (limited) and faith based, but most who accepted the model did so based on the common and accepted belief of the time, not on their own observations, calculations, and or reasoning. It was people like Copernicus, Galileo and Kepler, who refused to appeal to the common belief and uncovered a truth not obvious to the rest of humanity.

Example #2:

How could you not believe in virgin births? Roughly two billion people believe in them, don't you think you should reconsider your position?

Explanation: Anyone who believes in virgin births does not have empirical evidence for his or her belief. This is a claim accepted on faith, which is an individual and subjective form of accepting information, that should not have any effect on your beliefs. Don't forget that there was a time that the common beliefs included a flat earth, earth-centered universe, and demon-possession as the cause of most illness.

Appeal to Tradition (*Ad Antiquitatem*)

Any argument that defends a behavior or choice by pointing out that the behavior or choice is a longstanding practice. Unfortunately, many foolish and destructive behaviors are also very traditional, such as slavery, forced prostitution, and punishing children by hitting them with belts.

Example: "I believe in God. People have believed in God for thousands of years so it seems clear that God must exist. After all, why else would the belief last so long?"

Argument from Ignorance (*Ad Ignorantium*)

Description: The assumption of a conclusion or fact based primarily on lack of evidence to the contrary. Usually best described by, "absence of evidence is not evidence of absence."

Logical Form:

X is true because you cannot prove that X is false.

X is false because you cannot prove that X is true.

Example #1:

Although we have proven that the moon is not made of spare ribs, we have not proven that its core cannot be filled with them; therefore, the moon's core is filled with spare ribs.

Explanation: There is infinity of things we cannot prove – the moon being filled with spare ribs is one of them. Now you might expect that any "reasonable" person would know that the moon can't be filled with spare ribs,

but you would be expecting too much. People make wild claims, and get away with them, simply on the fact that the converse cannot otherwise be proven.

Example #2:

To this very day (at the time of this writing), science has been unable to create life from non-life; therefore, life must be a result of divine intervention.

Explanation: Ignoring the false dilemma, the fact that we have not found a way to create life from non-life is not evidence that there is no way to create life from non-life, nor is it evidence that we will someday be able to; it is just evidence that we do not know how to do it. Confusing ignorance with impossibility (or possibility) is fallacious.

Begging the Question (*Petitio Principii*)

Description: Any form of argument where the conclusion is assumed in one of the premises. Many people use the phrase “begging the question” incorrectly when they use it to mean, “prompts one to ask the question”. That is NOT the correct usage. Begging the question is a form of circular reasoning.

Logical Forms:

Claim X assumes X is true.

Therefore, claim X is true.

Example #1:

Paranormal activity is real because I have experienced what can only be described as paranormal activity.

Explanation: The claim, “paranormal activity is real” is supported by the premise, “I have experienced what can only be described as paranormal activity.” The premise presupposes, or assumes, that the claim, “paranormal activity is real” is already true.

Example #2:

The reason everyone wants the new "Slap Me Silly Elmo" doll is because this is the hottest toy of the season!

Explanation: Everyone wanting the toy is the same thing as it being "hot," so the reason given is no reason at all—it is simply rewording the claim and trying to pass it off as support for the claim.

Biased Sample Fallacy

Description: Drawing a conclusion about a population based on a sample that is biased, or chosen in order to make it appear the population on average is different than it actually is.

This differs from the hasty generalization fallacy, where the biased sample is specifically chosen from a select group, and the small sample is just a random sample, but too small to get any accurate information.

Logical Form:

Sample S, which is biased, is taken from population P.

Conclusion C is drawn about population P based on S.

Example #1:

Based on a survey of 1000 American homeowners, 99% of those surveyed have two or more automobiles worth on average \$100,000 each. Therefore, Americans are very wealthy.

Explanation: Where did these homeowners live? Beverly Hills, CA. If the same exact survey was taken in Detroit, the results would be quite different. It is fallacious to accept the conclusion about the American population in general based on not just the geographical sample, but also the fact that homeowners were only surveyed.

Example #2:

Pastor Pete: People are turning to God everywhere! 9 out of 10 people I interviewed said that they had a personal relationship with Jesus Christ.

Fred: Where did you find these people you interviewed?

Pastor Pete: In my church.

Explanation: Pastor Pete has drawn a conclusion about religious beliefs from people “everywhere” based on people he has interviewed in his church. That’s like concluding that the world likes to dance naked in front of strangers after interviewing a group of strippers.

Confirmation bias

The tendency to search for, interpret, favor, and recall information in a way that confirms one's beliefs or hypotheses, while giving disproportionately less consideration to alternative possibilities.

It is a type of cognitive bias and a systematic error of inductive reasoning. People display this bias when they gather or remember information selectively, or when they interpret it in a biased way. People also tend to interpret ambiguous evidence as supporting their existing position.

Biased search, interpretation and memory have been invoked to explain attitude polarization (when a disagreement becomes more extreme even though the different parties are exposed to the same evidence), belief perseverance (when beliefs persist after the evidence for them is shown to be false), the irrational primacy effect (a greater reliance on information encountered early in a series) and illusory correlation (when people falsely perceive an association between two events or situations).

Equivocation

Description: Using an ambiguous term in more than one sense, thus making an argument misleading.

Example #1:

I want to have myself a merry little Christmas, but I refuse to do as the song suggests and make the yuletide gay. I don't think sexual preference should have anything to do with enjoying the holiday.

Explanation: The word, “gay” is meant to be in light spirits, joyful, and merry, not in the homosexual sense.

Example #2:

The priest told me I should have faith.

I have faith that my son will do well in school this year.

Therefore, the priest should be happy with me.

Explanation: The term “faith” used by the priest, was in the religious sense of believing in God without sufficient evidence, which is different from having “faith” in your son in which years of good past performance leads to the “faith” you might have in your son.

False Dilemma

Description: When only two choices are presented yet more exist, or a spectrum of possible choices exists between two extremes. False dilemmas are usually characterized by “either this or that” language, but can also be characterized by omissions of choices. Another variety is the false trilemma, which is when three choices are presented when more exist.

Logical Form:

Either X or Y is true.

Either X, Y, or Z is true.

Example (two choices):

You are either with God, or against him.

Explanation: As Obi Wan Kenobi so eloquently puts it in Star Wars episode III, “Only a Sith deals in absolutes!” There are also those who simply don’t believe there is a God to be either with or against.

Example (omission):

I thought you were a good person, but you weren’t at church today.

Explanation: The assumption here is that bad people don't go to church. Of course, good people exist who don't go to church, and good church-going people could have had a really good reason not to be in church -- like a hangover from the swingers' gathering the night before.

Hasty Generalization

Description: Drawing a conclusion based on a small sample size, rather than looking at statistics that are much more in line with the typical or average situation.

Logical Form:

Sample S is taken from population P.

Sample S is a very small part of population P.

Conclusion C is drawn from sample S.

Example #1:

My father smoked four packs of cigarettes a day since age fourteen and lived until age sixty-nine. Therefore, smoking really can't be that bad for you.

Explanation: It is extremely unreasonable (and dangerous) to draw a universal conclusion about the health risks of smoking by the case study of one man.

Example #2:

Four out of five dentists recommend Happy Glossy Smiley toothpaste brand. Therefore, it must be great.

Explanation: It turns out that only five dentists were actually asked. When a random sampling of 1000 dentists was polled, only 20% actually recommended the brand. The four out of five results was not necessarily a biased sample or a dishonest survey, it just happened to be a statistical anomaly common among small samples.

Moving the Goalposts

Description: Demanding from an opponent that he or she address more and more points after the initial counter-argument has been satisfied refusing to concede or accept the opponent's argument.

Logical Form:

Issue A has been raised, and adequately answered.

Issue B is then raised, and adequately answered.

.....

Issue Z is then raised, and adequately answered.

(despite all issues adequately answered, the opponent refuses to concede or accept the argument.

Example #1:

Ken: There has to be an objective morality because otherwise terms like “right” and “wrong” would be meaningless, since they have no foundation for comparison.

Rob: The terms “right” and “wrong” are based on cultural norms, which do have a subjective foundation -- one that changes as the moral sphere of the culture changes. The term “heavy” does not have an objective standard, yet we have no problem using that term in a meaningful way. In fact, very few relational terms have any kind of objective foundation.

Ken: But without an objective morality, we would all be lost morally as a race.

Rob: Many would say that we are.

Ken: But how can you say that torturing children for fun is morally acceptable in any situation?

Rob: Personally, I wouldn't, but you are implying that anything that is not objective must necessarily be seen in all possible ways. A feather may not be seen as “heavy” to anyone, but that doesn't mean its “lightness” is still not relative to other objects.

Ken: But God is the standard of objective morality. Prove that wrong!

Rob: That I cannot do.

Explanation: Ken starts with a statement explaining why he thinks there has to be an objective morality – a statement based on a reasonable argument that can be pursued with reason and logic. Rob adequately answers that objection, as indicated by Ken's move away from that objection to a new objection. This pattern continues until we arrive at an impossible request. Despite all the objections being adequately answered, at no time does Ken concede any points or abandon the argument.

Example #2:

Perhaps the most classic example of this fallacy is the argument for the existence of God. Due to understanding of nature through science, many of the arguments that used to be used for God (or gods) were abandoned, only to be replaced with new ones, usually involving questions to which science has not definitively answered yet. The move from creationism to intelligent design is a prime example. Currently the origin of life is a popular argument for God (although a classic argument from ignorance), and an area where we very well may have a scientific answer in the next decade, at which time, the “origin of life” argument will fade away and be replaced by another, thus moving the figurative goalposts farther back as our understanding of the natural world increases.

Exception: This fallacy should not be confused with an argument or set of arguments, with multiple propositions inherent in the argument. The reason for the difference between this kind of argument and the moving the goalposts fallacy, is a subtle one, but indicated by a strong initial claim (“has to be”, “must”,

“required for”, etc.) that gets answered and/or what appears to be ad hoc objections that follow eventually leading to an impossible request for proof.

Poisoning the Well

Description: To commit a preemptive ad hominem attack against an opponent. That is, to prime the audience with adverse information about the opponent from the start, in an attempt to make your claim more acceptable, or discount the credibility of your opponent’s claim.

Logical Form:

Adverse information (be it true or false) about person 1 is presented.

Therefore, the claim(s) of person 1 will be false.

Example #1:

Tim: Boss, you heard my side of the story why I think Bill should be fired and not me. Now, I am sure Bill is going to come to you with some pathetic attempt to weasel out of this lie that he has created.

Explanation: Tim is poisoning the well by priming his boss by attacking Bill’s character, and setting up any defense Bill might present as “pathetic”. Tim is committing the fallacy here, but if the boss were to accept Tim’s advice about Bill, she, too, would be committing the fallacy.

Example #2:

I hope I presented my argument clearly. Now, my opponent will attempt to refute my argument by his own fallacious, incoherent, illogical version of history.

Explanation: Not a very nice setup for the opponent. As an audience member, if you allow any of this “poison” to affect how you evaluate the opponent’s argument, you are guilty of fallacious reasoning.

Red Herring (*Ignoratio Elenchi*)

Description: Attempting to redirect the argument to another issue that to which the person doing the redirecting can better respond. While it is similar to the avoiding the issue fallacy, the red herring is a deliberate diversion of attention with the intention of trying to abandon the original argument.

Logical Form:

Argument A is presented by person 1.

Person 2 introduces argument B.

Argument A is abandoned.

Example #1:

Mike: It is morally wrong to cheat on your spouse, why on earth would you have done that?

Ken: But what is morality exactly?

Mike: It's a code of conduct shared by cultures.

Ken: But who creates this code?...

Explanation: Ken has successfully derailed this conversation off of his sexual digressions to the deep, existential, discussion on morality.

Example #2:

Billy: How could the universe be 6000 years old when we know the speed of light, the distance of astronomical objects (13+ billion light years away), and the fact that the light has reached us?

Marty: 6000 years is not a firm number. The universe can be as old as about 10,000 years.

Billy: How do you figure that?...

Explanation: Marty has succeeded in avoiding the devastating question by introducing a new topic for debate... shifting the young-earth creation timeline where it does not necessarily coincide with the Bible.

Variation: Using judgmental language is using insulting, compromising or pejorative language to influence the recipient's judgment, and take the attention off the real argument.

Slippery Slope

Definition: When a relatively insignificant first event is suggested to lead to a more significant event, which in turn leads to a more significant event, and so on, until some ultimate, significant event is reached, where the connection of each event is not only unwarranted, but with each step it becomes more and more improbable. Many events are usually present in this fallacy, but only two are actually required – usually connected by “the next thing you know...”

Logical Form:

If A, then B, then C, ... then ultimately Z!

Example #1:

We cannot unlock our child from the closet because if we do, she will want to roam the house. If we let her roam the house, she will want to roam the neighborhood. If she roams the neighborhood, she will get picked up by a stranger in a van, who will sell her in a sex slavery ring in some other country. Therefore, we should keep her locked up in the closet.

Explanation: In this example, it starts out with reasonable effects to the causes. For example, yes, if the child is allowed to go free in her room, she would most likely want to roam the house – 95% probability estimate.

Sure, if she roams the house, she will probably want the freedom of going outside, but not necessarily “roaming the neighborhood”, but let’s give that a probability of say 10%. Now we start to get very improbable. The chances of her getting picked up by a stranger (.05%) in a van (35%) to sell her into sex slavery (.07%) in another country (40%) is next to nothing when you do all the math:

$.95 \times .10 \times .0005 \times .35 \times .0007 \times .4 = \text{about 1 in 25,000,000.}$

Morality and legality aside, is it really worth it to keep a child locked in a closet based on those odds?

Example #2:

If you accept that the story of Adam and Eve was figurative, then you will do the same for most of the Old Testament stories of similar literary styles. Once you are there, the New Testament and the story of Jesus does not make sense, which will lead you to believe that the resurrection of Jesus was a “spiritual” one. Once you accept that, you won’t be a Christian anymore, you will be a dirty atheist, and then you will have no morals and start having sex with animals of a barnyard nature. So you better take the story of Adam and Eve literally, before the phrase, “that chicken looks delicious”, takes on a whole new meaning.

Explanation: Accepting the story of Adam and Eve as figurative rarely (it is sad that I cannot confidently say “never”) leads to bestiality.

Strawman Fallacy

Description: Substituting a person’s actual position or argument with a distorted, exaggerated, or misrepresented version of the position of the argument.

Logical Form:

Person 1 makes claim Y.

Person 2 restates person 1’s claim (in a distorted way).

Person 2 attacks the distorted version of the claim.

Therefore, claim Y is false.

Example #1:

Ted: Biological evolution is both a theory and a fact.

Edwin: That is ridiculous! How can you possibly be absolutely certain that we evolved from pond scum!

Ted: Actually that is a gross misrepresentation of my assertion. I never claimed we evolved from pond scum. Unlike math and logic, science is based on empirical evidence and, therefore, a scientific fact is something that is confirmed to such a degree that it would be perverse to withhold provisional consent. The empirical evidence for the fact that biological evolution does occur falls into this category.

Explanation: Edwin has ignorantly mischaracterized the argument by a) assuming we evolved from pond scum (whatever that is exactly), and b) assuming “fact” means “certainty”.

Example #2:

Zebedee: What is your view on the Christian God?

Mike: I don't believe in any gods, including the Christian one.

Zebedee: So you think that we are here by accident, and all this design in nature is pure chance, and the universe just created itself?

Mike: You got all that from me stating that I just don't believe in any gods?

Explanation: Mike made one claim: that he does not believe in any gods. From that, we can deduce a few things, like he is not a theist, he is not a practicing Christian, Catholic, Jew, or a member of any other religion that requires the belief in a god, but we cannot deduce that he believes we are all here by accident, nature is chance, and the universe created itself. Mike might have no beliefs about these things whatsoever. Perhaps he distinguishes between “accident” and natural selection, perhaps he thinks the concept of design is something we model after the universe, perhaps he has some detailed explanation based on known physics as to how the universe might have first appeared, or perhaps he believes in some other supernatural explanation. Regardless, this was a gross mischaracterization of Mike's argument.

Tautology (Rhetorical)

It is an unnecessary or unessential (and sometimes unintentional) repetition of meaning, using different and dissimilar words that effectively say the same thing. In other words, using the object of expression in the definition of the object.

For example:

“The orange has an orange smell.”

“Many people losing jobs lead to unemployment.”

“When a person suffocates and becomes cyanotic, they appear to have bluish skin.”

NOTES

The Intellectual Standards of Thought

Clarity

Could you elaborate further?
Could you give me an example?
Could you illustrate what you mean?

Accuracy

How could we check on that?
How could we find out if that is true?
How could we verify or test that?

Precision

Could you be more specific?
Could you give me more details?
Could you be more exact?

Relevance

How does that relate to the problem?
How does that bear on the question?
How does that help us with the issue?

Depth

What factors make this a difficult problem?
What are some of the complexities of this question?
What are some of the difficulties we need to deal with?

Breadth

Do we need to look at this from another perspective?
Do we need to consider another point of view?
Do we need to look at this in other ways?

Logic

Does all this make sense together?
Does your first paragraph fit in with your last?
Does what you say follow from the evidence?

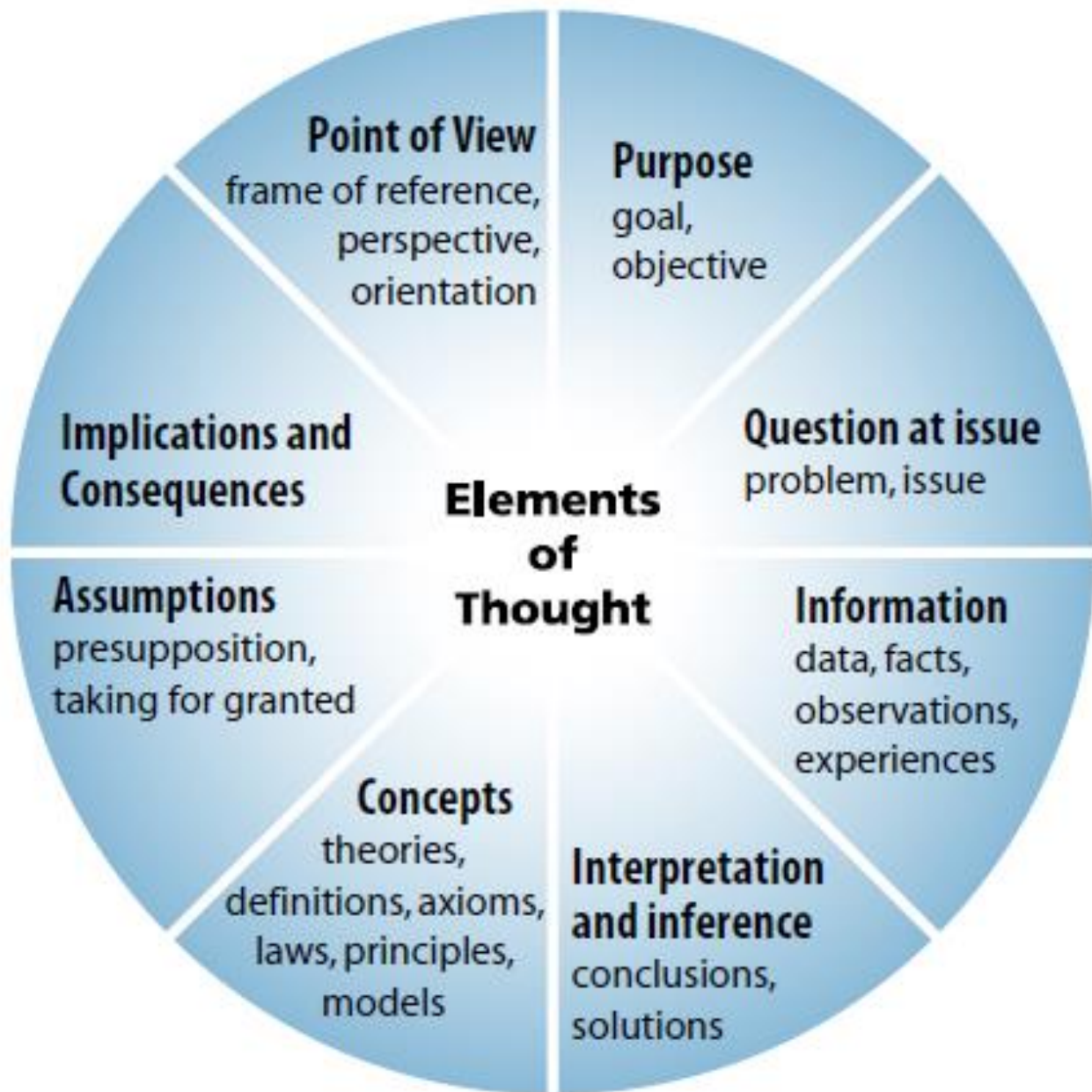
Significance

Is this the most important problem to consider?
Is this the central idea to focus on?
Which of these facts are most important?

Fairness

Do I have any vested interest in this issue?
Am I sympathetically representing the viewpoints of others?

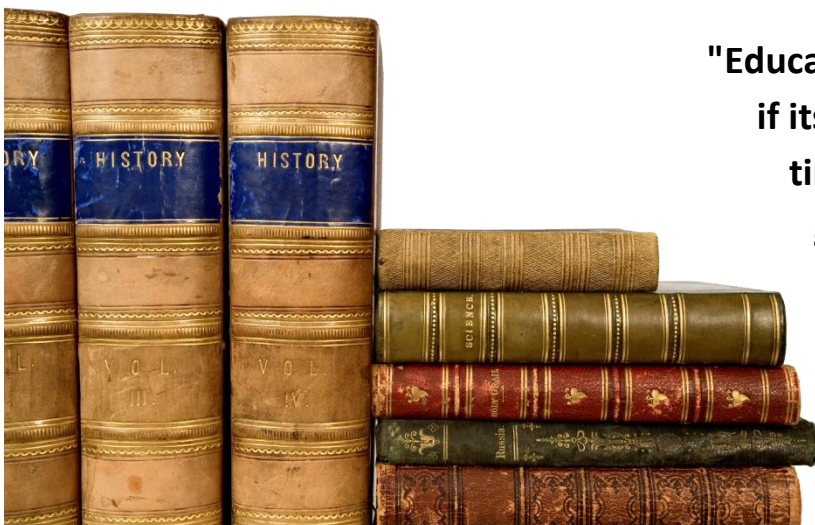
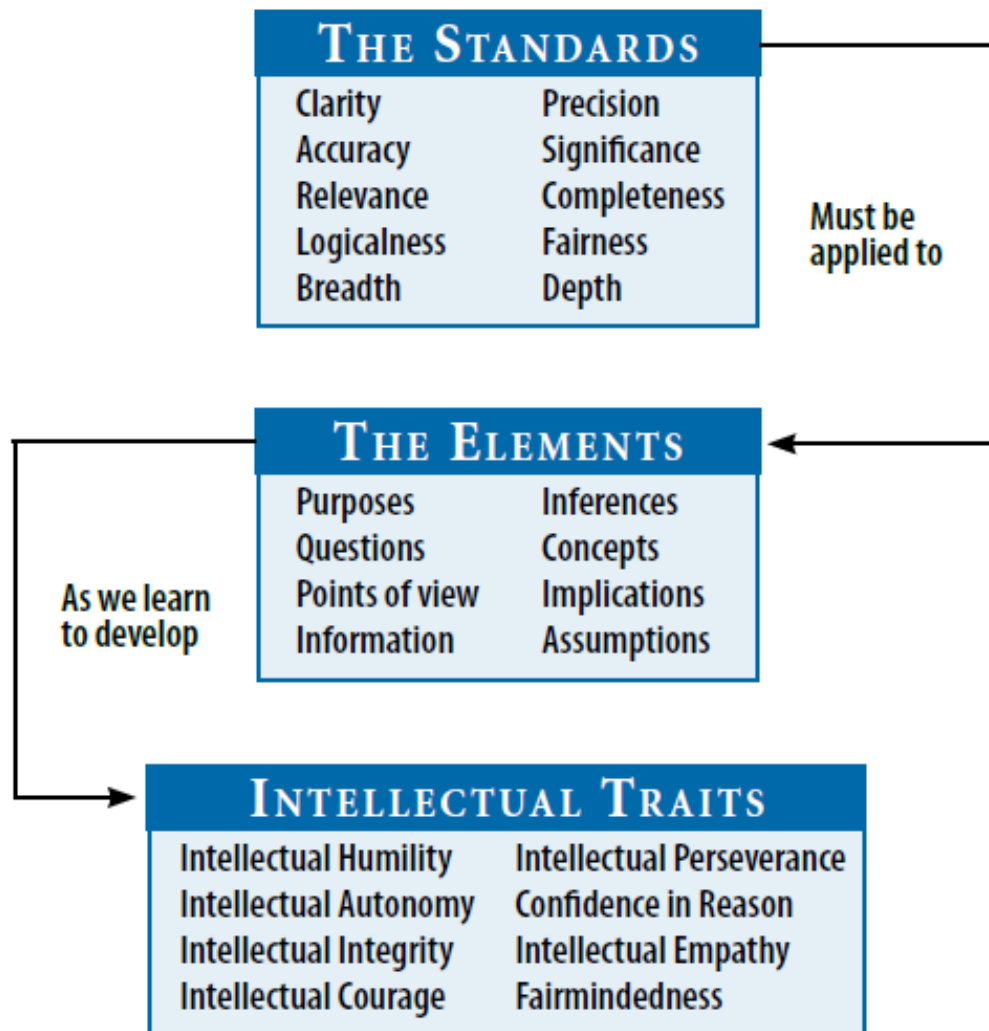
The Elements of Thought



Used With Sensitivity to Universal Intellectual Standards

Clarity → Accuracy → Depth → Breadth → Significance
Precision
Relevance

The Standards, Elements, and Traits of Thought



"Education would be much more effective if its purpose was to ensure that by the time they leave school every boy and girl should know how much they do not know, and be imbued with a lifelong desire to know it."

~ William Haley