


Dr Ro presents:



Organised by
 CENTER FOR ADVANCED RESEARCH AND DEVELOPMENT (CARD), ODISHA
 In Association with IIM Sambalpur & Central University of Odisha, Koraput

LOGIC AND CRITICAL THINKING


THE MISSING LINK?

Angelos Rodafinos

It all started with ...




A small lie?



Confirmation bias

The world was created 6,000 yrs. ago


"Evidence Against Evolution"



kialo Explore Tour Create


A unique tool for teaching critical thinking. Empower your students to develop critical thinking skills within the classroom.

Discussions (2 results)



Is believing in Santa Claus beneficial for children?

36 / 86 / 7 / 13 / 511




Should parents perpetuate myths like Santa Claus and the Easter Bunny to their children?

305 / 884 / 43 / 28 / 920

It is beneficial for children to believe in Santa Claus.

Pros	Cons
<p>Belief in Santa Claus improves magical thinking in young children, which has been linked to cognitive developmental benefits such as improved lateral thinking and creativity Magical Thinking and Children's Cognitive Development</p>	<p>It's figure replaces parents as potential providers of rewards for well behaviour. When the reveal occurs, it's disappearance may cause the loss of such figure in general, which could lead to instability to the child's view on reward/consequences on its actions, since it becomes unlikely for the parents to take that place again, because of trust loss.</p>
<p>Believing in Santa Claus can teach children a valuable lesson about generosity. They will want to emulate Santa.</p>	<p>Santa is unfair (rich Santa is more generous than poor Santa).</p>

The domino fallacy



SLIPPERY SLOPE

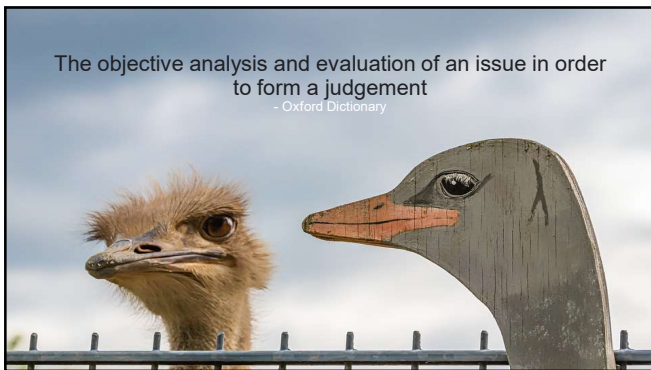
Contents

- The problem
- What's the harm
- Obstacles
- How do I find the truth
- Quick wins



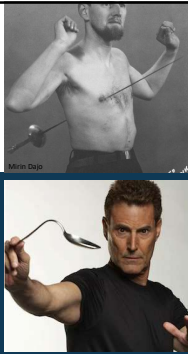
CRITICAL THINKING is

ICOMEU
International Conference on Management of Information and Systems



How do you know?

There are two forms of knowledge: one legitimate, one bastard. To the latter form belong all the following: sight, hearing, smell, taste, touch.
- Democritus



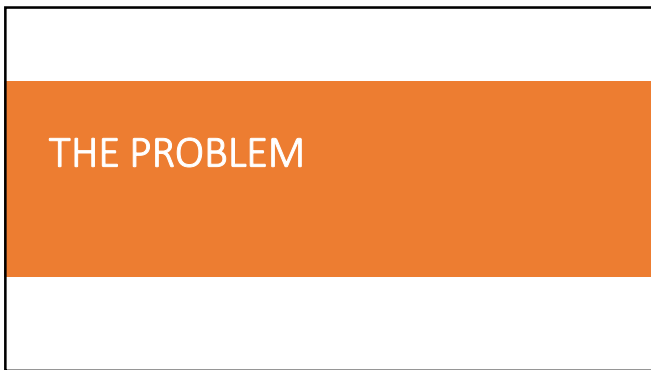
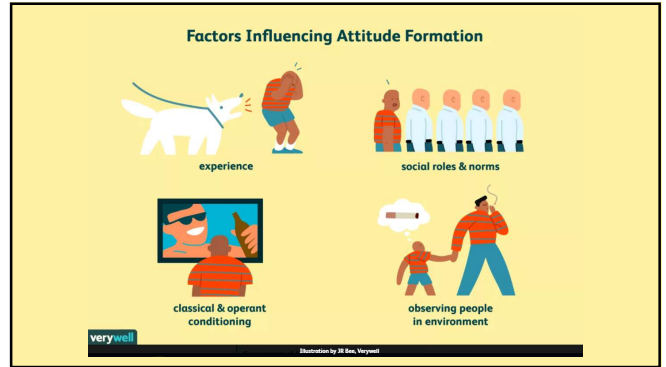
Theory of knowledge

The set of rules you follow to decide what to believe

Belief formation

Evidence
- by others
- selected by us






Miracles happen
 Homeopathy is a science
 The sun revolves around the earth
 Chemtrails are real
 Astrology is a science
 Too much science - instead of faith
 I pray for cure

<https://directpoll.com/c?XDVhEtFCE1.1lChfbNdU3GezO5XoluBk>

Is it serious, Doc?

- Too much science - instead of faith 58%
- Miracles 56%
- The evil eye 54%
- Cancer treatment is withheld 40%
- Homeopathy is a science 40%
- The sun revolves around the earth 33%
- I pray for cure 33%
- Chemtrails 29%
- Astrology is a science 15%





WIKIPEDIA
The free encyclopedia

List of common misconceptions
From Wikipedia, the free encyclopedia

This list is incomplete; you can help by adding missing items with red links.

This is a list of **common misconceptions**. Each entry is worded as a statement. These entries are concise summaries of the main subject articles, which you can find by clicking on the red link.

Contents [hide]

- Arts and culture
 - Food and cooking
 - Food history
 - 1.1.2 Microwave ovens
 - Law, crime, and military
 - Literature
 - Music
 - Religion
 - 1.5.1 Buddhism
 - 1.5.2 Judaism
- Science
 - Physics
 - Astronomy and space sciences
 - Earth science
 - Biology
 - Psychology
 - Health and medicine
 - Racial theories
 - Paranormal and ufology
- History
 - Religion and Science
 - 4.1 Creation science

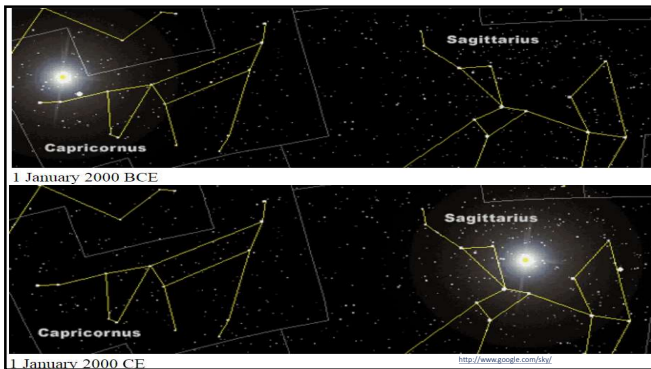
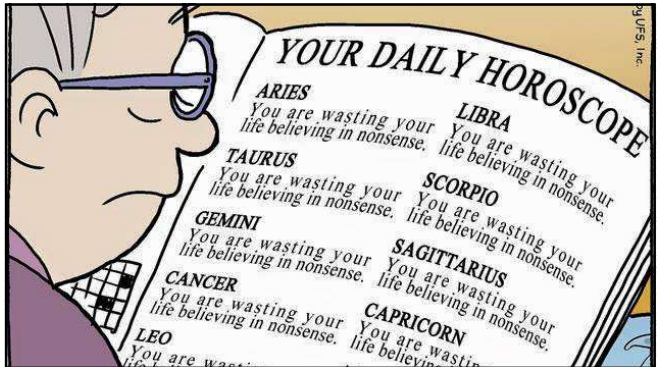
List of pseudosciences
From Simple English Wikipedia, the free encyclopedia

This article may have too many red links (2014)

This is a list of topics that have been characterized as pseudoscience

Contents [hide]

- Science
 - 1.1 Physics
 - 1.2 Astronomy and space sciences
 - 1.3 Earth science
 - 1.4 Biology
 - 1.5 Psychology
 - 1.6 Health and medicine
 - 1.7 Racial theories
- Paranormal and ufology
- History
 - Religion and Science
 - 4.1 Creation science



TRADITIONAL ASTROLOGICAL DATES			ACTUAL ASTRONOMICAL DATES TODAY (c. 2000 CE)		
Constellation	Date Span	Days	Constellation	Date Span	Days
Aries	21 Mar - 19 Apr	30	Aries	19 Apr - 13 May	25
Taurus	20 Apr - 20 May	31	Taurus	14 May - 19 Jun	37
Gemini	21 May - 20 Jun	31	Gemini	20 Jun - 20 Jul	31
Cancer	21 Jun - 22 Jul	32	Cancer	21 Jul - 9 Aug	20
Leo	23 Jul - 22 Aug	31	Leo	10 Aug - 15 Sep	37
Virgo	23 Aug - 22 Sep	31	Virgo	16 Sep - 30 Oct	45
Libra	23 Sep - 22 Oct	30	Libra	31 Oct - 22 Nov	23
Scorpio	23 Oct - 21 Nov	30	Scorpius	23 Nov - 29 Nov	7
			Ophiuchus	30 Nov - 17 Dec	18
Sagittarius	22 Nov - 21 Dec	30	Sagittarius	18 Dec - 18 Jan	32
Capricorn	22 Dec - 19 Jan	29	Capricornus	19 Jan - 15 Feb	28
Aquarius	20 Jan - 18 Feb	30	Aquarius	16 Feb - 3/11	24-25
Pisces	19 Feb - 20 Mar	30-31	Pisces	12 Mar - 18 Apr	38

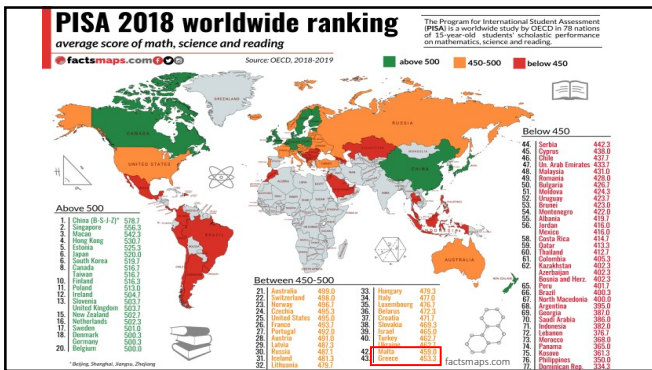
Higher education has failed to meet society's requirements for well-educated citizens

- Gardiner (1995)




School children lack training in critical thinking skills.

GR students' performance in science literacy, mathematics and reading is one of the lowest in the EU.



Opinion vs Fact



SAKATOBRIA

"Earthquakes are caused by the Jeans-Wearing Women"


What's the harm?



Deciding, choosing, acting

Money, politics, relationships, health, global issues

Progress



BACKWARD RUNNING
www.reversecounting.com

Financial

1



The Ghost Meter EMF Sensor
Brand: Alternative Tech International
★★★★☆ 1,229 ratings

Price: \$49.95 + \$28.33 Shipping & Import Fee

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- Low- or no-light operation
- Fully-adjustable audio tone
- Flashing led lights
- Signal-strength indicator

See more product details

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Report incorrect product information.

<https://www.amazon.com/The-Ghost-Meter-EMF-Sensor/>

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RIGHT DECISIONS x RIGHT TIME x RIGHT PLACE = GOOD LUCK



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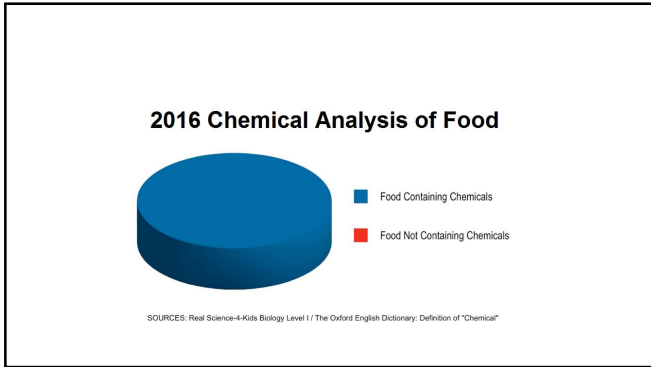
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Before After



<http://www.foxnews.com/health/2018/05/22/organic-diet-boosts-income/>



Ethical

Employing the services of frauds, cheats and con artists.

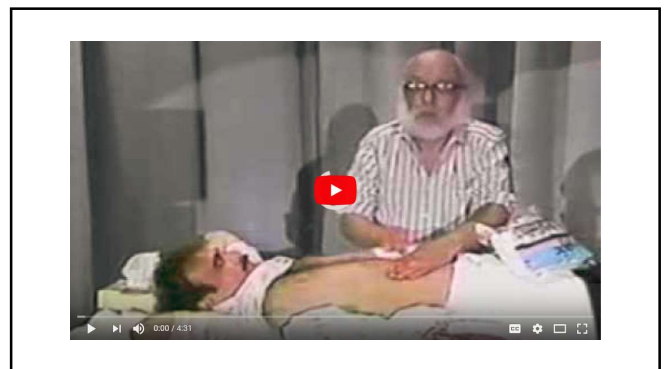
2

A. Knows it's worthless and sells it

B. Does not know





Health

3





Covldiots

 INDIA/ARABIA Camel/cow dung	 IRAN Industrial methanol 300 dead 1000 hospitalized	 S. KOREA church service ... Salt water spray - 46 cases	 GREECE Holly communion
--	---	---	---

HOW DO I FIND THE TRUTH

Logic & Arguments

IF {THAT}
THEN {THIS}

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Human beings are rational animals
- Aristotle

Except ... when they are not.
- Kahneman & Tversky

How
Does Santa fit in the chimney?

What
Did the animals eat?

Why
Do churches need lightning rods?

LOGICAL FALLACIES

thou shalt not commit logical fallacies

But I wore the juice!
- McArthur Wheeler

Argument from authority

X is true because Y said it.



Donald J. Trump
@realDonaldTrump

The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.

RETWEETS 105,514 LIKES 67,781

2:15 PM - 6 Nov 2012

Argument from history

X is true because it has been believed for so long.



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Argument from ignorance

We do not know where the virus came from. Therefore...



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Conspiracy theories

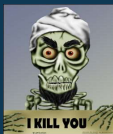
FLOURISH IN UNCERTAINTY
Need to feel in control



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Availability heuristic

Terrorists



Toddlers



Number of Americans killed annually by:

Islamic jihadist immigrants ¹ :	2
Far right-wing terrorists ¹ :	5
All Islamic jihadist terrorists (including US citizens) ¹ :	9
Armed toddlers ² :	21
Lightning ³ :	31
Lawnmowers ⁴ :	69
Being hit by a bus ⁴ :	264
Falling out of bed ⁴ :	737
Being shot by another American ⁵ :	11,737

¹10-year average of terrorist attacks "Deadly Attacks Since 9/11," New America, <http://securitydata.newamerica.net/terrorism/deadly-attacks.html>

²www.snopes.com/toddlers-killed-americans-terrorists/

³10-year average of deaths by lightning, NOAA, www.noaa.gov/owh/hazstat/resources/weather_fatalities.pdf

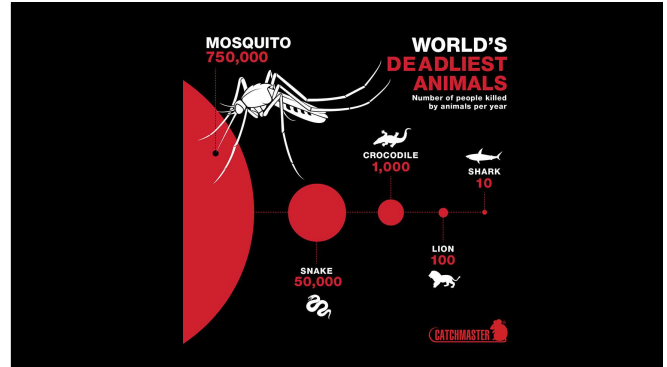
⁴10-year average, Underlying Cause of Death 2014, CDC, <http://wonder.cdc.gov/>

Numeracy

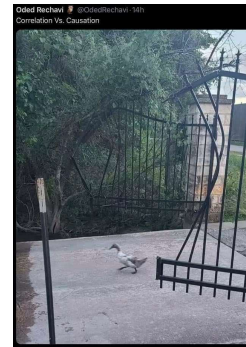
Car accidents



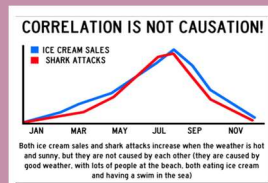
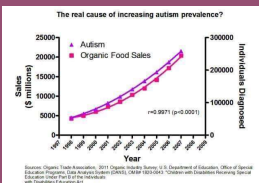
Shark attacks



Post hoc ergo propter hoc



False cause




Argument from popularity

Idea X is popular, therefore correct.
So many people can't be wrong!

If Christianity is right: 5,000,000,000 people are wrong.
If Islam is right: 5,500,000,000 people are wrong.
If Hinduism is right: 6,000,000,000 people are wrong.

Anecdotal evidence

X is true because it worked for me




Dozens of satisfied consumers

Double blind RCT at Yale ...

All "alternative medicines" rely on the same "evidence"

	Anecdotes	Blogs/websites	Youtube videos	Appeals to nature	Appeals to antiquity	Conspiracy theories	A consistent body of rigorous scientific studies
Turpentine	✓	✓	✓	✓	✓	✓	✗
Acupuncture	✓	✓	✓	✓	✓	✓	✗
Chiropractic	✓	✓	✓	✓	✓	✓	✗
Crystal healing	✓	✓	✓	✓	✓	✓	✗
Homeopathy	✓	✓	✓	✓	✓	✓	✗
MMS	✓	✓	✓	✗	✗	✓	✗
Bleach enemas	✓	✓	✓	✗	✗	✓	✗
Cancer "cures"	✓	✓	✓	✓	✓	✓	✗

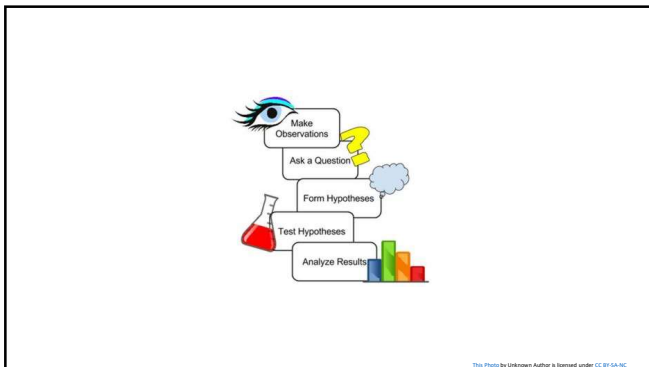
Science is

A logical thought process

- Self-correcting

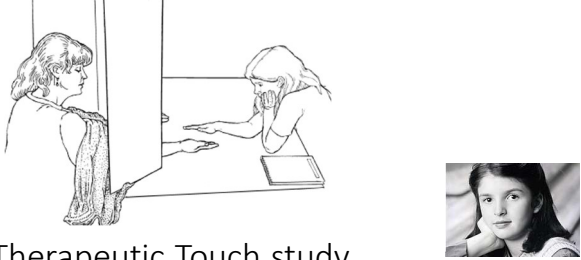
Based on observing

- i.e. experimentation



"I did¹ my own² research³"

1 watched
2 someone else's
3 shitty youtube video



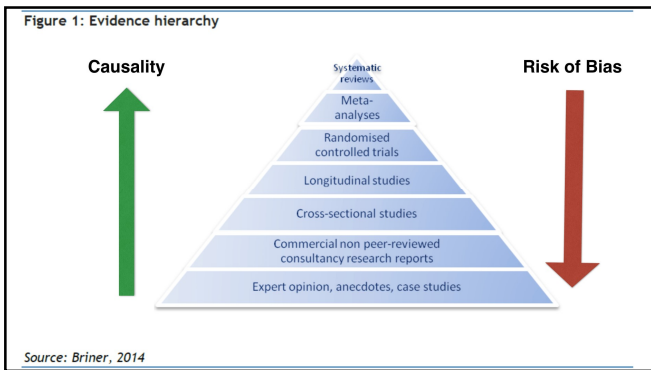
Therapeutic Touch study

Emily Rosa
https://en.wikipedia.org/wiki/Emily_Rosa

Dowsing from Enemies of Reason



1:24 / 5:00
http://www.youtube.com/watch?v=iMPz0hggYY&feature=player_embedded



WHAT CAN WE DO?

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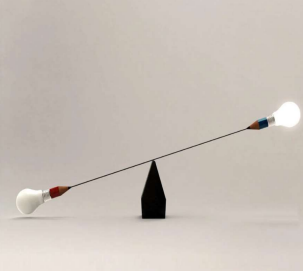
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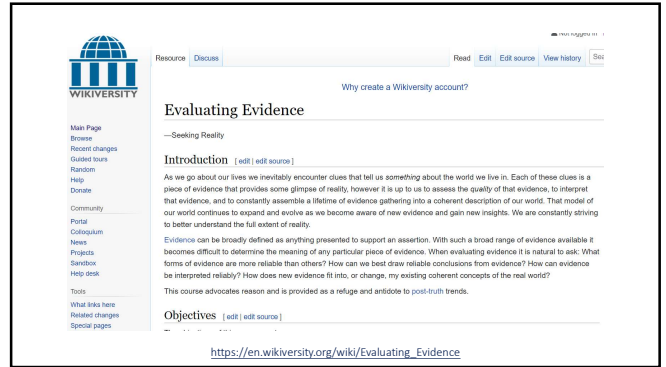
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Weighing the evidence

How do you decide what to believe?



Wikiversity

Why create a Wikiversity account?

Evaluating Evidence

— Seeking Reality

Introduction [edit | edit source]

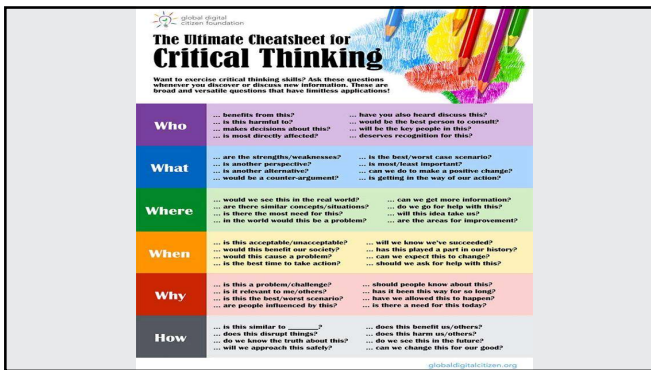
As we go about our lives we inevitably encounter clues that tell us something about the world we live in. Each of these clues is a piece of evidence that provides some glimpse of reality, however it is up to us to assess the quality of that evidence, to interpret that evidence, and to constantly assemble a lifetime of evidence gathering into a coherent description of our world. That model of our world continues to expand and evolve as we become aware of new evidence and gain new insights. We are constantly striving to better understand the full extent of reality.

Evidence can be broadly defined as anything presented to support an assertion. With such a broad range of evidence available it becomes difficult to determine the meaning of any particular piece of evidence. When evaluating evidence it is natural to ask: What forms of evidence are more reliable than others? How can we best draw reliable conclusions from evidence? How can evidence be interpreted reliably? How does new evidence fit into, or change, my existing coherent concepts of the real world?

This course advocates reason and is provided as a refuge and antidote to post-truth trends.

Objectives [edit | edit source]

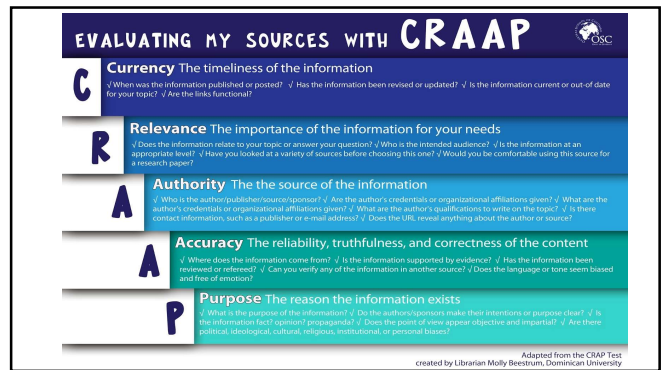
https://en.wikiversity.org/wiki/Evaluating_Evidence



The Ultimate Cheatsheet for Critical Thinking

Want to exercise critical thinking skills? Ask these questions whenever you discover or discuss new information. These are broad and versatile questions that have timeless applications!

Who	... benefits from this? ... is this harmful to? ... makes decisions about this? ... is most directly affected?	... have you also heard discuss this? ... would be the best person to consult? ... will be the key people in this? ... observe recognition for this?
What	... are the strengths/weaknesses? ... is another perspective? ... is another alternative? ... would be a counter-argument?	... is the best/worst case scenario? ... is most/least important? ... can we do to make a positive change? ... is getting in the way of our action?
Where	... would we see this in the real world? ... are there similar concepts/situations? ... is there the most need for this? ... is the world would this be a problem?	... can we get more information? ... do we go for help with this? ... will this idea take us? ... are the areas for improvement?
When	... is this acceptable/unacceptable? ... would this benefit our society? ... would this cause a problem? ... is the best time to take action?	... will we know we've succeeded? ... has this already a part in our history? ... can we expect this to change? ... should we look for help with this?
Why	... is this a problem/challenge? ... is it relevant to me/others? ... is this the best/worst scenario? ... are people influenced by this?	... should people know about this? ... has it been this way for so long? ... have we allowed this to happen? ... is there a need for this today?
How	... is this similar to...? ... does this diverge things? ... do we know the truth about this? ... will we approach this safely?	... does this benefit us/others? ... does this harm us/others? ... do we see this in the future? ... can we change this for our good?



EVALUATING MY SOURCES WITH CRAAP

Currency The timeliness of the information
 ✓ When was the information published or posted? ✓ Has the information been revised or updated? ✓ Is the information current or out-of-date for your topic? ✓ Are the links functional?

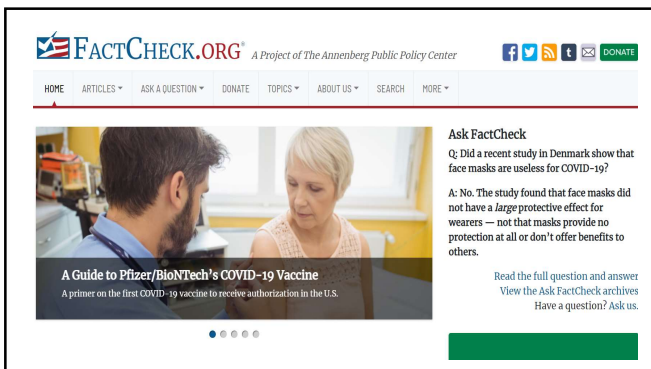
Relevance The importance of the information for your needs
 ✓ Does the information relate to your topic or answer your question? ✓ Who is the intended audience? ✓ Is the information at an appropriate level? ✓ Have you looked at a variety of sources before choosing this one? ✓ Would you be comfortable using this source for a research paper?

Authority The source of the information
 ✓ Who is the author/publisher/source/sponsor? ✓ Are the author's credentials or organizational affiliations given? ✓ What are the author's credentials or organizational affiliations given? ✓ What are the author's qualifications to write on the topic? ✓ Is there contact information, such as a publisher or e-mail address? ✓ Does the URL reveal anything about the author or source?

Accuracy The reliability, truthfulness, and correctness of the content
 ✓ Where does the information come from? ✓ Is the information supported by evidence? ✓ Has the information been reviewed or referenced? ✓ Can you verify any of the information in another source? ✓ Does the language or tone seem biased and free of emotion?

Purpose The reason the information exists
 ✓ What is the purpose of the information? ✓ Do the author/sponsors make their intentions or purpose clear? ✓ Is the information fact/opinion/propaganda? ✓ Does the point of view appear objective and impartial? ✓ Are there political, ideological, cultural, religious, institutional or personal biases?

Adapted from the CRAAP Test created by Librarian Molly Beaulieu, Dominican University.



FACTCHECK.ORG A Project of The Annenberg Public Policy Center

HOME ARTICLES ASK A QUESTION DONATE TOPICS ABOUT US SEARCH MORE

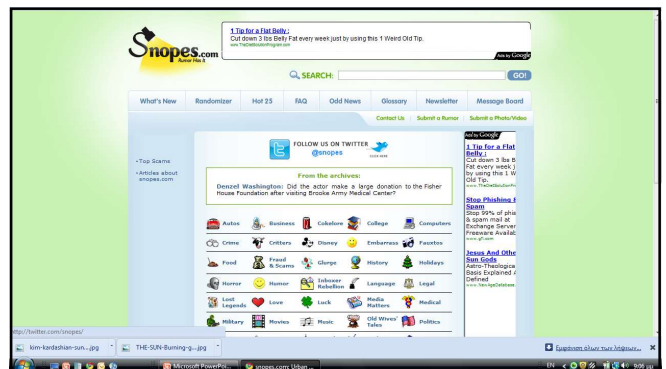
Ask FactCheck

Q: Did a recent study in Denmark show that face masks are useless for COVID-19?

A: No. The study found that face masks did not have a large protective effect for wearers — not that masks provide no protection at all or don't offer benefits to others.

A Guide to Pfizer/BioNTech's COVID-19 Vaccine
 A primer on the first COVID-19 vaccine to receive authorization in the U.S.

Read the full question and answer
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Snopes.com

1. The Sic a Fat Rally: Cut down 100 daily fat every week! just by using this 1 Word Of The Day!

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Science > DOGMA

Science-loving Skeptics

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Go on to So You Think You're A Sceptic!

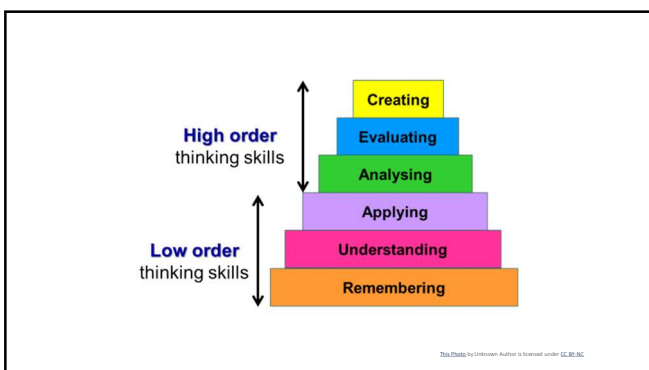
Ask The Friendly Skeptics

Public group · 1.9K members



Education is not the learning of facts but training the mind to think

- Alexander the Great



Learning how to learn

- Rodafinos The Great

Petition

Make "critical thinking" a mandatory subject in secondary school.

Critical thinking skills will allow the UK populous to improve their decision making process. Making critical thinking mandatory in schools will lead to future generations being better equipped to question what they are told in terms of facts and feasibility.

[▶ More details](#)

UK & Scotland

Credibility of Evidence

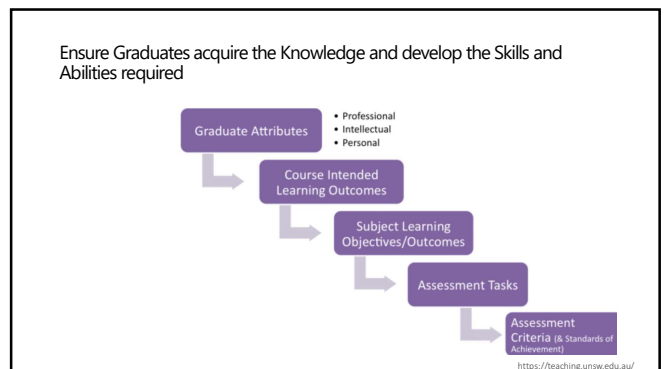
Assessing and Developing Arguments

in 2020

Top 10 skills

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

World Economic Forum



UTS Business School

All **UTS Business School** courses have a set of GAs and program learning objectives (equivalent to course intended learning outcomes). The GAs are:

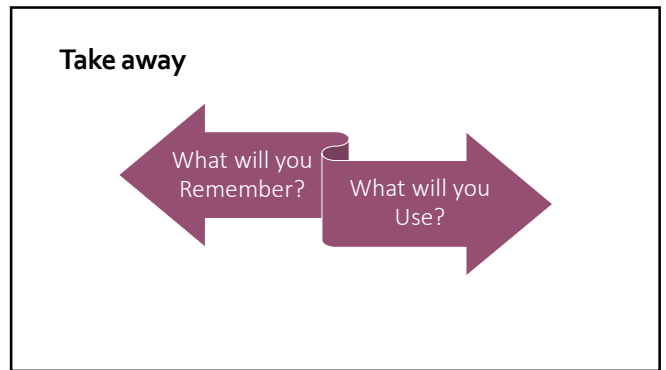
- business knowledge and concepts
- critical thinking, creativity and analytical skills
- communication and interpersonal skills
- attitudes and values
- business practice oriented skills

ENDING THOUGHTS

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Teachers should prepare the student for the student's future, not for the teacher's past.

- Richard Hamming



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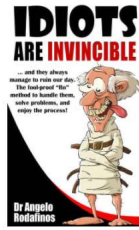
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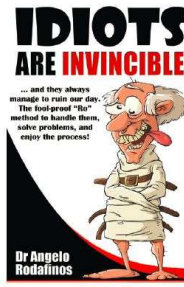
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