Erasmus+

Pushing Pseudoscience over the Edge of the World

"Wise and Inventive Screen@gers" - Be wise, be inventive, be media literate.

May 9th, 2019 - Day 4

Andrei Sapera

Goals & Objectives

- Build upon the concepts introduced by Andreea & Ovidiu
- Continue the conversation around “digital literacy” in the realm of science & pseudoscience
- Share some of my experience and thoughts
- Add a “pop science” dimension to your digital identity
- Look into a few definitions, basic notions and concepts related to our main topics
- Learn while testing your knowledge (Kahoot!)
- Absorb new information and find some inspiration
- Have fun!

Rules for today!

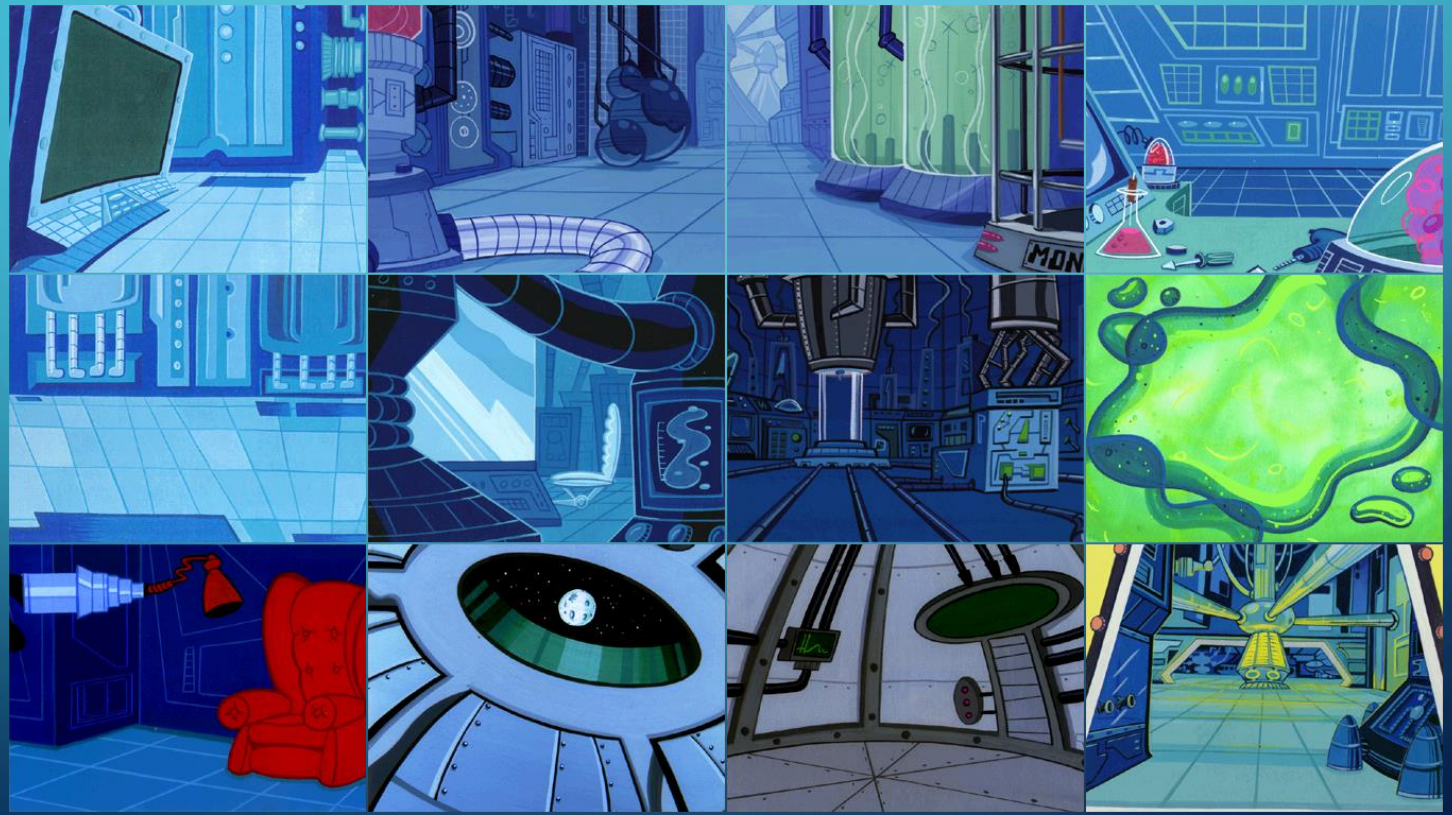
- Pick a nickname for the day! (Kahoot time!)
- Feel free to interrupt me anytime
- Raise your hand & Ask me anything! (There’s no such thing as a silly question)
- Ask a friend!
- Keep your phones close, but try not to drain the battery too quickly!
- Focus! Focus! Focus!
- You will have fun!

Agenda!

1. Welcome to my World
2. Science!
3. Pseudoscience?
4. Science vs. Pseudoscience!
5. Preparing for the Future(s)
6. Quizzes & RPG exercise
7. Food for thought & Conclusions

“What a fine day for Science!” - Energizer (5 min)

Part 1: Welcome to my World!



Who am I?

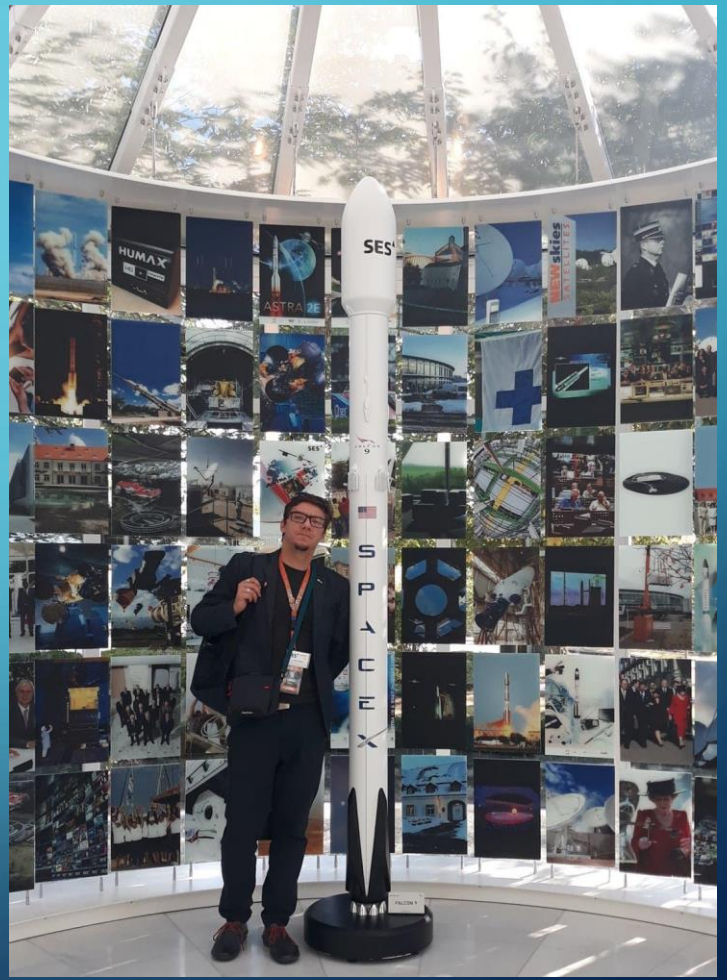
Short Bio:

- Born in 1988, Tulcea
- Grew up with Lego, Cartoon Network, piano & classical music, dinosaurs, Sci-Fi books and films;
- 1999 - 2003: Music School
- 2003 - 2007: “Spiru Haret” High-school, Tulcea
- 2007 - 2010: BSc in Business & International Affairs, Bucharest, Ro
- 2010 - 2012: MSc x 2 in Geopolitics & Political Economy (Ro & Norway)
- 2012 - 2015: Market Research, Nielsen, Bucharest, Ro
- 2015 - 2017: “Space Economy 2.0”, ESA/ESTEC, Netherlands
- 2018: International Space University SSP18, Delft, NL


STAR WARS
ROGUE ONE
USA

LEGO Saturn V

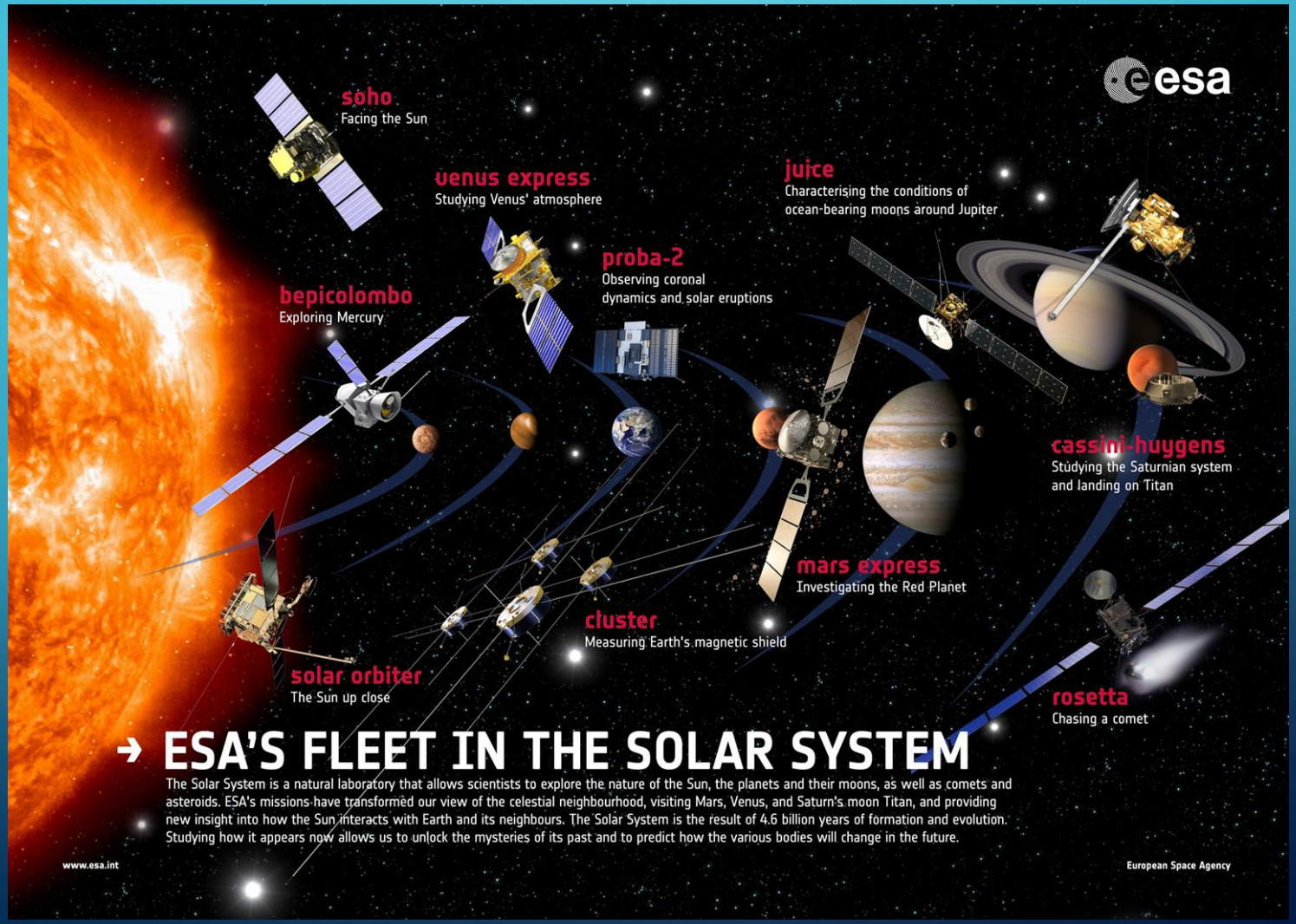
European Astronaut Centre, Cologne

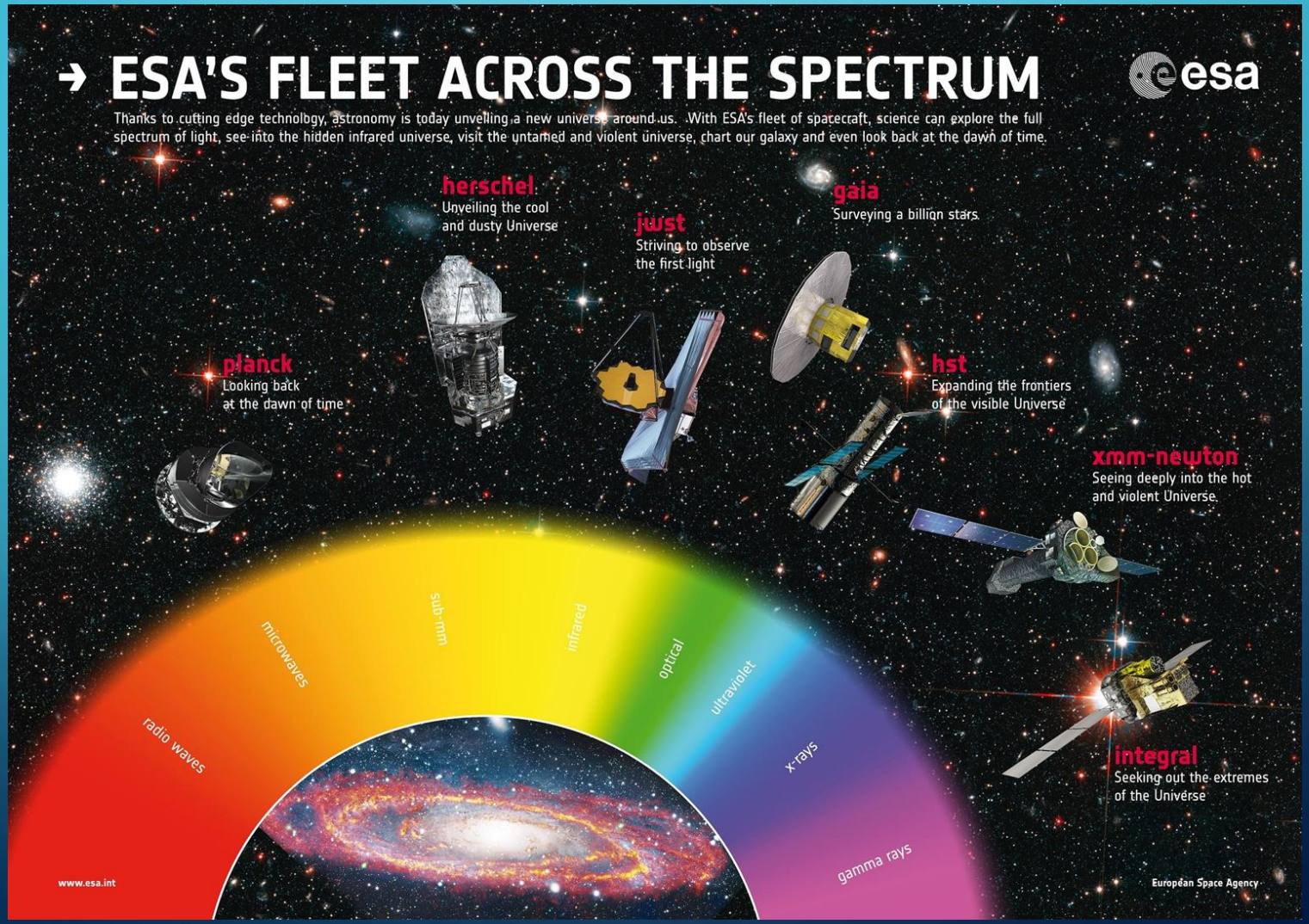


SES, Luxembourg

May the Force be with you always!

ESA/ESTEC, Netherlands


esa
soho
Facing the Sun
venus express
Studying Venus' atmosphere
juice
Characterising the conditions of ocean-bearing moons around Jupiter
proba-2
Observing coronal dynamics and solar eruptions
bepicolombo
Exploring Mercury
cassini-huygens
Studying the Saturnian system and landing on Titan
mars express
Investigating the Red Planet
cluster
Measuring Earth's magnetic shield
solar orbiter
The Sun up close
rosetta
Chasing a comet
ESA'S FLEET IN THE SOLAR SYSTEM
The Solar System is a natural laboratory that allows scientists to explore the nature of the Sun, the planets and their moons, as well as comets and asteroids. ESA's missions have transformed our view of the celestial neighbourhood, visiting Mars, Venus, and Saturn's moon Titan, and providing new insight into how the Sun interacts with Earth and its neighbours. The Solar System is the result of 4.6 billion years of formation and evolution. Studying how it appears now allows us to unlock the mysteries of its past and to predict how the various bodies will change in the future.
www.esa.int
European Space Agency


ESA'S FLEET ACROSS THE SPECTRUM
esa
Thanks to cutting edge technology, astronomy is today unveiling a new universe around us. With ESA's fleet of spacecraft, science can explore the full spectrum of light, see into the hidden infrared universe, visit the untamed and violent universe, chart our galaxy and even look back at the dawn of time.
herschel
Unveiling the cool and dusty Universe
jwst
Striving to observe the first light
gaia
Surveying a billion stars
planck
Looking back at the dawn of time
hst
Expanding the frontiers of the visible Universe
xmm-newton
Seeing deeply into the hot and violent Universe
integral
Seeking out the extremes of the Universe
radio waves
microwaves
sub-mm
infrared
optical
ultraviolet
x-rays
gamma rays
www.esa.int
European Space Agency

Advanced Concepts Team, ESA/ESTEC

ESA | PREPARING FOR THE FUTURE | ACT

Overview
- The team
- Who we are
- Who we were
- Join the team

– Research
- Advanced Materials
- Artificial Intelligence
- Bio-Engineering
- Biomimetics
- Earth System Science
- Energy Systems
- Fundamental Physics
- Habitats
- Informatics
- Management Science
- Mission Analysis
- Propulsion

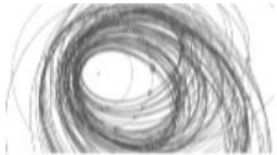
ESA > Our Activities > Preparing for the Future > ACT

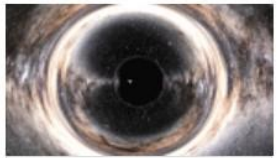
Archive

Search here

Related Links


Kelvin's competition platform


GTOC portal


Black Hole Shadows

ESA’s ACT


We are ESA's THINK-TANK...
$k_B \ln \Omega$
... seeking DISRUPTIVE changes in space technologies.
We are a MULTIDISCIPLINARY team...
...that is constantly RENEWED for fresh ideas.
We carry out and support CUTTING-EDGE research...
...and investigate concepts with a LONG-TERM IMPACT in space!

THE SPACE ECONOMY: A MODERN DAY GOLD RUSH

Asteroid Mining Will Create A Trillion-Dollar Industry

As our **population grows** we need to find a **sustainable supply of natural resources** to fuel exploration in space and prosperity on Earth.

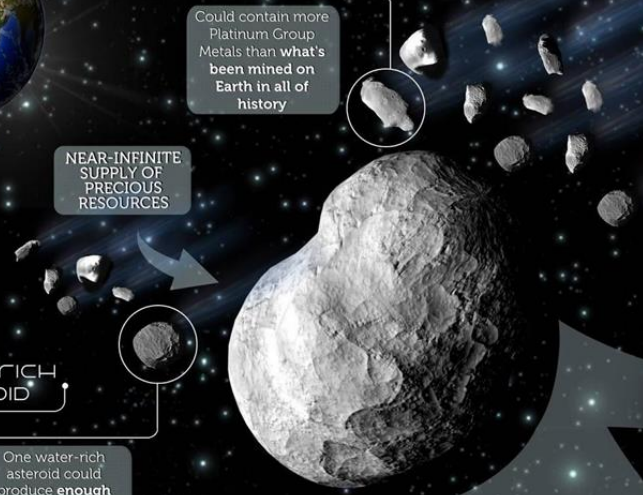
MORE ASTEROIDS DISCOVERED NEAR EARTH EVERYDAY

1,500	EASIER TO REACH THAN MOON
8,800	DISCOVERED TO DATE
1000+	NEARLY 1K+ FOUND EVERY YEAR

PLATINUM-RICH ASTEROID

Could contain more Platinum Group Metals than **what's been mined on Earth in all of history**

NEAR-INFINITE SUPPLY OF PRECIOUS RESOURCES



WATER-RICH ASTEROID

One water-rich asteroid could produce **enough fuel for every rocket launched in history.**

USES OF WATER IN SPACE

- ROCKET **FUEL**
- BREATHABLE **AIR**
- DRINKABLE **WATER**

USES OF PLATINUM GROUP METALS ON EARTH

- **REDUCE COST** OF ELECTRONICS
- **ELECTRIFY TRANSPORTATION**
- **DRIVE INNOVATION**, AND CREATE A GREENER EARTH

ONE SINGLE 500M platinum-rich asteroid

At current market prices, one ounce of platinum is valued over **$1,500**

Worth $2.9 Trillion

174 times more than the yearly world output of platinum

50 %

More than the known world-reserves of PGMs

ONE SINGLE 500M water-rich asteroid

$ 5 trillion would produce over $5 trillion worth of water for use in space.

It currently costs **$20,000** to send a liter of water from Earth to Deep Space

Asteroid mining will open a trillion-dollar industry and provide a **near-infinite supply** of Platinum Group Metals and water to **support our growth** both on this planet and off.

PLANETARY RESOURCES

ESTEC Open Day 2016 (3 min)

Who am I? I'm still trying to figure it out...

What I am/am NOT

What I am:

- (Currently) independent researcher in the emerging field of “space economics” / ExoEconomics: “Space exploration through economic development”
- Dreamer, space enthusiast, multi/interdisciplinary explorer;

What I am NOT:

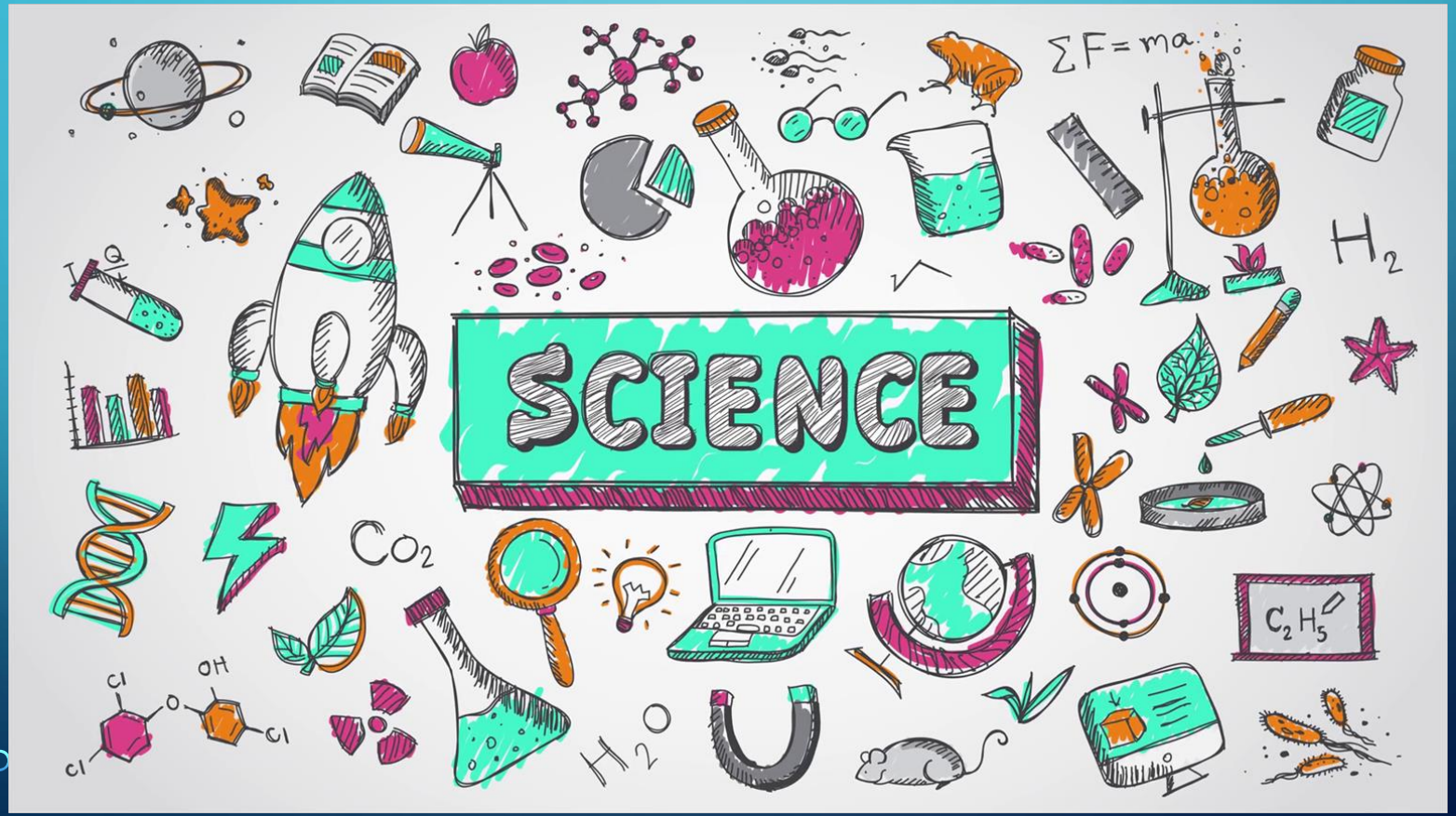
- Educator, teacher, certified trainer, science communicator;

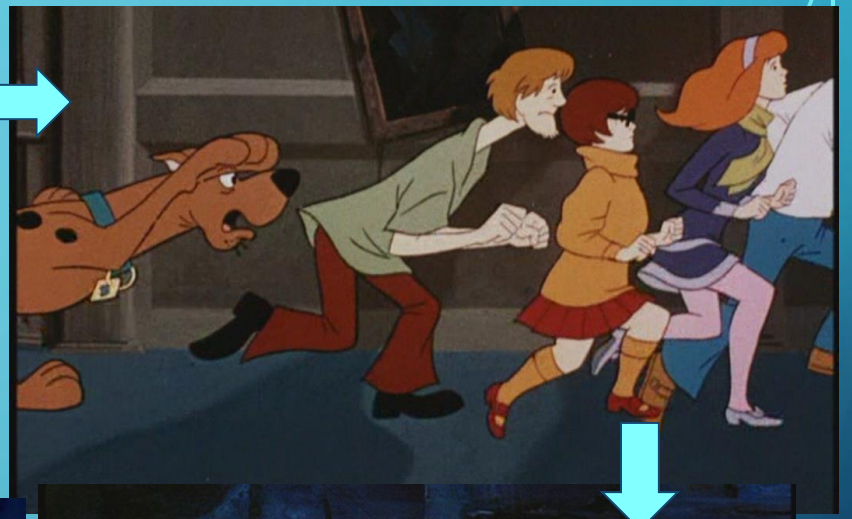
Warning!

- Don’t take everything I say for a fact; I may be wrong sometimes too;
- Question everything!

17 years of SpaceX (3 min)

Part 2: Science!





Unmasking the imposter

- Stop running, find the courage in you to face your fears, confront the unknown and debunk the mystery.

- Behind every ghost, monster or terrifying creature, there’s a much simpler, more reasonable explanation.

Brief history of Science (2 min)

Definitions

Science* (from the Latin word *scientia*, meaning "knowledge") is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe.

Pseudoscience* consists of statements, beliefs, or practices that are claimed to be both scientific and factual, but are incompatible with the scientific method. (*pseudo* + *scientia*)

The expression **junk science*** is used to describe scientific data, research, or analysis considered by the person using the phrase to be spurious or fraudulent. The concept is often invoked in political and legal contexts where facts and scientific results have a great amount of weight in making a determination.

* Source: Wikipedia (always check the source!)

Definitions

Fringe science* is an inquiry in an established field of study which departs significantly from mainstream theories in that field and is considered to be questionable by the mainstream.

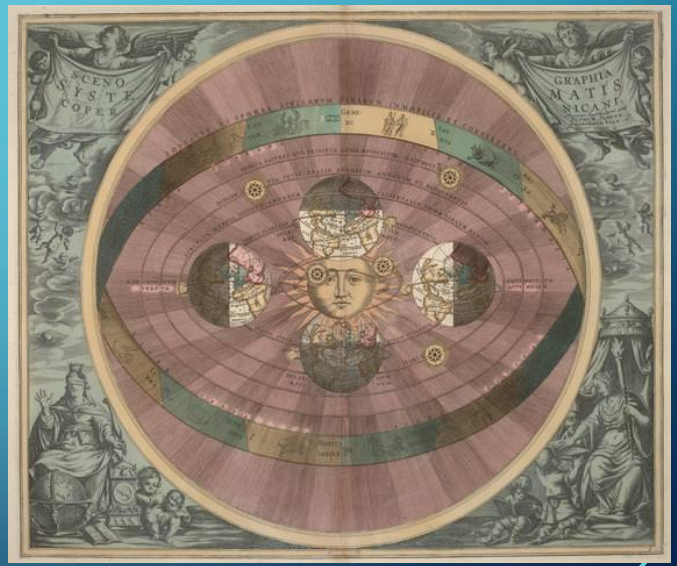
Fringe science may be either a questionable application of a scientific approach to a field of study or an approach whose status as scientific is widely questioned.

Paradigm shift* is a fundamental change in the basic concepts and experimental practices of a scientific discipline. Paradigm shifts arise when the dominant paradigm under which normal science operates is rendered incompatible with new phenomena, facilitating the adoption of a new theory or paradigm.

The Scientific Method*: is an empirical method of acquiring knowledge that has

Fringe Science

Some theories that were once rejected as fringe science, but were eventually accepted as mainstream science, are:



- Plate tectonics
- The existence of Troy
- Heliocentrism
- Norse colonization of the Americas
- The Big Bang theory
- Neanderthal-Homo Sapian hybridization (HSN, now substantiated by genetic evidence)

Paradigm Shifts

Some of the "classical cases" of paradigm shifts in science are:

- 1543 – The transition in cosmology from a Ptolemaic cosmology (geocentric) to a Copernican one (heliocentric).
- 1687 – The transition in mechanics from Aristotelian mechanics to classical mechanics.
- The transition in optics from geometrical optics to physical optics with Augustin-Jean Fresnel's wave theory.
- 1859 – The revolution in evolution from goal-directed change to Charles Darwin's natural selection.
- 1905 – The development of quantum mechanics, which replaced classical mechanics at microscopic scales.
- 1887 to 1905 – The transition from the luminiferous aether present in space to electromagnetic radiation in spacetime.
- 1919 – The transition between the worldview of Newtonian gravity and the Einsteinian general relativity.
- 1965 - The acceptance of plate tectonics as the explanation for large-scale geologic changes

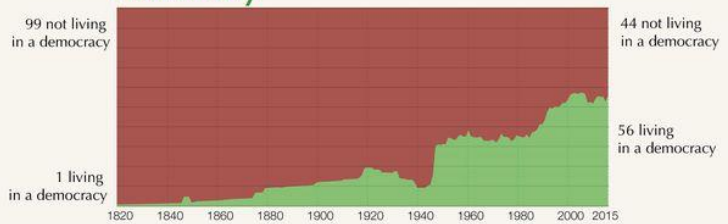

LUNCH
4/MON
12:00

The World as 100 People
over the last two centuries

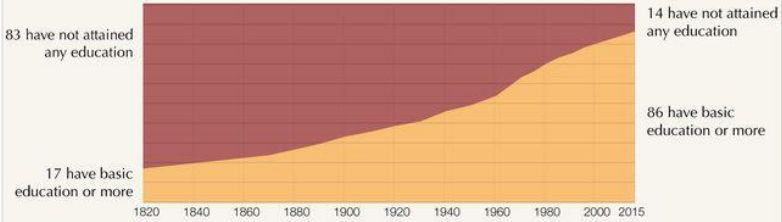
Our World in Data

Extreme Poverty

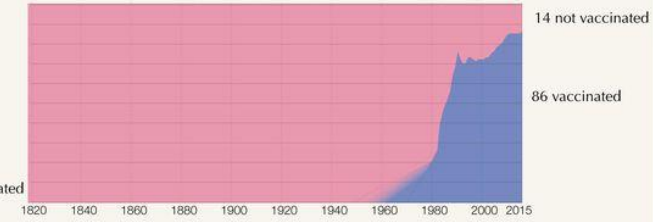
Democracy



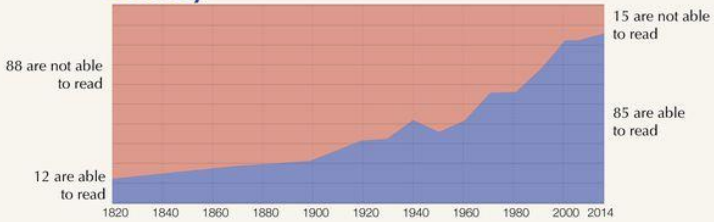
Basic Education



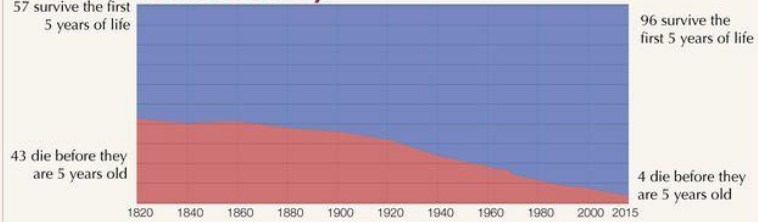
Vaccination against diphtheria, pertussis (whooping cough), and tetanus



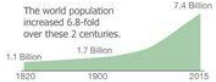
Literacy



Child Mortality



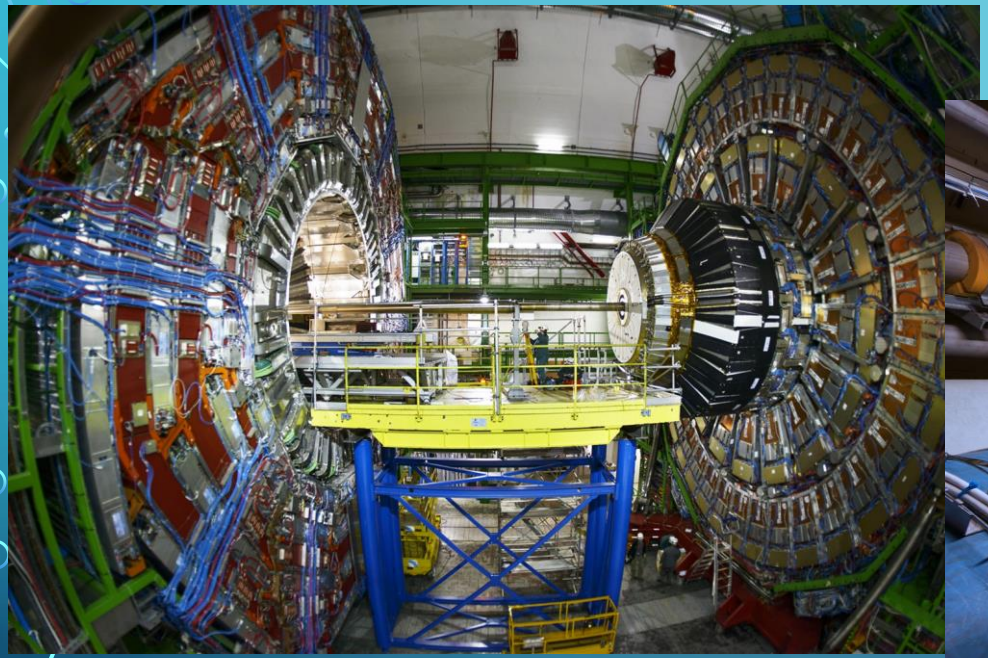
Data sources:
Extreme Poverty: Bourguignon & Morrison (2002) up to 1970 – World Bank 1981 and later (2015 is a projection).
Vaccination: WHO (Global data are available for 1980 to 2015 – the DPT3 vaccination was licenced in 1949)
Education: OECD for the period 1820 to 1960. IIASA for the time thereafter.
Literacy: OECD for the period 1820 to 1990. UNESCO for 2004 and later.
Democracy: Polityy IV index (own calcluation of global population share)
Colonialism: Wimmer and Min (own calcluation of global population share)
Continent: HYDE database
Child mortality: up to 1960 own caluclations based on Gapminder; World Bank thereafter



All these visualizations are from OurWorldInData.org an online publication that presents the empirical evidence on how the world is changing.

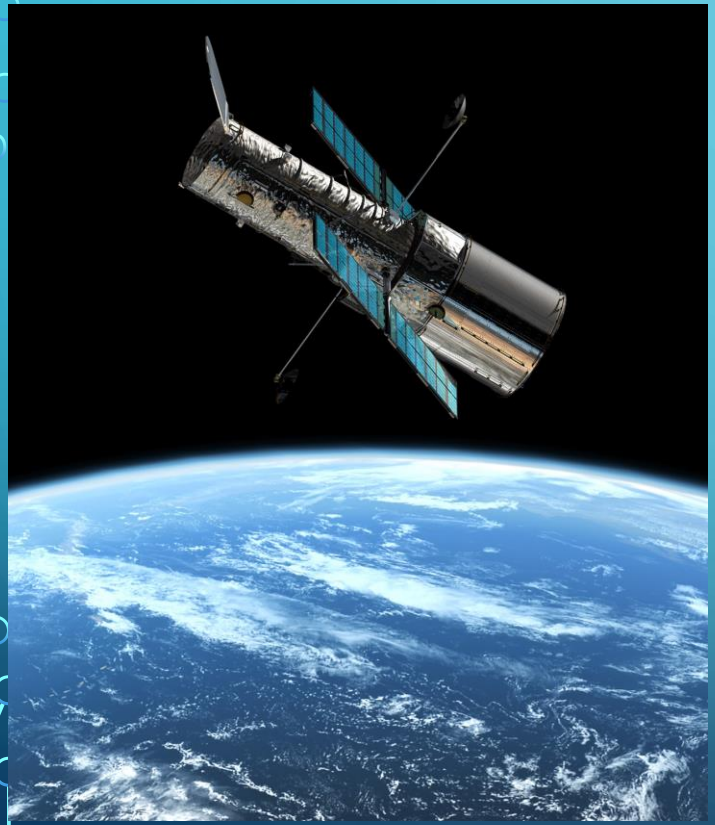
Licensed under CC-BY-SA by the author Max Roser.

Proof that science works!

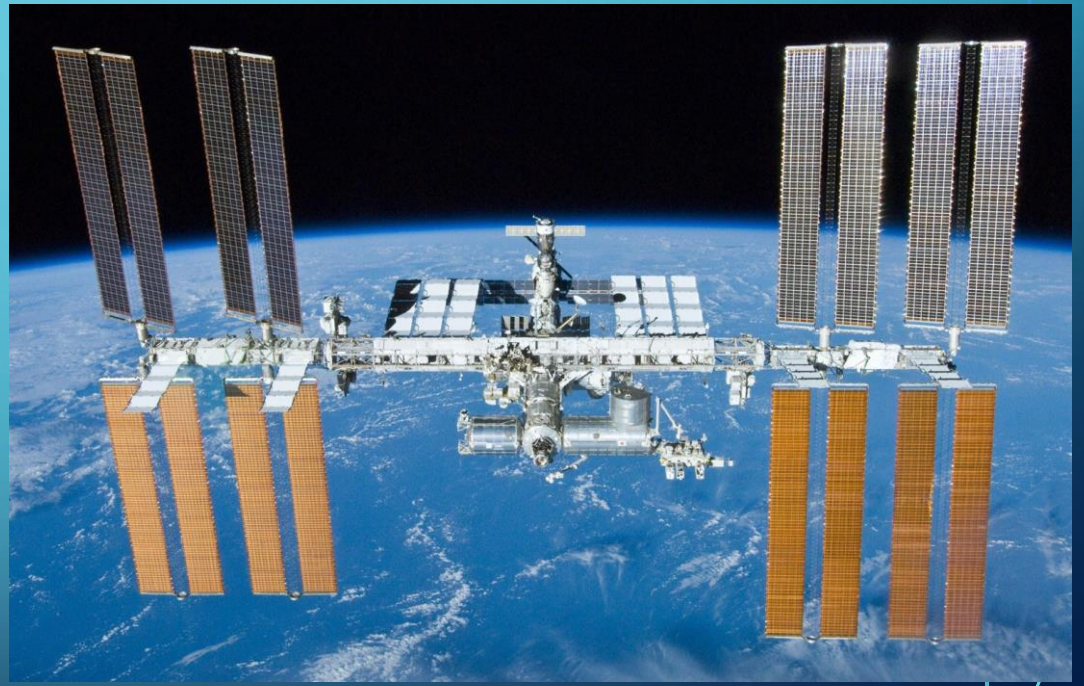


Large Hadron Collider, CERN, Geneva

Proof that science works!



Hubble Space Telescope



International Space Station

Quiz time!

Instructions:

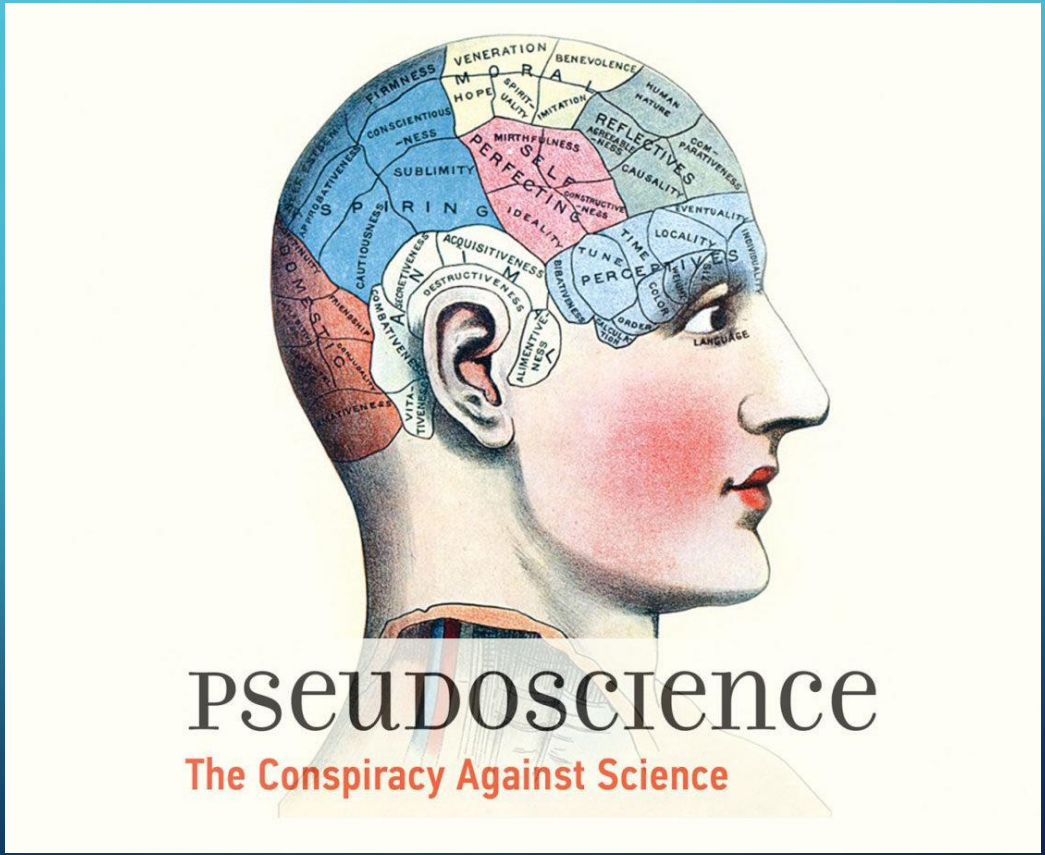
- Make sure you’re connected to the wi-fi/mobile data ON
- Go to Kahoot.it
- Enter the pin code on the screen
- Use the nickname you chose earlier
- Read the question on the screen!
- Think fast, choose an answer on your phone!
- Short reaction time will earn you extra points!
- If you don’t manage to connect, work with a buddy!

Kahoot! Quiz #1: Space!

Space!

- 10 questions
- 10 min

Part 3: Pseudoscience?



Pseudoscience Intro

Definitions

- ***Science*** is an enterprise that builds and organizes knowledge in the form of *testable explanations and predictions* about the world.
- ***Pseudoscience*** is a claim, belief or practice which is presented as scientific but *lacks the valid scientific methodology or supporting evidence*.

Main pseudoscientific concepts #1

- Astronomy and Space sciences

- Ancient astronauts
- Astrology
- Creationist cosmologies
- Modern Flat Earth beliefs
- Moon Landing conspiracy theories

Main pseudoscientific concepts #2

- Earth Sciences

- Bermuda Triangle
- Climate change denial
- Hollow Earth theory

Main pseudoscientific concepts #3
- Health & Medicine

- Acupuncture
- Alternative & fringe medicine
- Biorhythms
- Detoxification
- Homeopathy
- Faith healing
- Magnet therapy
- Reiki
- Crystal healing
- Cupping therapy
- And many, many more...

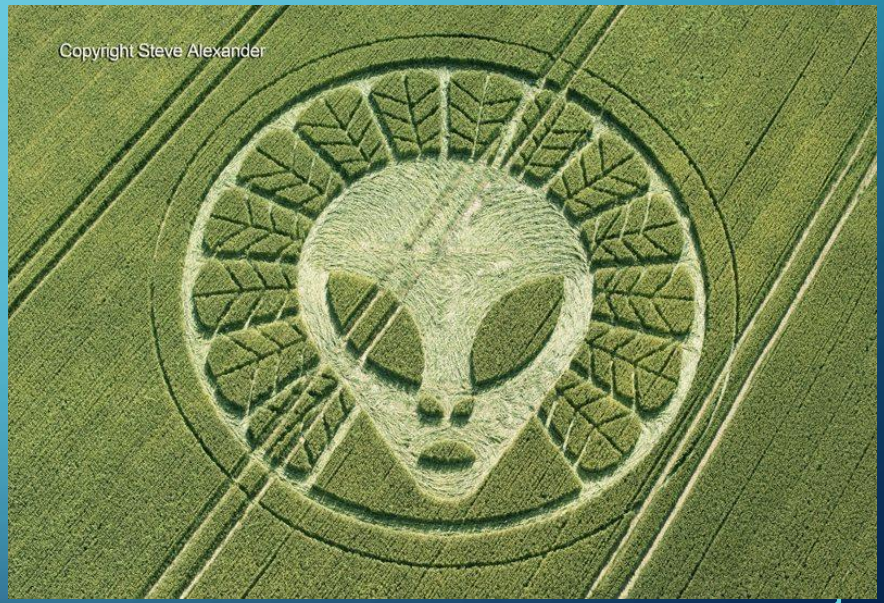
Main pseudoscientific concepts #4

- Social sciences: Psychology

- Brainwashing
- Hypnosis
- Parapsychology
- Psychoanalysis
- Psychokinesis
- [...]

Main pseudoscientific concepts #5

- Other
- Paranormal subjects
- Ufology
- Crop circles
- Extra-sensory perception (telepathy, precognition, psychic abilities)
- Levitation
- Numerology
- Intelligent design
- Creation biology
- And many, many, many



Why do people believe weird things?

I want to believe!

Kahoot! Quiz #2: Pseudoscience!

Pseudoscience

- 7 questions
- 5 min

Part 4: Science vs. Pseudoscience!

Intro to the Scientific Method

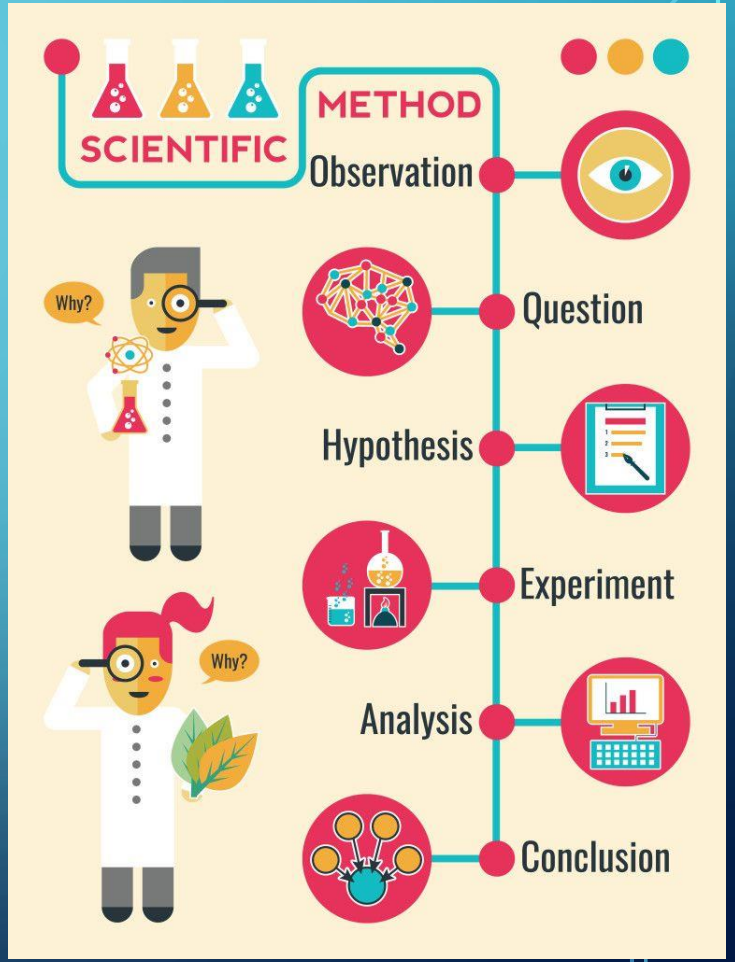
The scientific method involves careful observation, applying rigorous skepticism about what is observed, given that cognitive assumptions can distort how one interprets the observation.

It involves formulating hypotheses, via induction, based on such observations; experimental and measurement-based testing of deductions drawn from the hypotheses; and refinement (or elimination) of the hypotheses based on the experimental findings. These are *principles* of the scientific method, as distinguished from a definitive series of steps applicable to all scientific enterprises

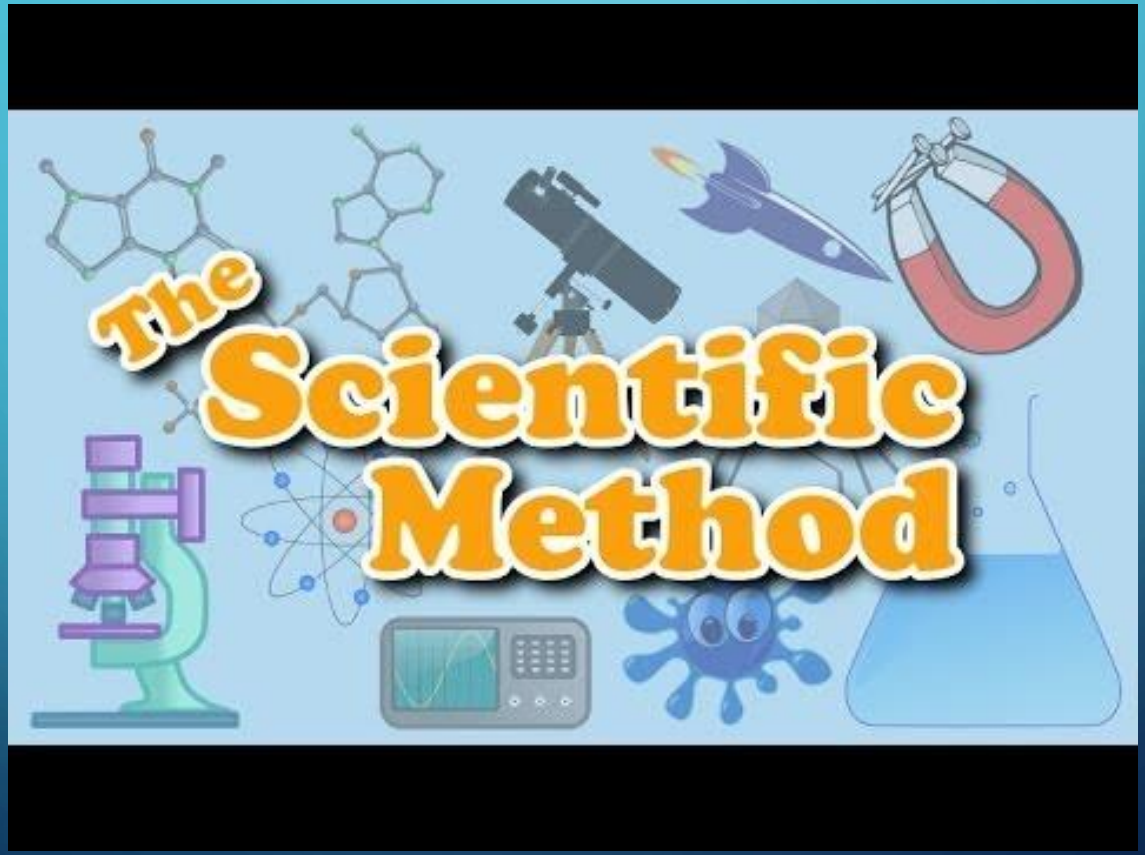
Scientific Method - Main steps

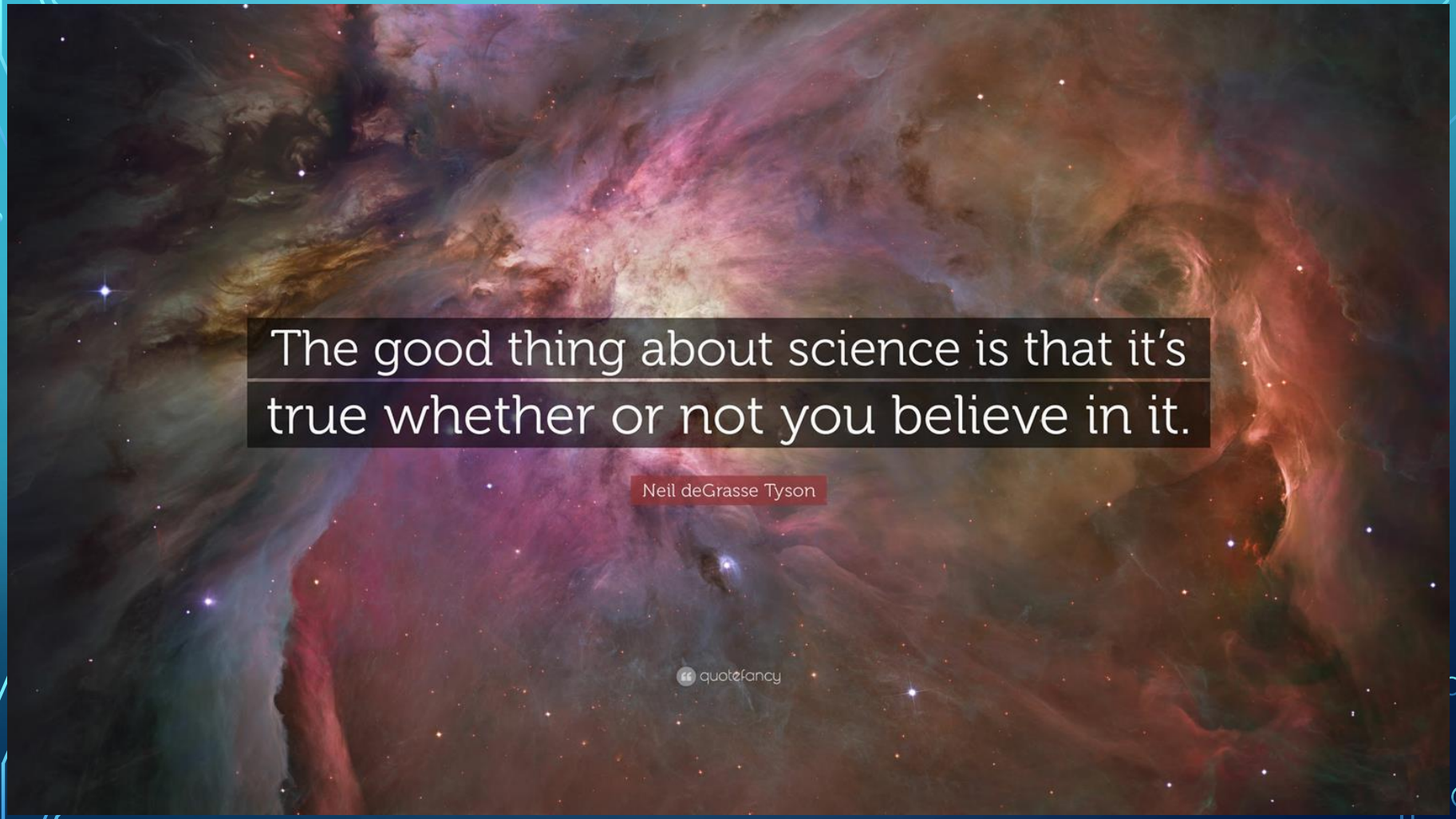
A pragmatic scheme as a guideline for proceeding:

1. Define a question
2. Gather information and resources (observe)
3. Form an explanatory hypothesis
4. Test the hypothesis by performing an experiment and collecting data in a reproducible manner
5. Analyze the data
6. Interpret the data and draw conclusions that serve as a starting point for new hypothesis
7. Publish results
8. Retest (frequently done by other scientists)

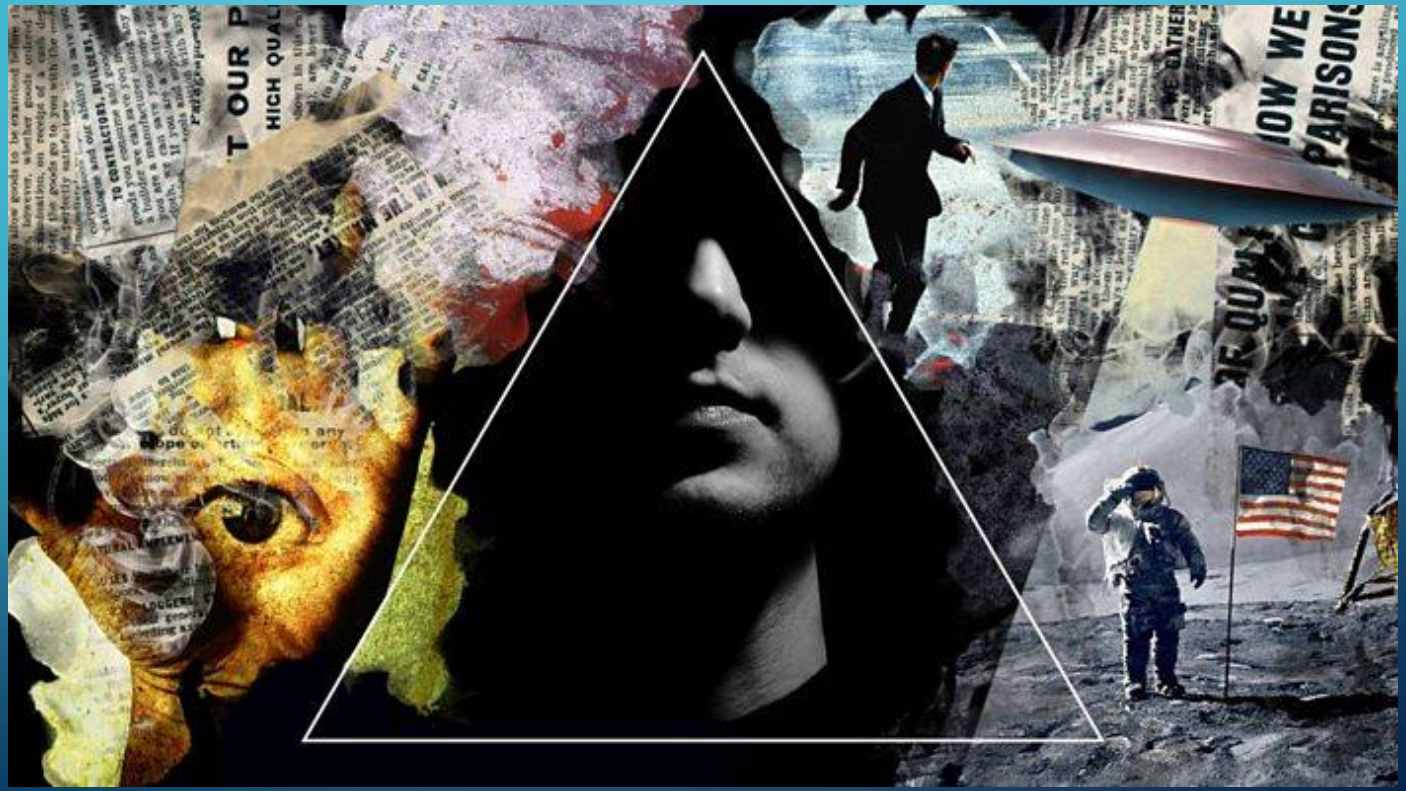


How does Science Work? (4 min)




The good thing about science is that it's
true whether or not you believe in it.
Neil deGrasse Tyson
quotefancy

Conspiracy theories!?

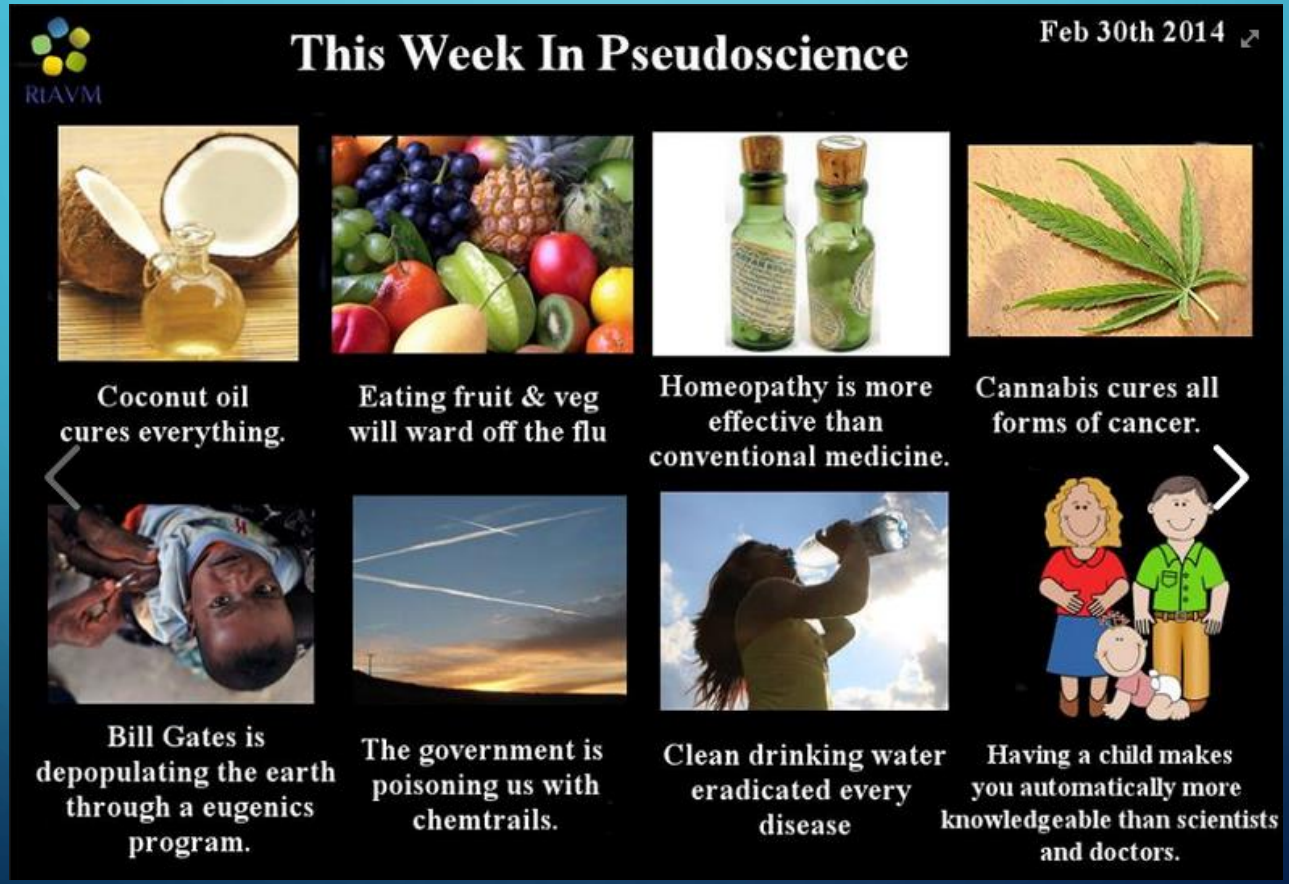


Moon Landing conspiracy theories

Third-party evidence of Moon Landing:

- Imaging the landing sites
- Moon rocks
- Missions tracked by independent parties

Why is Pseudoscience dangerous?



Pseudoscience & your walle

- A well-informed consumer is a wise consumer.
- Do your research before you open your wallet!

EXACTLY HOW HOMEOPATHY WORKS:

It doesn't. It's a waste of money.

There is no evidence showing homeopathy works for any illness

There are hardly any active ingredients in homeopathic products

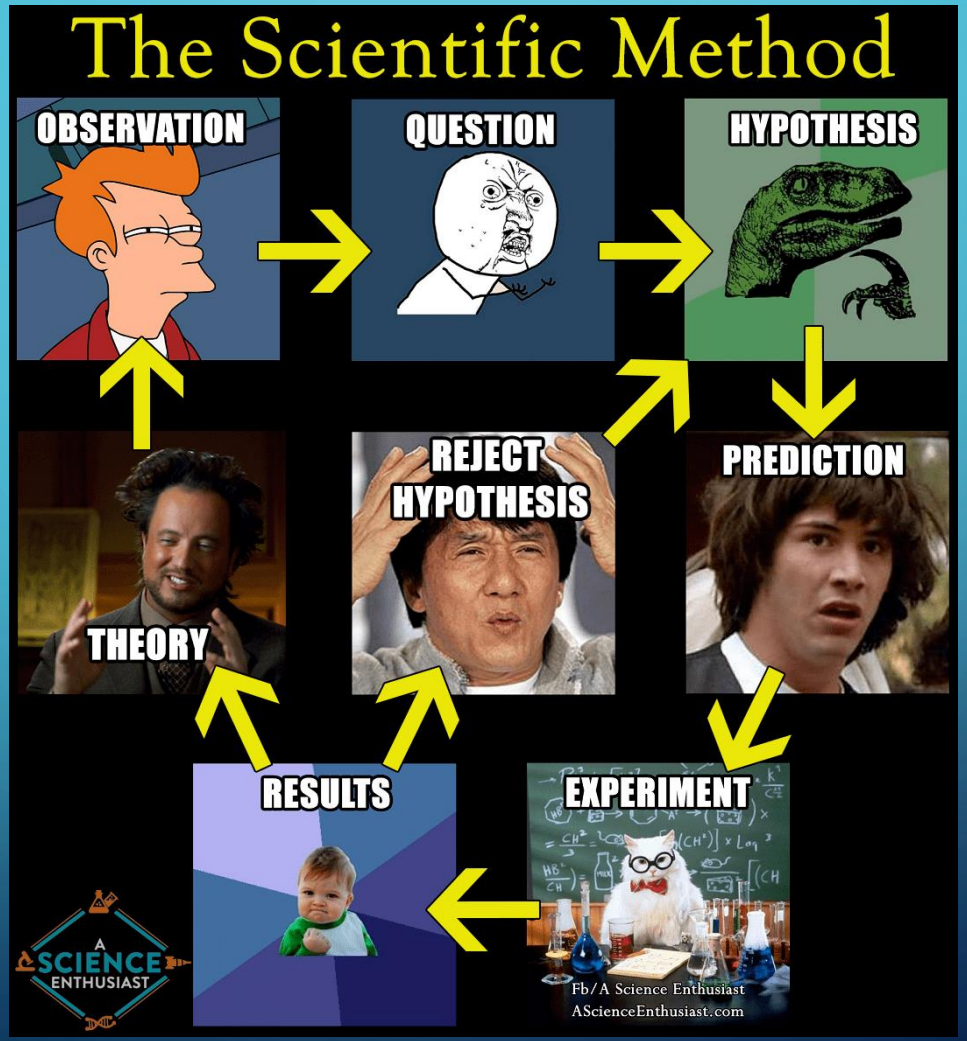
There is no ultimate mechanism proven to make sugar pills work as medicine

And it does hurt to try. Instead of wasting your money, you could be donating to buy a vaccine for a child or send a girl to school for a year.

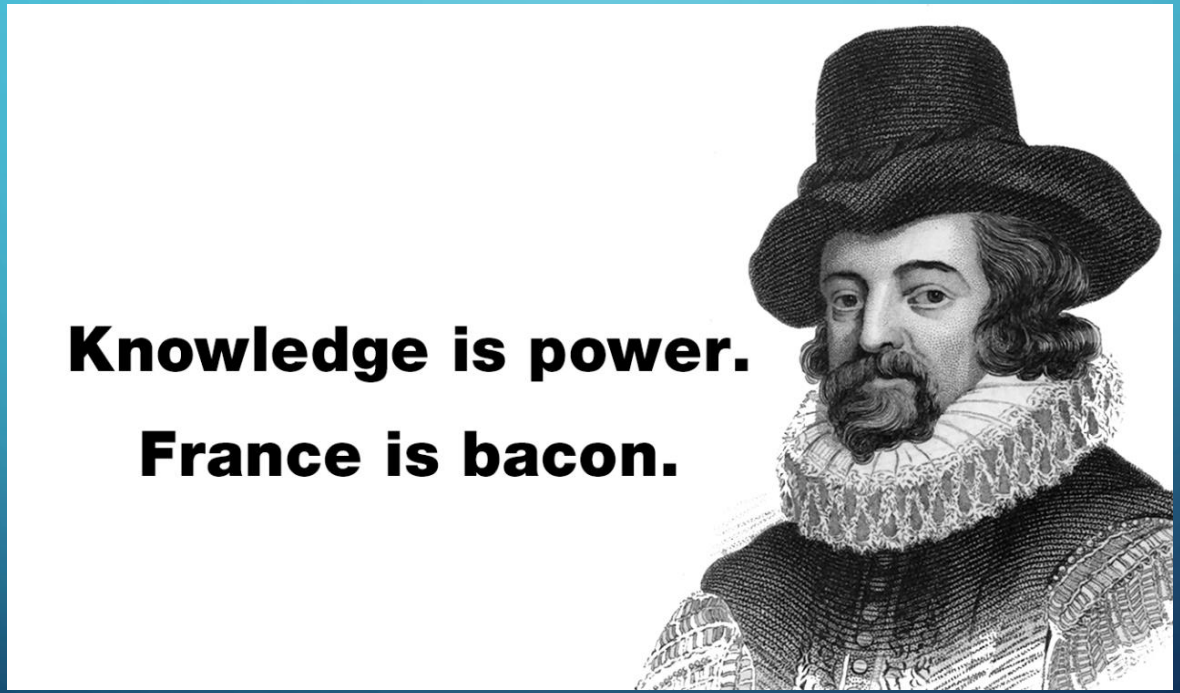
FITNESS**RELOADED**.COM

Some food for thought...

- Role of intuition
- Ideas that simply cannot be tested (yet)
- Fake news in science
- Harmless vs harmful pseudoscience
- MISinformation vs DISinformation
- Fake news & wishful thinking
- Opinion articles vs. Scientific studies


The Scientific Method
OBSERVATION
QUESTION
HYPOTHESIS
PREDICTION
REJECT HYPOTHESIS
THEORY
RESULTS
EXPERIMENT
A SCIENCE ENTHUSIAST
Fb/A Science Enthusiast
AScienceEnthusiast.com

Just remember...

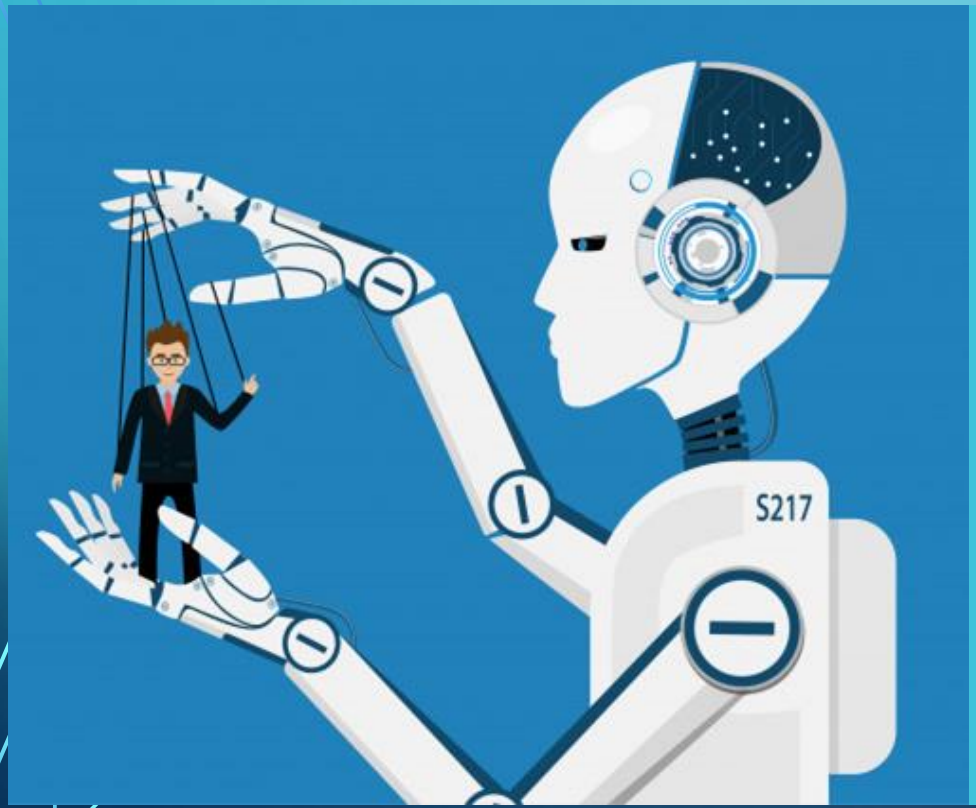


Kahoot! Quiz #3: Science of Pseudoscience?

Science or Pseudoscience?

- 13 questions
- 7 min

Part 5: Preparing for the Future(s)!

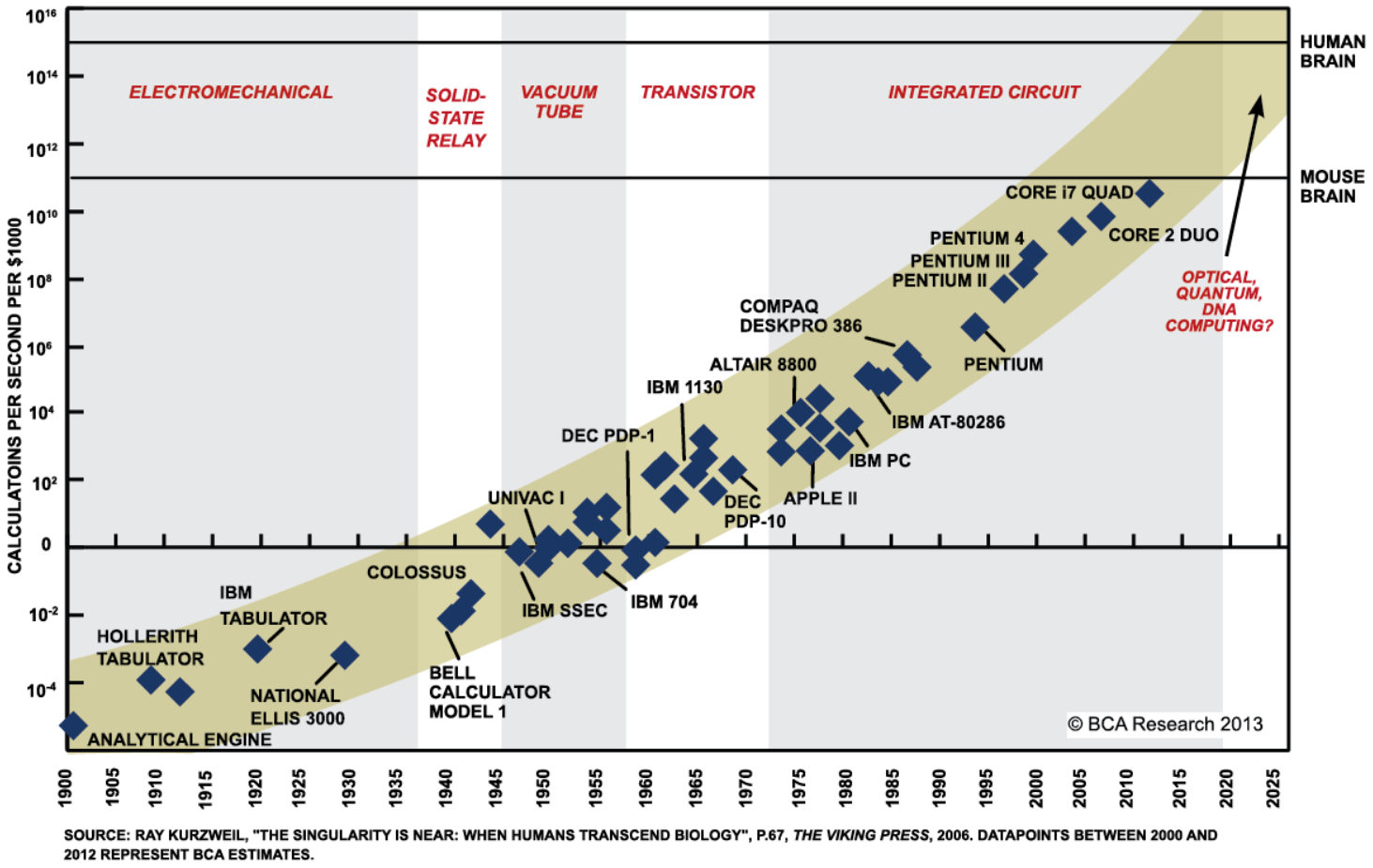


Visions of the future

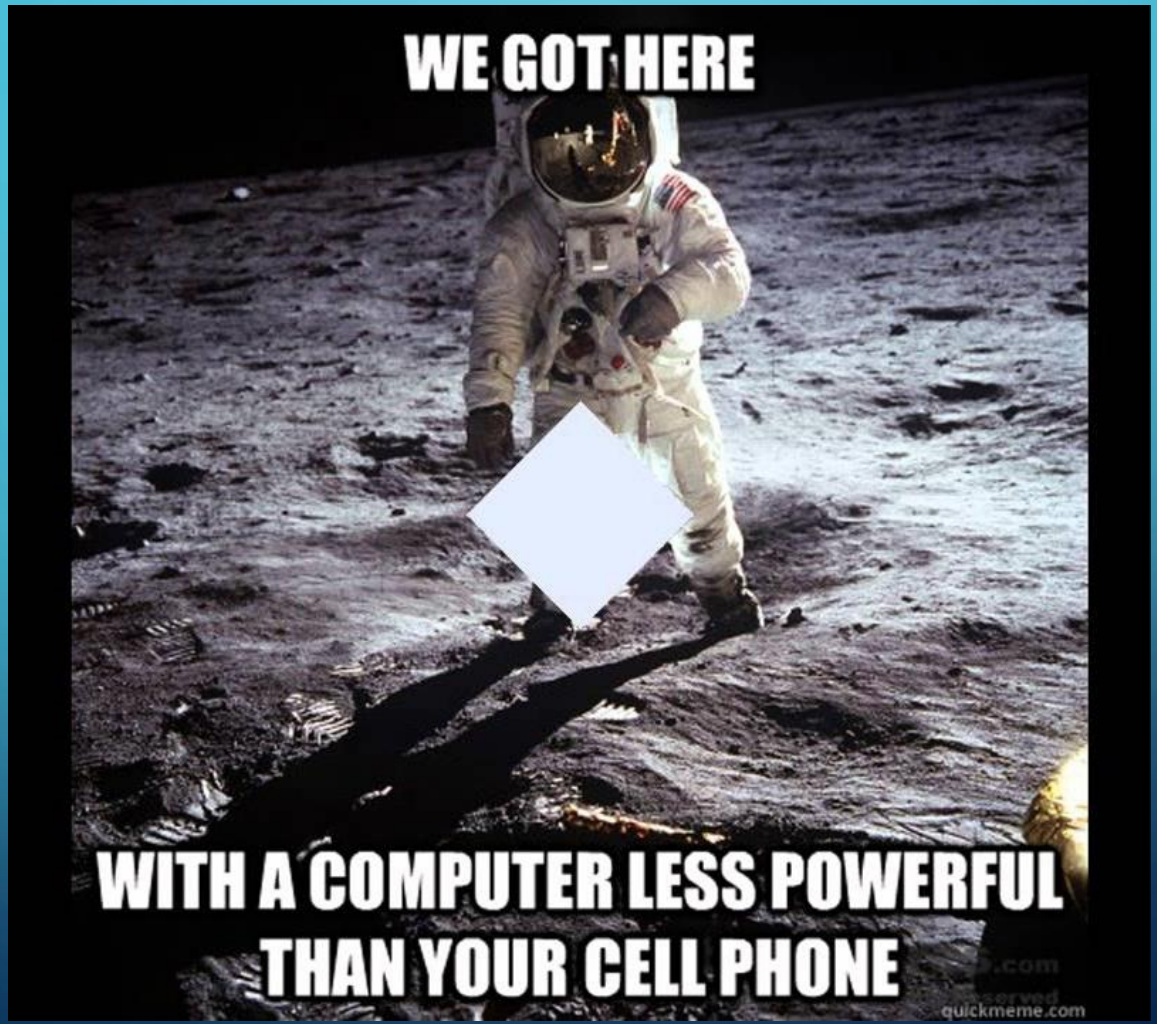
- What will the future look like?
- How can we prepare for it?
- Prospecting, projecting in the Age of Big Data
- Futurology/ Future(s) studies
- Predicting the Future(s)?

Moore’s Law & Exponential technologies

Moore's law is the observation that the number of transistors in a dense integrated circuit doubles about every two years.



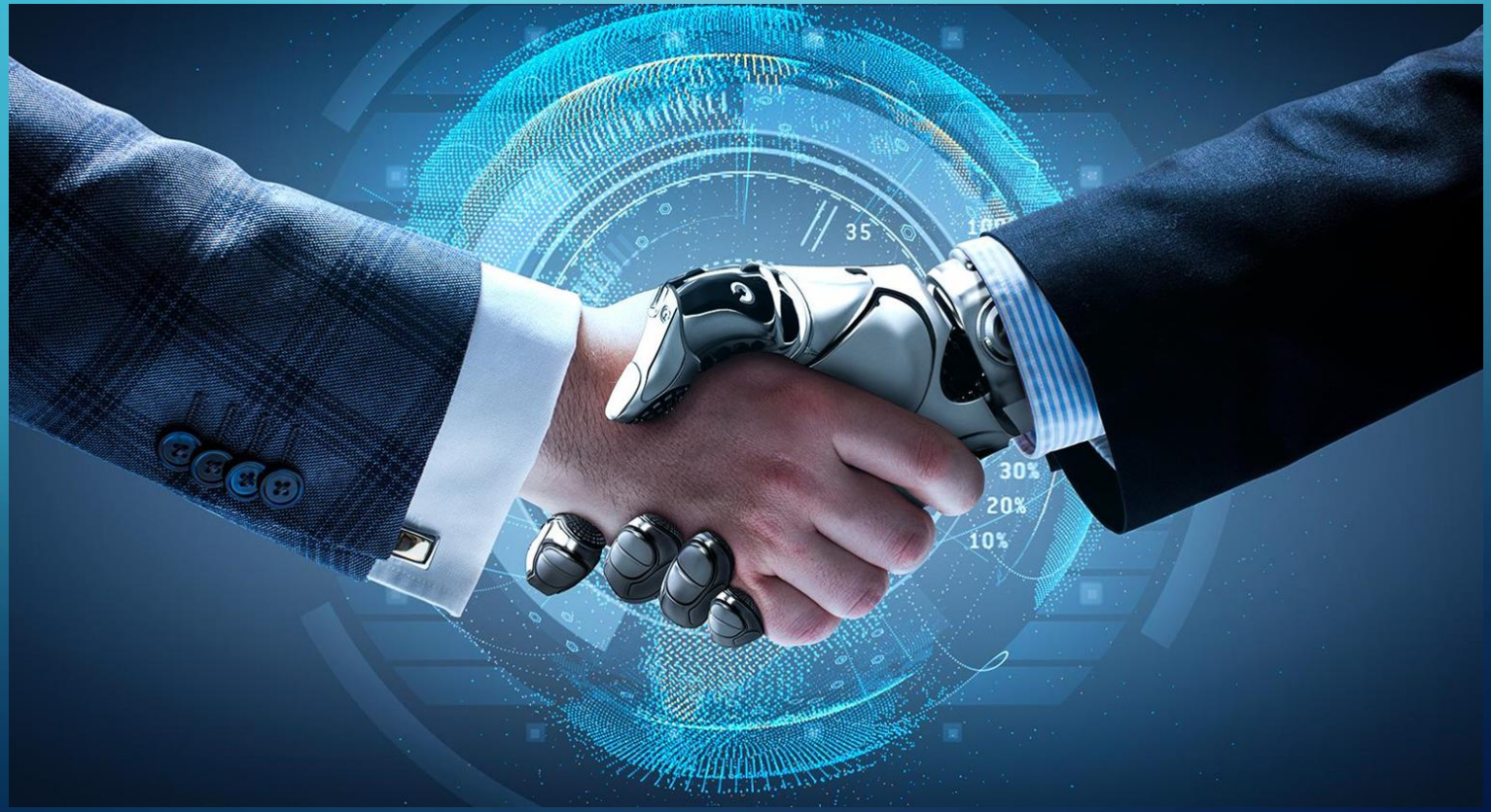
SOURCE: RAY KURZWEIL, "THE SINGULARITY IS NEAR: WHEN HUMANS TRANSCEND BIOLOGY", P.67, *THE VIKING PRESS*, 2006. DATAPOINTS BETWEEN 2000 AND 2012 REPRESENT BCA ESTIMATES.


WE GOT HERE
WITH A COMPUTER LESS POWERFUL THAN YOUR CELL PHONE
quickmeme.com

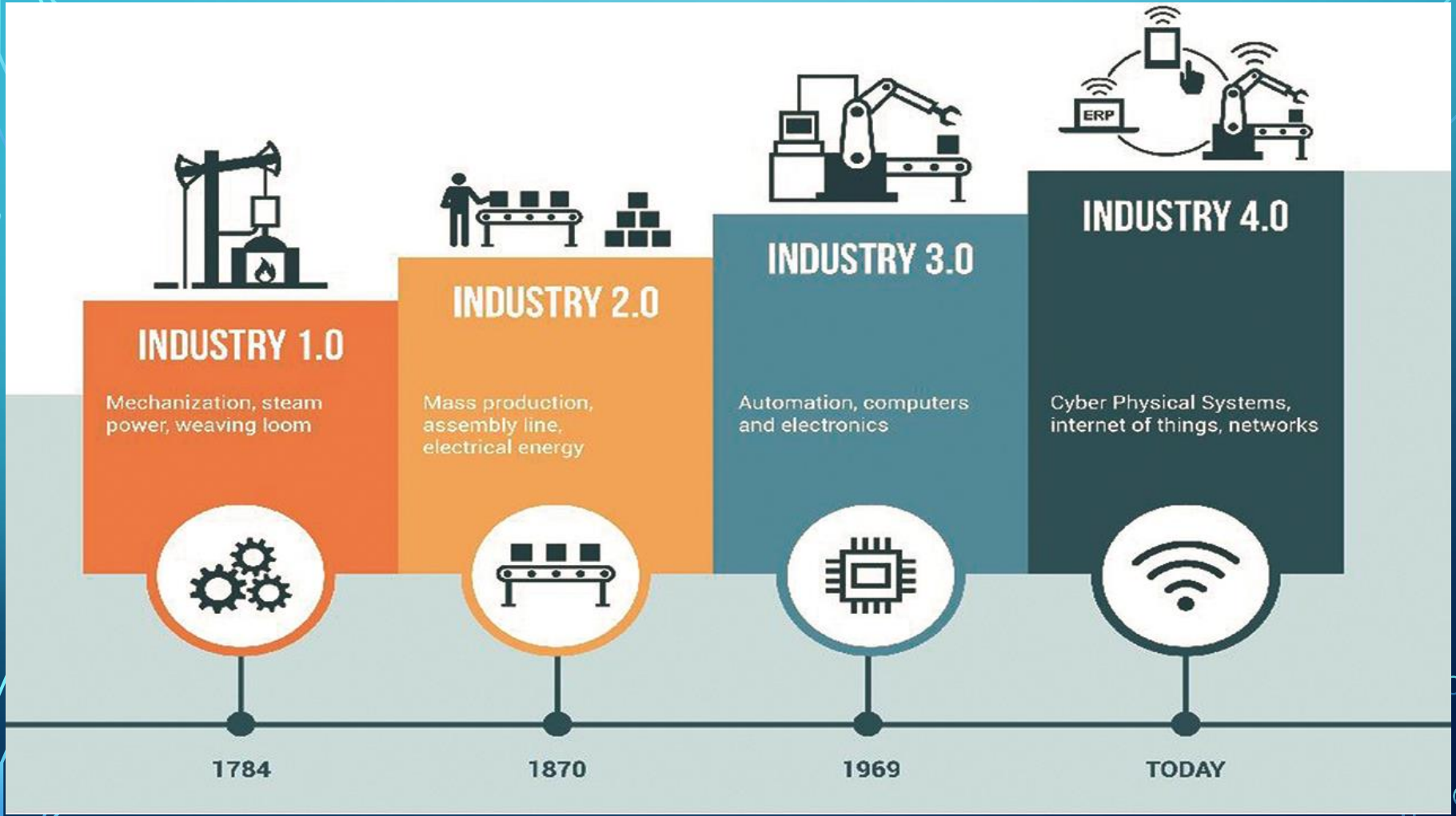
2004

2014

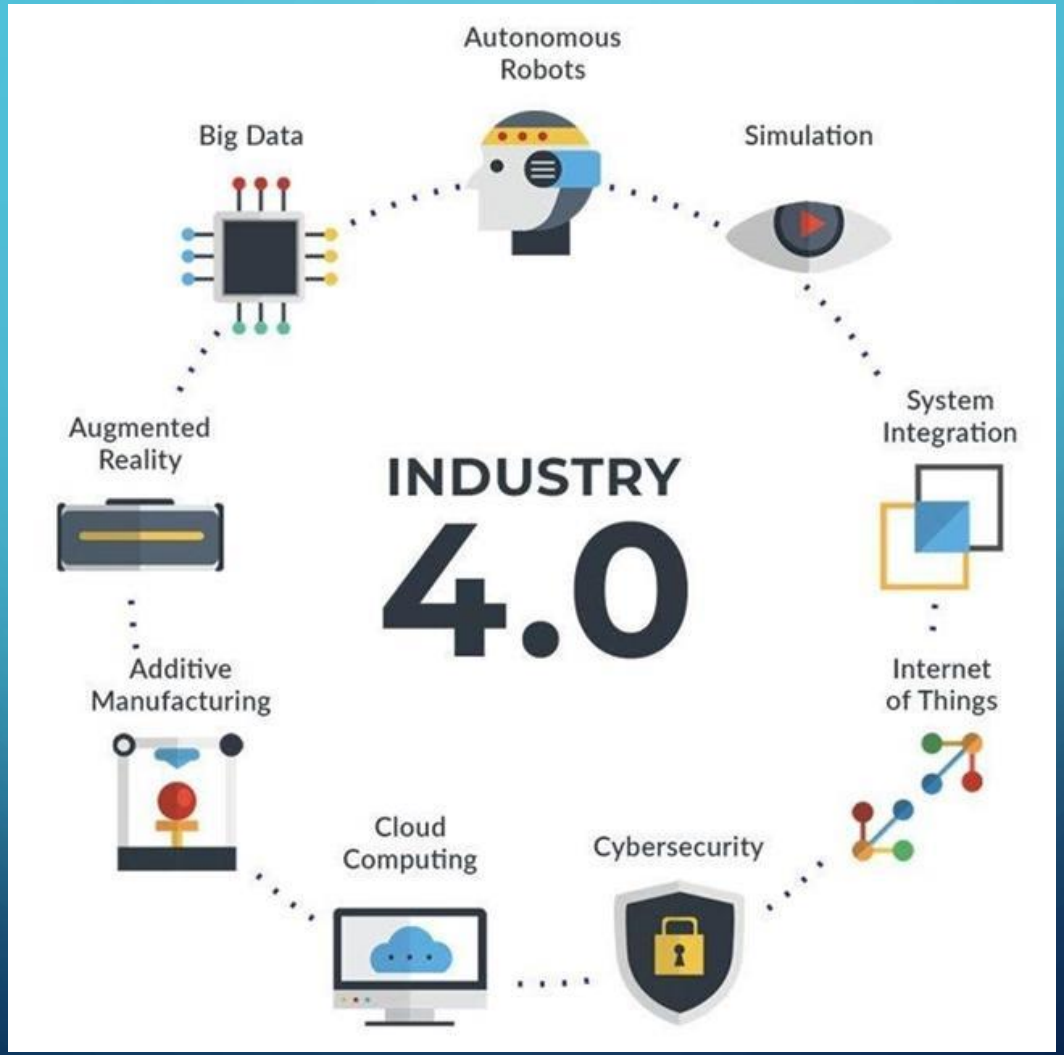
Rise of Artificial Intelligence (AI), intelligent machines and Internet of Things (IoT)



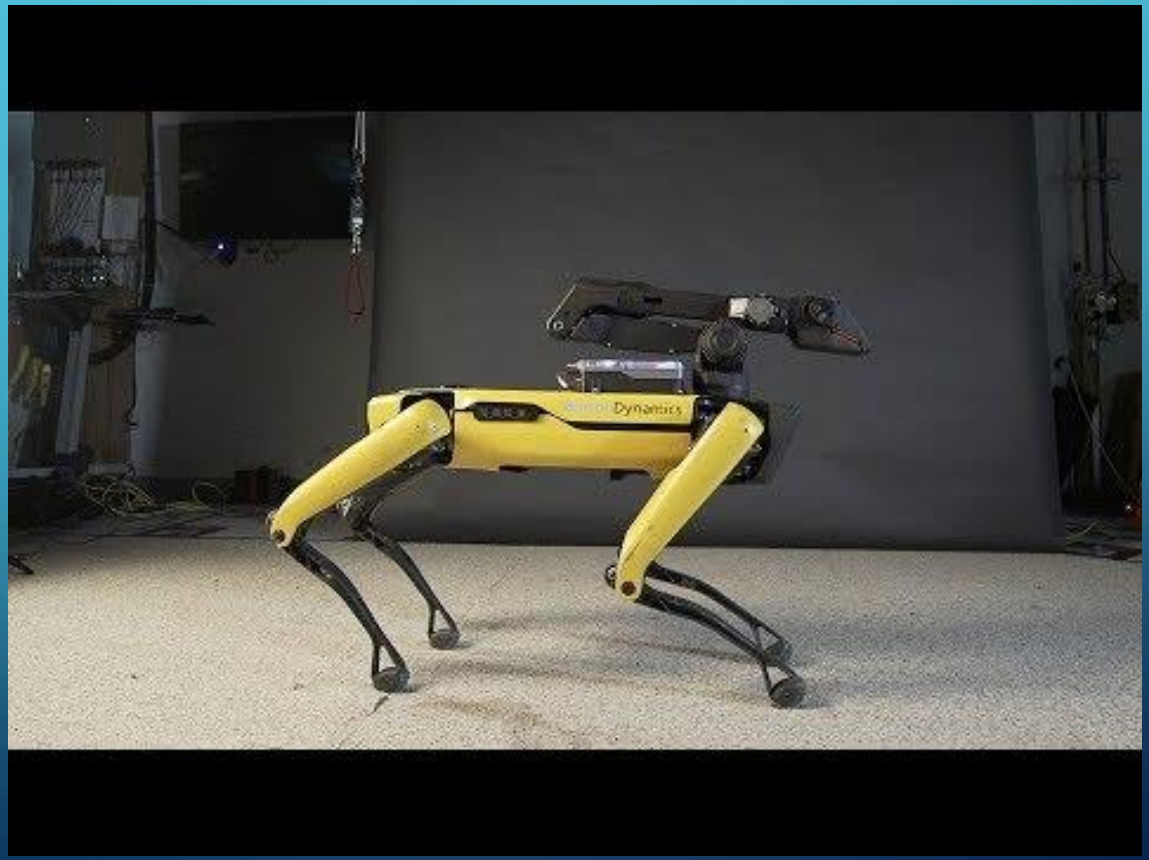

4th
Industrial
Revolution


INDUSTRY 1.0
Mechanization, steam power, weaving loom
INDUSTRY 2.0
Mass production, assembly line, electrical energy
INDUSTRY 3.0
Automation, computers and electronics
INDUSTRY 4.0
Cyber Physical Systems, internet of things, networks
ERP
1784
1870
1969
TODAY

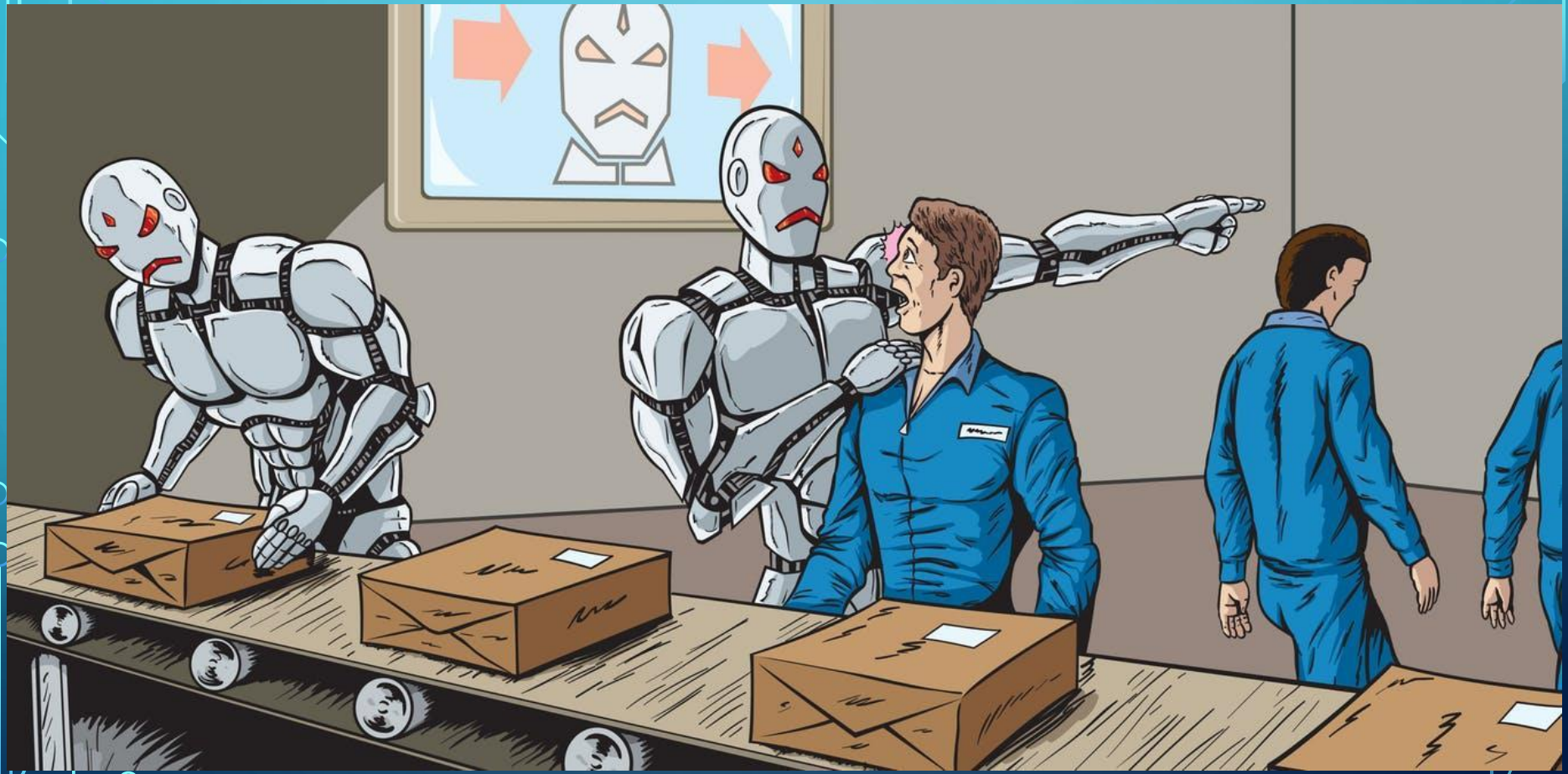

THE DAWN OF THE
FOURTH INDUSTRIAL REVOLUTION
Mobile Devices
IoT platforms
Location detection technologies
Advanced human-machine interfaces
Authentication & fraud detection
3D printing
Smart Sensors
Big data analytics
Multilevel customer interaction and customer profiling
Augmented Reality
Cloud Computing
1. Digitization / Integration of value chains
2. Digitization of product and service offerings
3. Digital business models and customer access
INDUSTRY 4.0
3.0 1969-2010s
Computing / Internet
Nuclear Energy
2.0 1830s-1915
Assembly Line
1.0 1760-1840
Steam Engineering
shockoe
Enterprise Mobile Solutions
Apps for the Fourth Industrial Revolution


Autonomous Robots
Big Data
Simulation
Augmented Reality
System Integration
INDUSTRY
4.0
Additive Manufacturing
Internet of Things
Cloud Computing
Cybersecurity

Boston Dynamics - Uptown Spot (1 min)

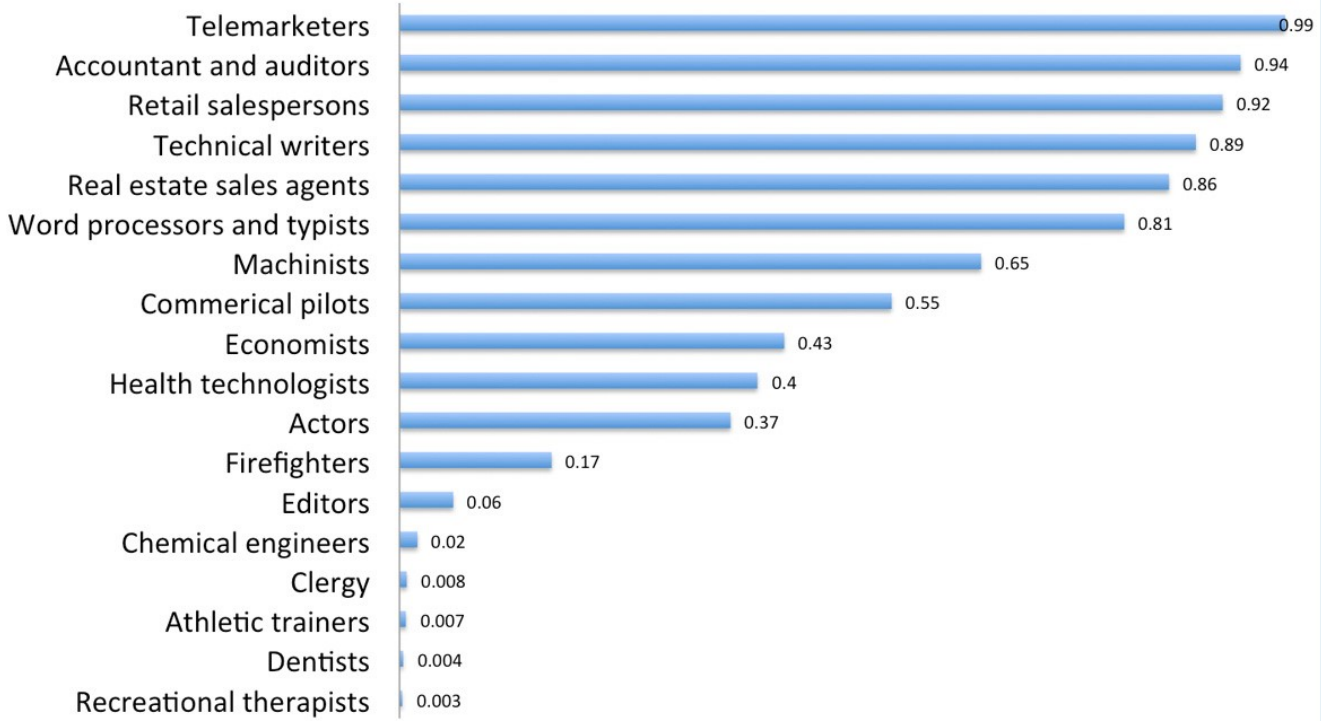


Boston Dynamics - Handle Robot (1 min)



Tech Chart of the Day

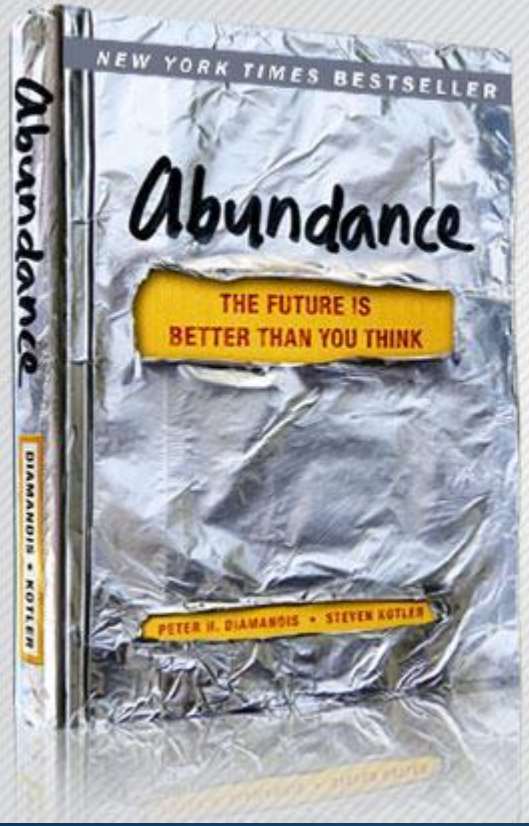
Probability Robots Will Take Your Job In Next 20 Years, 1=Certain



BUSINESS INSIDER

Source: The Economist,
The Future of Employment: How susceptible are jobs to computerisation?

A future full of opportunities!



By X PRIZE Foundation and Singularity University Chairman

Peter H. Diamandis

And Best-Selling Author and Award-Winning Science Journalist

Steven Kotler

"Brilliant must-read book"
- Ray Kurzweil

"Proof that we can meet any grand challenge"
- Sir Richard Branson

SpaceX - Falcon Heavy & Starman (2 min)

Recommended Sites

1 | HowStuffWorks
365 - eBizMBA Rank | **19,500,000** - Estimated Unique Monthly Visitors | 3
Quantcast Rank | 680 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

2 | NASA
798 - eBizMBA Rank | **12,000,000** - Estimated Unique Monthly Visitors | 7
Quantcast Rank | 1,313 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

3 | Discovery
1,505 - eBizMBA Rank | **6,500,000** - Estimated Unique Monthly Visitors | 8
Quantcast Rank | 2,132 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

4 | LiveScience
1,575 - eBizMBA Rank | **5,250,000** - Estimated Unique Monthly Visitors | 7
1,049 - Quantcast Rank | 2,902 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

5 | ScienceDaily
1,769 - eBizMBA Rank | **5,000,000** - Estimated Unique Monthly Visitors | 1
496 - Quantcast Rank | 3,206 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

6 | ScienceDirect
2,403 - eBizMBA Rank | **3,900,000** - Estimated Unique Monthly Visitors | 1
3,775 - Quantcast Rank | 1,790 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

7 | Space
2,576 - eBizMBA Rank | **3,500,000** - Estimated Unique Monthly Visitors | 1,576 - Compete Rank |
616 - Quantcast Rank | 5,535 - Alexa Rank | *Last Updated:* January 1, 2019.

8 | ScientificAmerican
2,735 - eBizMBA Rank | **3,300,000** - Estimated Unique Monthly Visitors | 2,525 - Compete Rank |
1,063 - Quantcast Rank | 4,618 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

9 | Nature
2,873 - eBizMBA Rank | **3,100,000** - Estimated Unique Monthly Visitors | 2,423 - Compete Rank |
3,268 - Quantcast Rank | 2,928 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

10 | PopSci
3,388 - eBizMBA Rank | **2,800,000** - Estimated Unique Monthly Visitors | 3,470 - Compete Rank |
1,063 - Quantcast Rank | 5,632 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

11 | SmithsonianMag
3,575 - eBizMBA Rank | **2,500,000** - Estimated Unique Monthly Visitors | 2,518 - Compete Rank |
741 - Quantcast Rank | 7,466 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

12 | TreeHugger
3,733 - eBizMBA Rank | **2,200,000** - Estimated Unique Monthly Visitors | 4,592 - Compete Rank |
1,099 - Quantcast Rank | 5,509 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

13 | NewScientist
5,350 - eBizMBA Rank | **1,100,000** - Estimated Unique Monthly Visitors | 7,087 - Compete Rank |
1,624 - Quantcast Rank | 7,339 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

14 | ScienceMag
7,637 - eBizMBA Rank | **900,000** - Estimated Unique Monthly Visitors | 6,442 - Compete Rank | 4,827
- Quantcast Rank | 11,643 - Alexa Rank | *Last Updated:* January 1, 2019.
The Most Popular Science Websites | eBizMBA

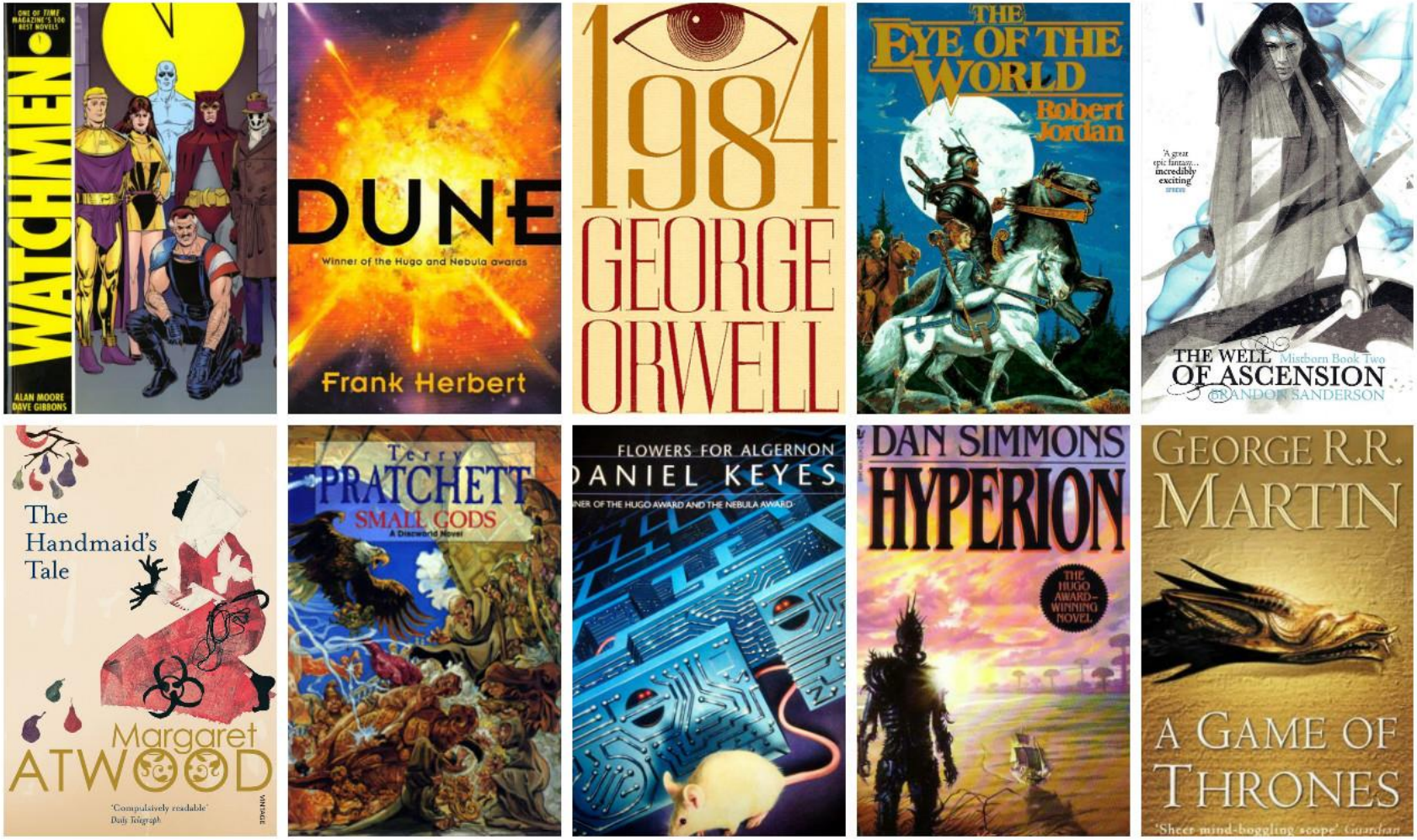
Recommended YouTube Channels

- Kurzgesagt—In a Nutshell
- 3Blue1Brown
- Physics Videos by Eugene Khutoryansky
- acapellascience
- The Science Asylum
- minutephysics
- TED-Ed
- PBS Space Time
- PBS Infinite Series
- Lectures by Walter Lewin. They will make you ♥ Physics.
- SciShow Space
- Vsauce
- Vsauce2
- Vsauce3
- Veritasium
- CrashCourse
- Numberphile
- SciShow

Online Courses / MOOCs

The Best MOOC Platforms of 2018

Rank	Site	Score
1	Coursera	8.8
2	edX	7.4
3	FutureLearn	6.4
4	Cognitive Class	5.6
5	iversity	3.4
6	Udacity	0.4

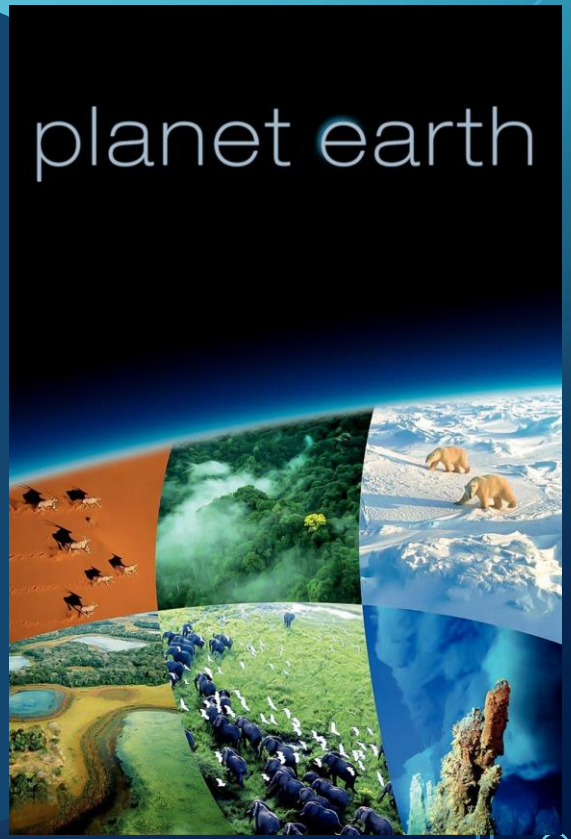

WATCHMEN
ONE OF TIME MAGAZINE'S 100 BEST NOVELS
ALAN MOORE
DAVE GIBBONS
DUNE
Winner of the Hugo and Nebula awards
Frank Herbert
1984
GEORGE ORWELL
THE EYE OF THE WORLD
Robert Jordan
'A great epic fantasy... incredibly exciting'
THE WELL OF ASCENSION
Mistborn Book Two
BRANDON SANDERSON
The Handmaid's Tale
Margaret ATWOOD
'Compulsively readable' Daily Telegraph
Terry PRATCHETT
SMALL GODS
A Discworld Novel
FLOWERS FOR ALGERNON
DANIEL KEYES
DAN SIMMONS
HYPERION
THE HUGO AWARD–WINNING NOVEL
GEORGE R.R. MARTIN
A GAME OF THRONES
'Sheer mind-boggling scope' Guardian


The New York Times Bestselling Novel
BATTLEFIELD EARTH
A SAGA OF THE YEAR 3000
21st CENTURY EDITION
Expanded Content
Author Interview
Author Notes
L. RON HUBBARD
THE LEGENDARY SF CLASSIC
LORD OF LIGHT
ROGER ZELAZNY
"TRICKY AND BRILLIANT AND HEARTFELT AND DANGEROUS."
—NEIL GAIMAN
ROBERT SILVERBERG
DYING INSIDE
"One of those rare novels that manages to be at once dazzling and tender." MICHAEL CHABON "[Dying] Inside is an artist's summit that doubles as an intimate allegory of the artist's quandary." JONATHAN LETHEM
THE PHENOMENAL GRAND MASTER OF SCIENCE FICTION
ASIMOV
HIS HUGO AND NEBULA AWARD–WINNING CLASSIC
THE GODS THEMSELVES
Science Fiction's Supreme Masterpiece
DUNE
FRANK HERBERT
Alfred Bester's
The Stars My Destination
"Considered by many to be the greatest single SF novel."
—Samuel R. Delany
THE CLASSIC BESTSELLER AND A LANDMARK OF 20TH-CENTURY LITERATURE
A CANTICLE FOR LEIBOWITZ
WALTER M. MILLER JR.
Author of Saint Leibowitz and the Wild Horse Woman
CITIES IN FLIGHT
James Blish
60TH ANNIVERSARY EDITION
FAHRENHEIT 451
RAY BRADBURY
WINNER OF THE HUGO AND NEBULA AWARDS
the dreaming jewels
THEODORE sturgeon


JANET ASIMOV
PSHRINKS ANONYMOUS
FANTASTIC VOYAGE
ISAAC ASIMOV
THE UGLY LITTLE BOY
The BEST MYSTERIES of ISAAC ASIMOV
ISAAC ASIMOV
FORWARD THE FOUNDATION
ROBOT DREAMS
ASIMOV
THE GODS THEMSELVES
ASIMOV
THE END OF ETERNITY
ISAAC ASIMOV
THE GODS THEMSELVES
ISAAC ASIMOV
NIGHTFALL AND OTHER STORIES
ISAAC ASIMOV
PEBBLE IN THE SKY
ISAAC ASIMOV
THE CURRENTS OF SPACE
ISAAC ASIMOV
THE STARS, LIKE DUST
THE BEST SCIENCE FICTION OF Isaac Asimov
Isaac Asimov
ISAAC ASIMOV
ISAAC ASIMOV
FANTASTIC VOYAGE
DESTINATION BRAIN
ASIMOV
I, ROBOT
ASIMOV
THE CAVES OF STEEL
ASIMOV
THE NAKED SUN
ISAAC ASIMOV
ROBOTS AND EMPIRE
ISAAC ASIMOV
THE WINDS OF CHANGE
ISAAC ASIMOV
THE BICENTENNIAL MAN
ISAAC ASIMOV
NINE TOMORROWS
ISAAC ASIMOV
THE MARTIAN WAY
ASIMOV
NEMESIS
ISAAC ASIMOV
THE EARLY ASIMOV
ISAAC ASIMOV
THE EARLY ASIMOV
ISAAC ASIMOV
THE END OF ETERNITY
ISAAC ASIMOV
THE EDGE OF TOMORROW
ASIMOV
AZAZEL
FANTASY STORIES
ISAAC ASIMOV & ROBERT SILVERBERG
NIGHTFALL
ISAAC ASIMOV
PRELUDE FOUNDATION
ISAAC ASIMOV
FOUNDATION AND EARTH

Recommended documentary shows/series

- Planet Earth (2006) & Planet Earth II (2016)
- Our Planet (2019)
- Blue Planet (2001) & Blue Planet II (2017)
- Cosmos (1980) & Cosmos (2014)
- Life (2009)
- Human Planet (2011)
- Frozen Planet (2011)
- One Strange Rock (2018)
- Mars (2016)
- When we left Earth: The NASA Missions (2008)
- Prophets of Science Fiction (2011)
- James Cameron’s story of Science Fiction (2018)



Recommended documentary films

- The Farthest (2017)
- For all Mankind (1989)
- Hubble 3D (2010)
- Terra (2015)
- Chasing Ice (2012)
- Chasing Coral (2017)
- Before the Flood (2016)
- Jane (2017)
- Mars: Inside SpaceX (2018)
- Apollo 11 (2019)

Recommended documentary shows

Recommended documentary shows


THE 100 ALL TIME BEST
SCI-FI
MOVIES


THE FUTURE BEGINS
STAR TREK
MAY 8


METROPOLIS
EIN FILM VON FRITZ LANG
BRIGITTE HELM GUSTAV FRÖHLICH
UFA FILM IM VERLEIH DER


METRO GOLDWYN MAYER presents
A GEORGE PAL PRODUCTION
H.G. WELLS'
THE TIME MACHINE
in Futuristic METROCOLOR
ROD TAYLOR
ALAN YOUNG · YVETTE MIMIEUX
SEBASTIAN CABOT · TOM HELMORE
Screen Play by DAVID DUNCAN · Based on the Novel by H. G. WELLS · Produced by GEORGE PAL


Solaris


CLOSE ENCOUNTERS
OF THE THIRD KIND


THIS ISLAND, EARTH
TWO MORTALS TRAPPED IN OUTER SPACE...CHALLENGING THE UNEARTHLY FURIES OF AN OUTLAW PLANET GONE MAD!
TECHNICOLOR


TWO YEARS IN THE MAKING!
DESTINATION MOON
COLOR BY TECHNICOLOR


An epic drama of adventure and exploration
2001: a space odyssey

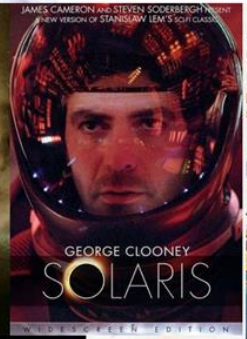

STAR WARS


FORBIDDEN PLANET


First Spaceship on Venus


WORLD Without END


LORD OF THE RINGS
THE FELLOWSHIP OF THE RING

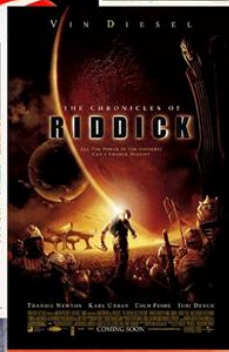

JAMES CAMERON AND STEVEN SODERBERGH PRESENT
A NEW VERSION OF STANISLAW LEM'S SCIFI CLASSIC
GEORGE CLOONEY
SOLARIS
WIDESCREEN EDITION


A SPECTACLE OF THE WORLD OF TOMORROW!
Fantastic sights to stagger the imagination!
BEYOND THE TIME BARRIER
ROBERT CLARKE · DARLENE TOMPKINS
ARTHUR C. PIERCE · ROBERT CLARKE · EDGAR C. ULMER


SAM ROCKWELL
MOON

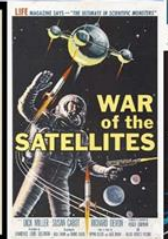

WELCOME TO THE 23RD CENTURY.
The perfect world of total pleasure.
LOGAN'S RUN


THE EARTH IS SCOURGED BY FLOODS, EARTHQUAKES AND DISASTERS...
WAR BETWEEN THE PLANETS
JACK STUART


VIN DIESEL
THE CHRONICLES OF
RIDDICK
COMING SOON


FROM THE DIRECTOR OF "TITANIC"
AVATAR


H·G·WELLS'
The War of the Worlds
COLOR BY TECHNICOLOR


LIFE
WAR of the SATELLITES


CLOSE ENCOUNTERS


NATURAL OR SUPERNATURAL?
HOWARD HAWKS'
THE THING
from another world


WHEN WORLDS COLLIDE
PLANETS DESTROY EARTH!
COLOR BY TECHNICOLOR


MATRIX


FROM OUT OF SPACE..... A WARNING AND AN ULTIMATUM!
THE DAY THE EARTH STOOD STILL


BODY SNATCHER

Wanderers (4 min) / Carl Sagan

Part 6: Final Quizzes & RPG Exercise!

Kahoot! Quiz #4: Catch the Pseudoscience!

Catch the Pseudoscience!

- 12 questions
- 10 min

Kahoot! Quiz #5: More Space!

Space!

- 20 questions
- 15 min

Kahoot! Quiz #6: General Knowledge: Science

General Knoledge: Science

- 8 questions
- 8 min

The Most Astounding Fact / Neil deGrasse Tyson (4 min)

Group exercise!

- Start counting from 1 to 4 and split into 4 groups

Question A: Is the Earth flat?

- Team 1: Yes (Pro arguments)
- Team 2: No (Cons)

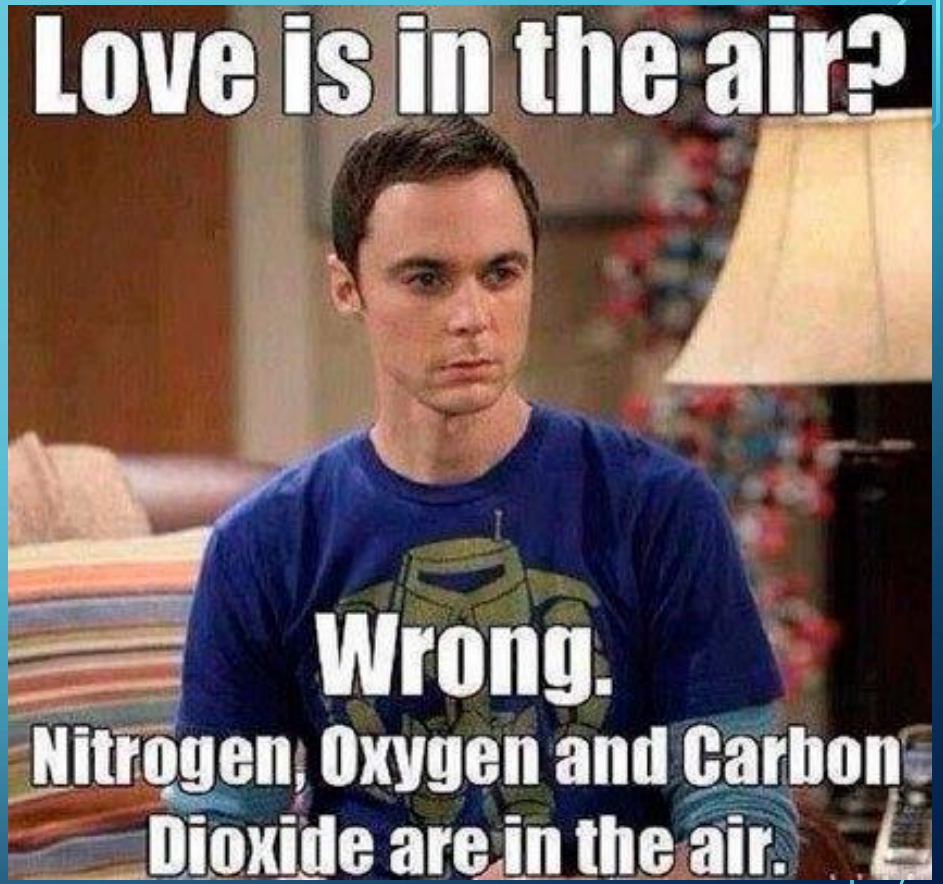
Question B: Are we alone in the Universe?

- Team 3: Yes (arguments)
- Team 4: No (arguments)
    - Send your group representatives: DEBATE TIME!

Part 7: Food for thought & Conclusions

Memes!

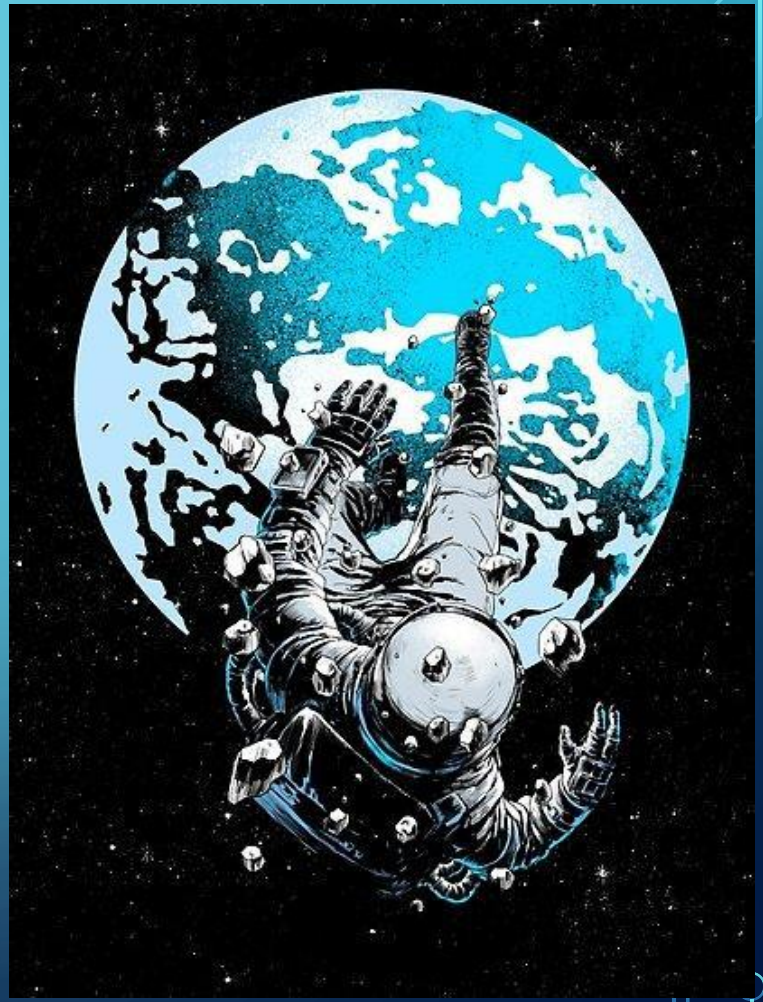

I HAVE NO IDEA WHAT I'M DOING


Love is in the air?
Wrong.
Nitrogen, Oxygen and Carbon Dioxide are in the air.

Richard Feynman - Beauty (5 min)

The post-modern life

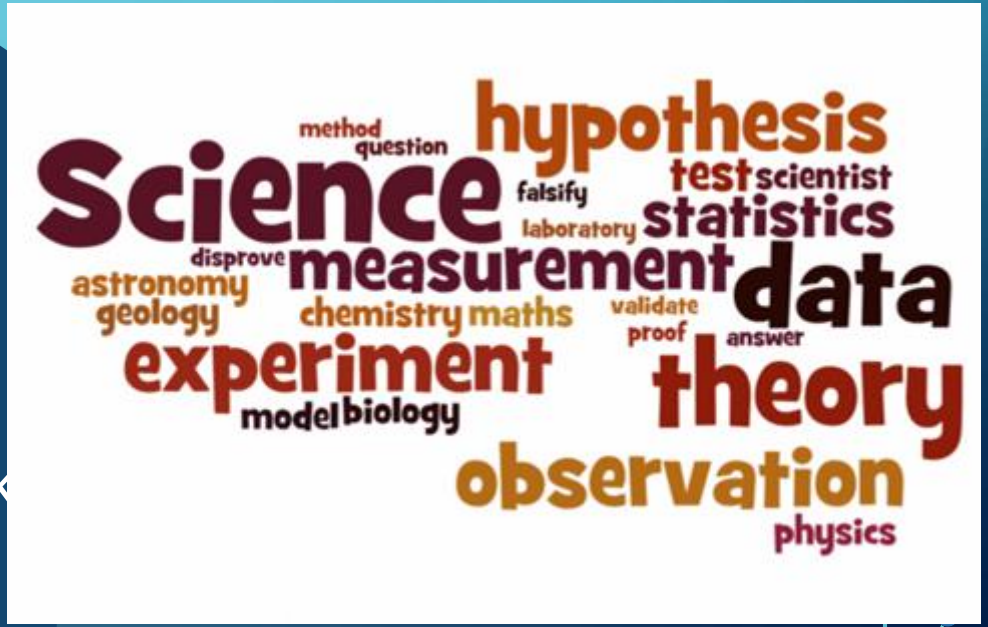
- Big Data / A flood of data
- Unlimited information at your fingertips
- The illusion of knowledge
- Fact vs Fiction: a blurry line in the age of Internet
- So many options! I’m tired & confused...



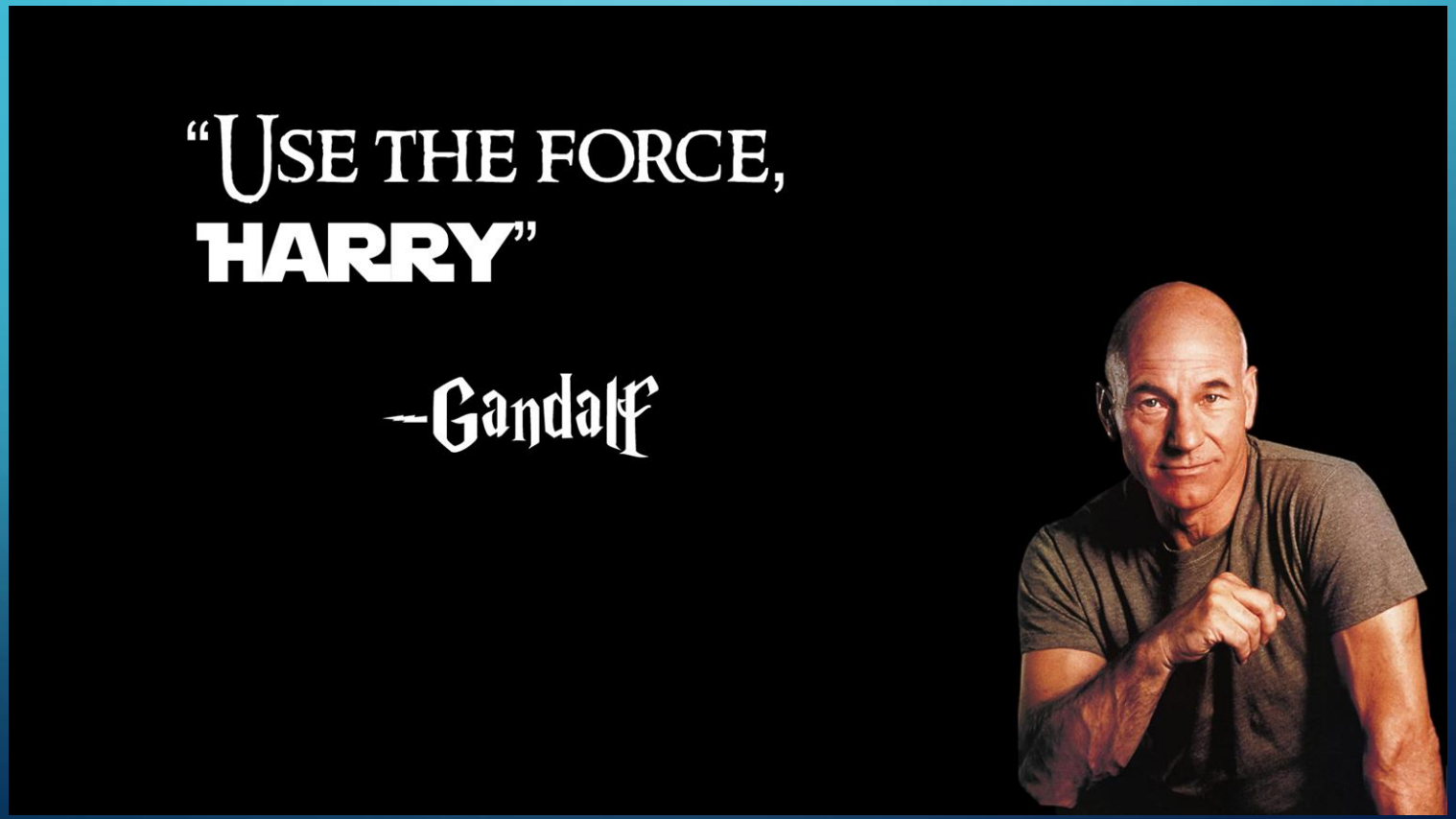
How to train your (dragon) brain!?

- Digital Literacy & Scientific Literacy in the Age of Big Data

- Acquire a Critical/Sceptical/ Scientific Mindset
- Develop a scientific language and interpretation skills
- Fact-check! Fact-check
- Check your sources!
- Fact-check again!



The internet is full of wonders

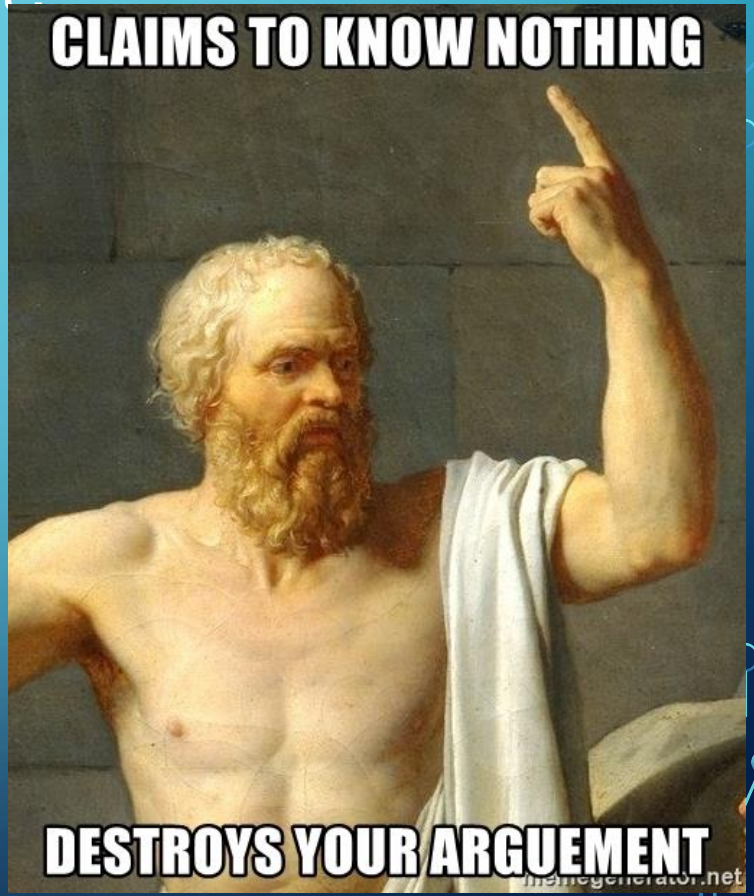


Advice & Tips for your (professional) future

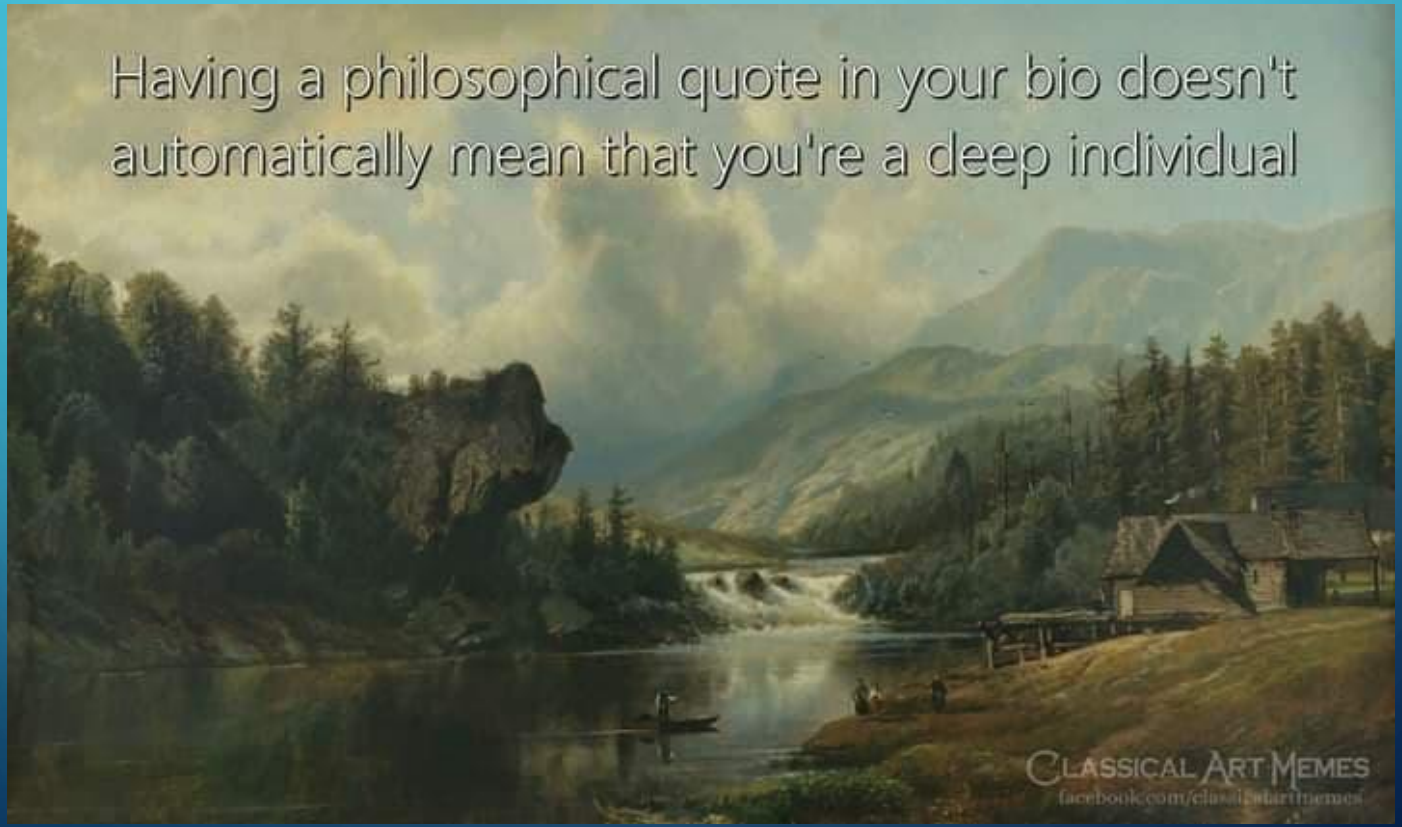
- AI & the learning process
- Unlearning & New learning skills
- You can never stop learning!
- Embrace change! And get used to it!
- Doubt, scepticism & the scientific method: Apply them in your daily lives, on your brain's innerworkings
- Intuition vs. Emotional traps: "It feels right, so it must be true"
- Role of emotional intelligence
- Inconvenient & Uncomfortable "truths"
- Pick your sources wisely: transferring trust and authority to other trustworthy people/sources.

Why is Philosophy Important?

- Philosophy of Science!



Insert Inspirational/Philosophical Quote here

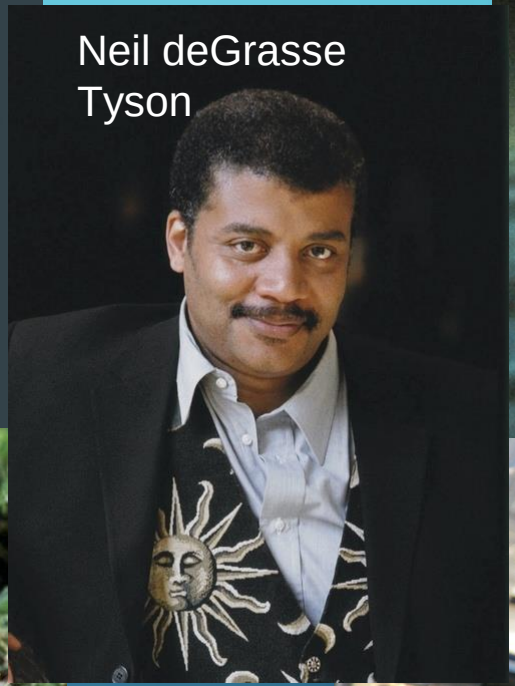


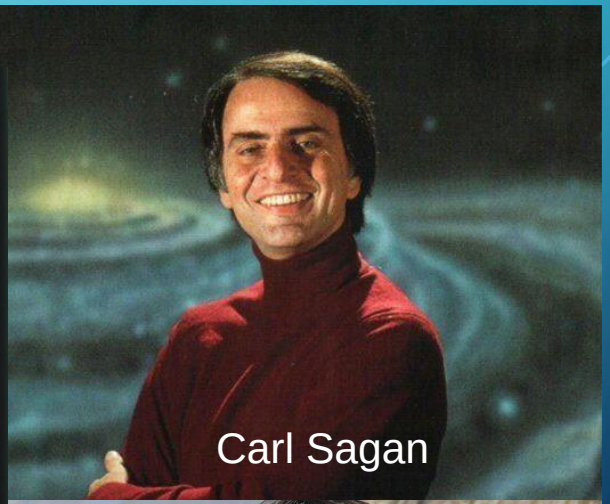

"The Comfort Zone"
Find purpose
Deal with challenges and problem
Live dreams
Lack of self-confidence
COMFORT ZONE
Feel safe and in control
FEAR ZONE
Find excuses
Be affected by others' opinions
LEARNING ZONE
Acquire new skills
GROWTH ZONE
Set new goals
Extend your comfort zone
Conquer objectives

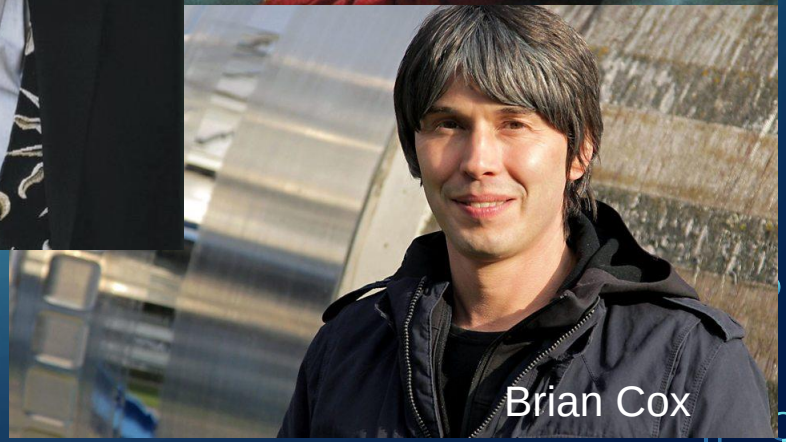
Head up in the sky / Feet on the ground

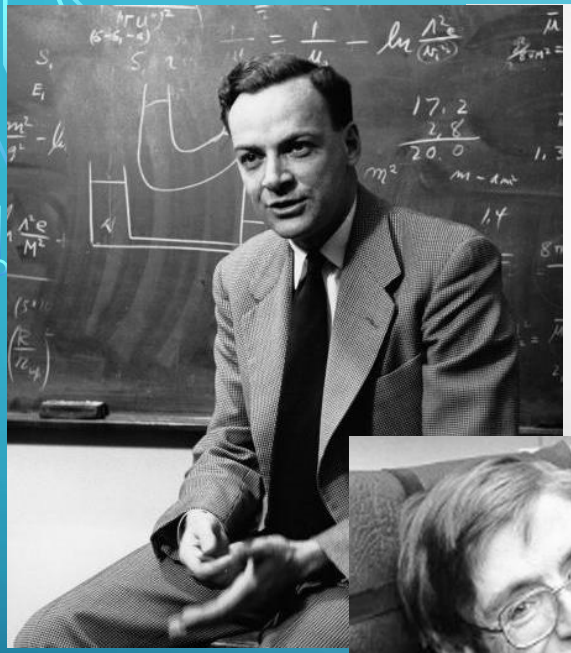
- Be ambitious & Dream big - set the bar high!
- Keep learning, searching, exploring.
- Don’t be afraid to speak your mind!
- Listen to everyone, but draw your own conclusions!
- Always check the source(s) & make fact-checking a habit!
- Get out of your comfort zone and face your fears!
- Work smarter, not harder!
- Stay in school & do your homework!
- Enjoy your youth!

Choose your Science Communicators wisely!



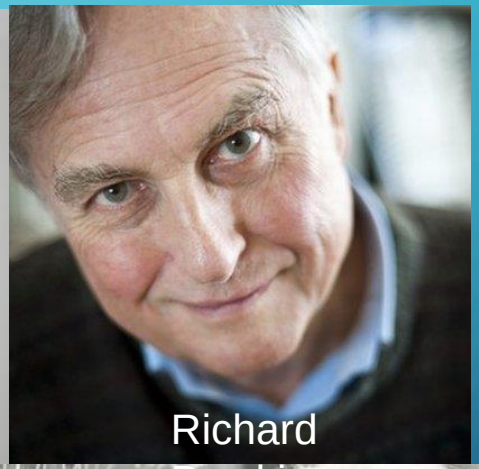




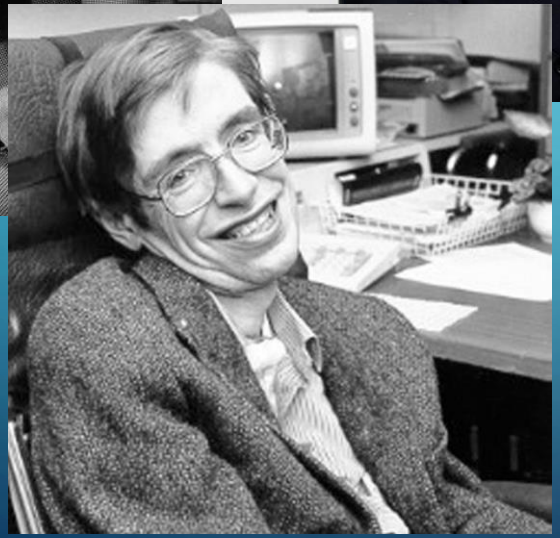


Richard Feynman

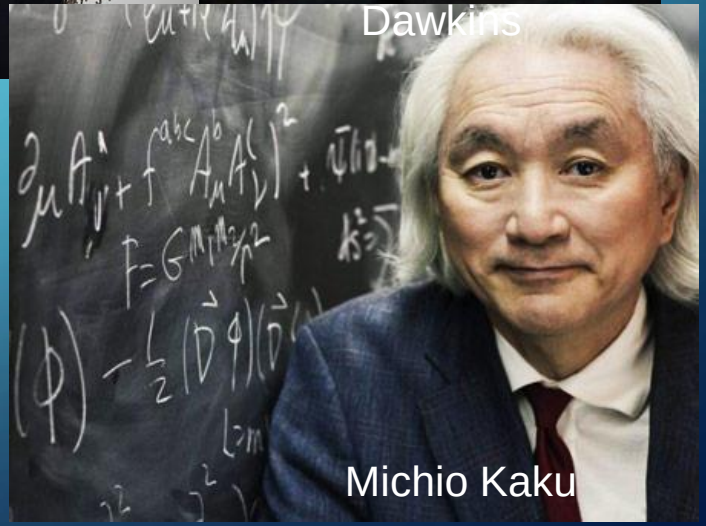
Brian Greene



Richard Dawkins



Stephen Hawking

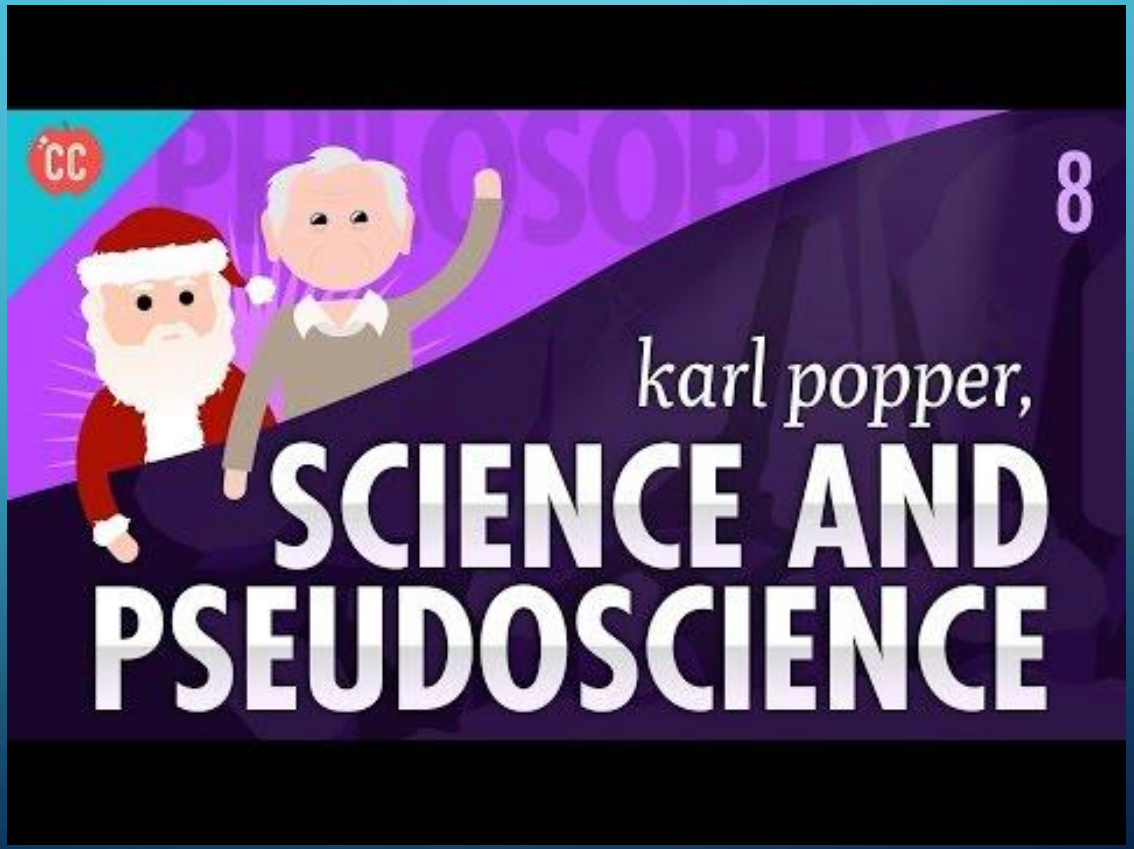


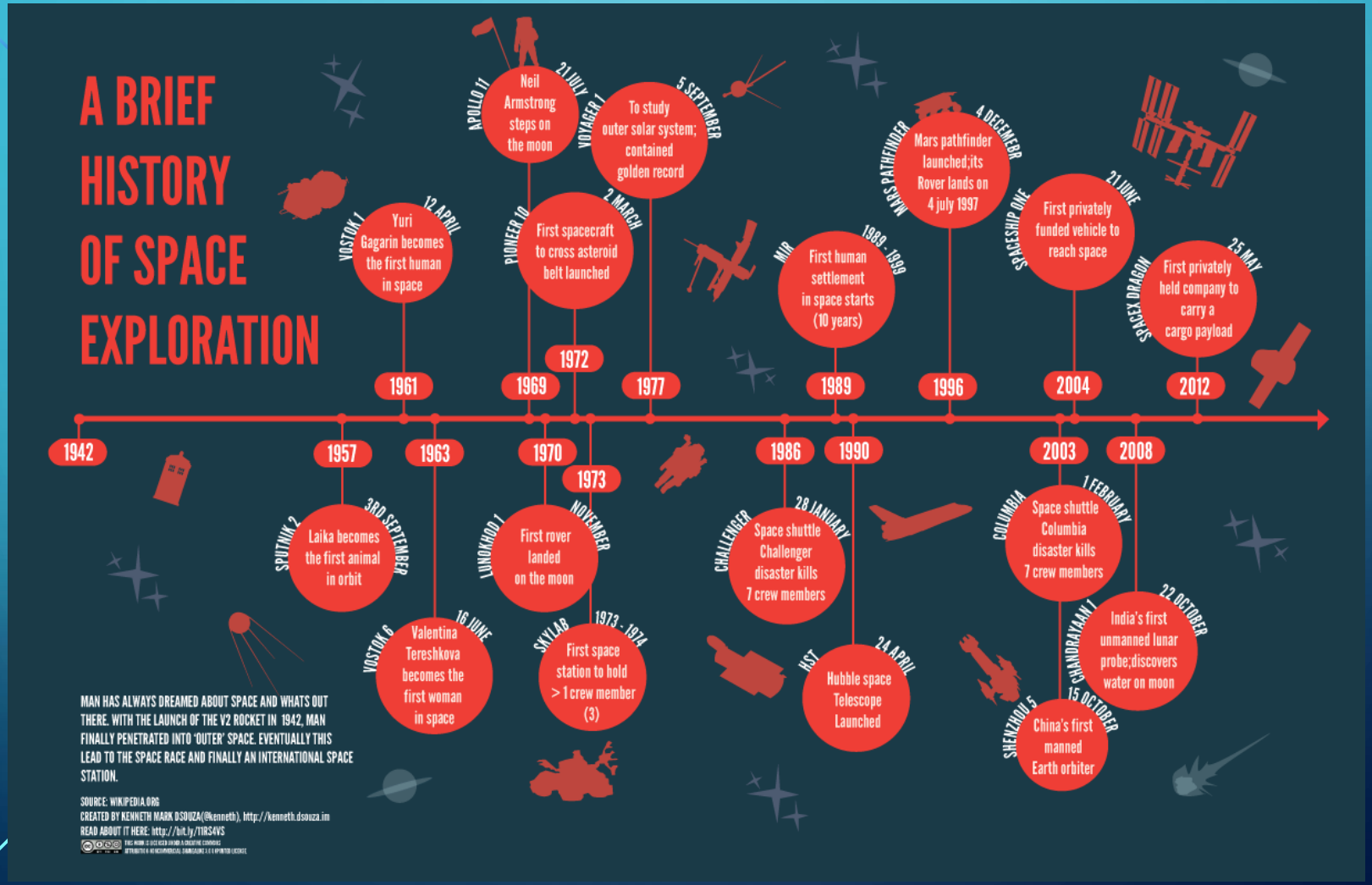
Michio Kaku

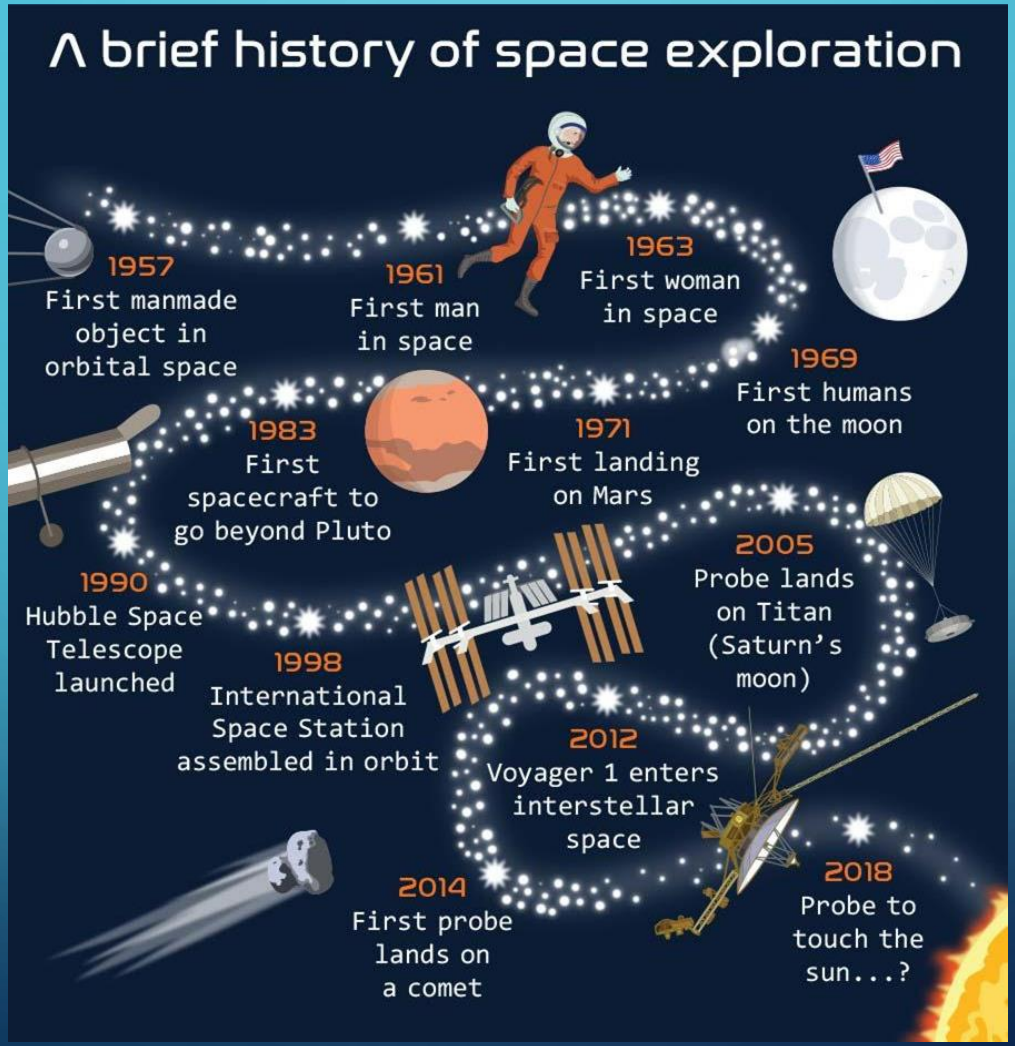
Read & watch Detective Stories!

Bonus / If there's time left...

Karl Popper, Science and Pseudoscience (9 min)



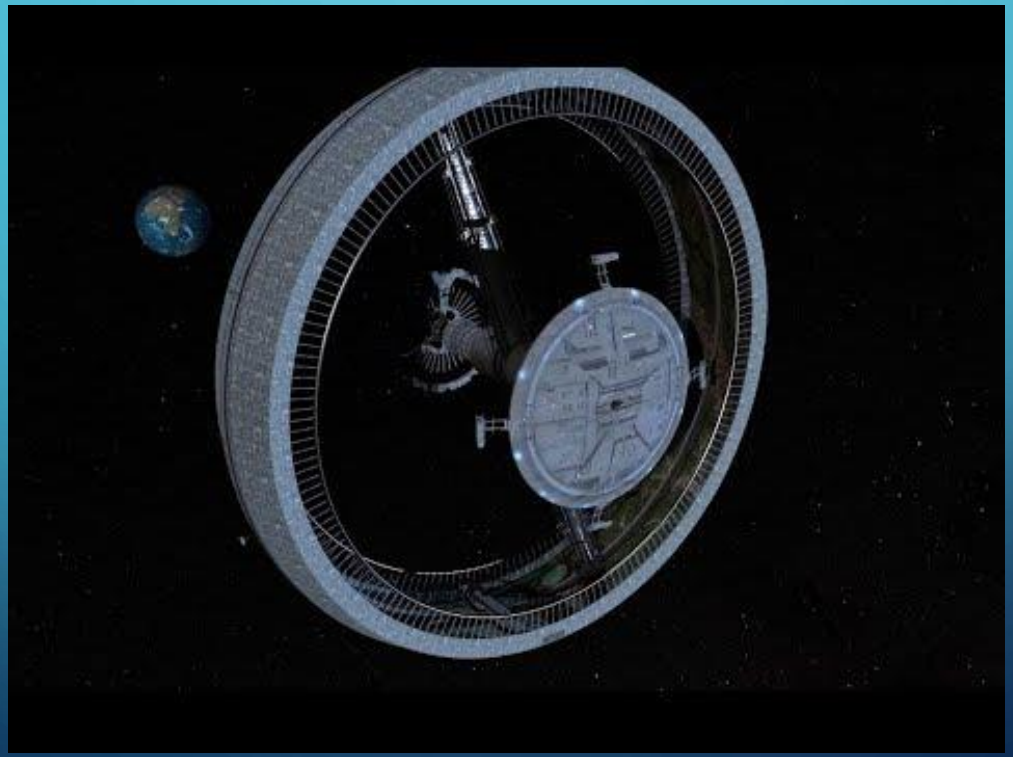

A BRIEF HISTORY OF SPACE EXPLORATION
1942
1957
SPUTNIK 2
3RD SEPTEMBER
Laika becomes the first animal in orbit
1961
VOSTOK 1
12 APRIL
Yuri Gagarin becomes the first human in space
1963
VOSTOK 6
16 JUNE
Valentina Tereshkova becomes the first woman in space
1969
APOLLO 11
21 JULY
Neil Armstrong steps on the moon
1970
LUNOKHOD 1
NOVEMBER
First rover landed on the moon
1972
PIONEER 10
2 MARCH
First spacecraft to cross asteroid belt launched
1973
SKYLAB
1973 - 1974
First space station to hold > 1 crew member (3)
1977
VOYAGER 1
5 SEPTEMBER
To study outer solar system; contained golden record
1986
CHALLENGER
28 JANUARY
Space shuttle Challenger disaster kills 7 crew members
1989
MIR
1989 - 1999
First human settlement in space starts (10 years)
1990
HST
24 APRIL
Hubble space Telescope Launched
1996
MARS PATHFINDER
4 DECEMBER
Mars pathfinder launched;its Rover lands on 4 july 1997
2003
COLUMBIA
1 FEBRUARY
Space shuttle Columbia disaster kills 7 crew members
2004
SPACESHIP ONE
21 JUNE
First privately funded vehicle to reach space
2008
CHANDRAYAAN 1
22 OCTOBER
India's first unmanned lunar probe;discovers water on moon
SHENZHOU 5
15 OCTOBER
China's first manned Earth orbiter
2012
SPACEX DRAGON
25 MAY
First privately held company to carry a cargo payload
MAN HAS ALWAYS DREAMED ABOUT SPACE AND WHATS OUT THERE. WITH THE LAUNCH OF THE V2 ROCKET IN 1942, MAN FINALLY PENETRATED INTO 'OUTER' SPACE. EVENTUALLY THIS LEAD TO THE SPACE RACE AND FINALLY AN INTERNATIONAL SPACE STATION.
SOURCE: WIKIPEDIA.ORG
CREATED BY KENNETH MARK DSOUZA(@kenneth), http://kenneth.dsouza.im
READ ABOUT IT HERE: http://bit.ly/TIRS4VS


A brief history of space exploration
1957
First manmade object in orbital space
1961
First man in space
1963
First woman in space
1969
First humans on the moon
1971
First landing on Mars
1983
First spacecraft to go beyond Pluto
1990
Hubble Space Telescope launched
1998
International Space Station assembled in orbit
2005
Probe lands on Titan (Saturn's moon)
2012
Voyager 1 enters interstellar space
2014
First probe lands on a comet
2018
Probe to touch the sun...?

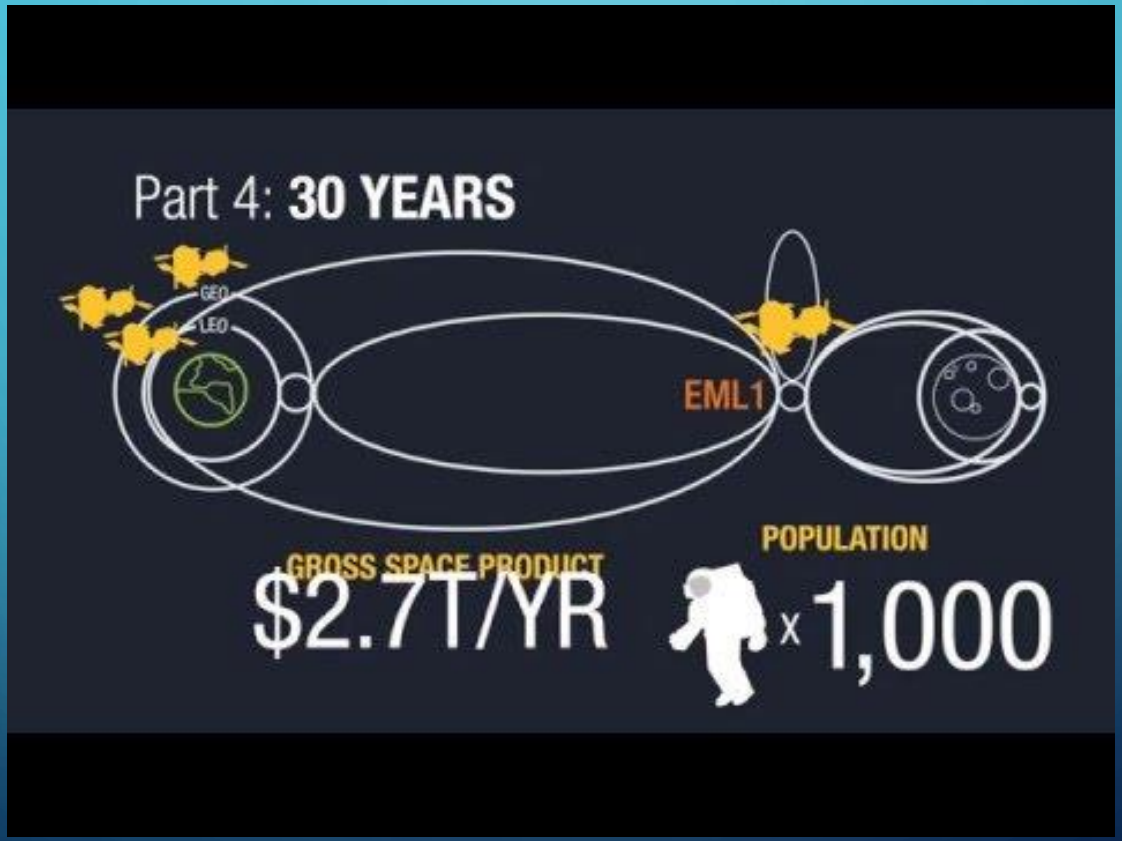
“First Man” (2018) - Moon Landing scene (5 min)

United Launch Alliance - CisLunar:

A Vision for a Self-Sustaining Space Economy (2 min)



ULA CisLunar-1000 (7 min)



Timelapse of the Future: A Journey to the End of Time (30 min)

Kahoot! Quiz #7: Science Review: Earth & Space

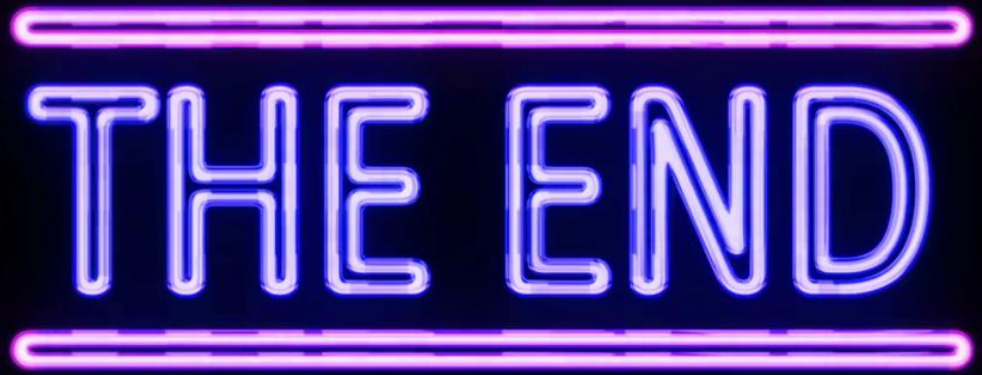
Earth & Space

- 20 questions
- 20 min
- Bonus

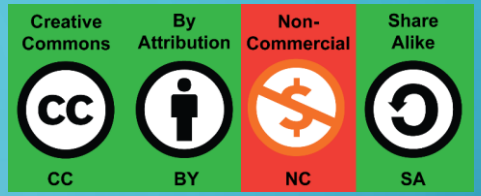
ExoEconomics / Space Economics

Space Economy 2.0 - Posters
Space Economy of the 2040s - Presentation


That's all Folks!


THE END

DISCLAIMER



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